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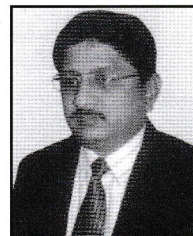
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Editorial



The Union Budget 2010 - 11 has just been placed in Parliament a few days back. Most members are eager to know the various implications of this budget. This issue has, therefore, been dedicated as a Budget Special Issue wherein we have tried in a few pages to cover the various recommendations of the budget. We hope members will find the analysis of the budget very helpful.

Putting too much emphasis on our busyness has become a way of life, almost a knee jerk reaction. In fact, I'd guess that one of the most common responses to the greeting "How are you doing?" has become "I'm so busy" As I write about this, I have to admit, that, at times, I'm as guilty of this tendency as anyone else. However, I've noticed that as I've become more conscious of it. I'm putting less and less emphasis on my own busyness - and I'm feeling a whole lot better as a result.

When we talk about our busyness it continues to make us stressed.

It's almost as though we become more comfortable after conforming to others that, we too, are busy.

The truth is that most of us are really busy. Also, many people feel that they have to be busy or they have no value in our society. Some people are even competitive about how busy they are.

As we work with volunteers, we are looking for those individuals who are not so busy. Where are those people?

But the most interesting part of it all is that those individuals who are busy and successful are the ones who have time to spare. They can easily juggle so many things and still come up with new ideas at every meeting.

Does being busy thus make you more creative? Probably stress makes one alert. It keeps us going and it keeps us alive. Creative stress is what the leadership gurus call it.

When you read the stories of all those beautiful people- the rich and famous- we find that in spite of running huge business empires, attending high powered meetings they still have time for all the social do's, celebrations and even can take out time for a holiday. How do these successful people manage their busyness?

Being organized can be one answer. Prioritizing can be another solution. Another thing that I have noticed in these successful people is that when they are in a meeting they are 100% there. And the most striking feature is that their mobile phones never ring.

What we need to do is to be focused on the job at hand. Doing one thing at a time and doing it in totality can reduce our work load. Taking instant action also frees one from items being added to the pending list. The shorter the pending list the less is the anxiety.

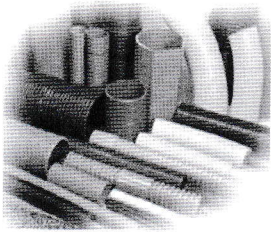
Probably, we need to go back to the categorization into important and urgent, important and not urgent and then the not important and not urgent.

Use these simple tools to stay away from these self created stress related ailments and lead a healthy life.

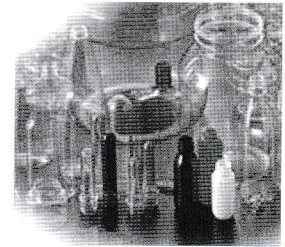
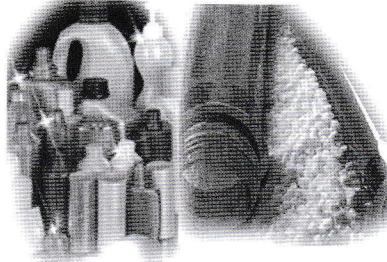
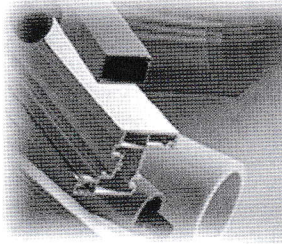


Pradip Nayyar

Editor

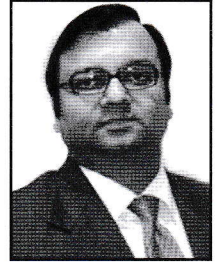


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PRESIDENTIAL ADDRESS



Dear Members,

The elephant has been synonymous with India from time immemorial, through history, mythology and belief. For decades, the Indian economy, too, came to be likened to an elephant, but in a pejorative, lumbering sense. Today, as the balance of global power shifts to the East, and India is regarded with awe for weathering the financial storm better than most, the elephant analogy is back but with the positive attributes of size, stability, solidity and strength. With our economy projected to become the second largest in the world, after China and ahead of even the US, there is a growing sense that we are riding a quiet but powerful giant, one that needs to be taken care of if we want it to travel far and carry over a billion people on its back. Just as the elephant-god is worshipped by millions as remover of obstacles and bearer of good fortune, our Budgets are awaited with a prayer that they will lead us to a better tomorrow. Will this Budget make a difference to our lives, will it help the elephant dance.

TIME TO SHINE.....

The finance minister Pranab Mukherjee said the budget cannot be a mere statement of accounts. Budget 2010 went a step forward and laid out a plan for the next two years to bring down fiscal deficit to 4.1 per cent from 5.5 per cent now.

There have been no large increases in taxes — direct or indirect and the government's focus on infrastructure and rural development has been retained. The reiteration for the direct tax code (DTC) and goods and service tax (GST) implementation from April 2011 is a very positive step.

The revision of income tax slabs for individuals will leave more disposable income with households. On the corporate tax front, though there has been an increase in the MAT rate, surcharge has been cut. Some rollback of the stimulus package has been proposed through selective hikes in excise/import duties, but this is in line with market expectations.

The budget has given a much-needed direction to the market from a short-term perspective and has also stuck to long-term growth plans laid out earlier. The main triggers from the budget were controlled fiscal deficit and rolling out targets for the next couple of years.

Relaxation in personal tax is going to have a positive impact on the overall economy.

The rural economy was also taken into consideration while formulating the policies and this will have a long-lasting impact on the economy.

As expected, stimulus rolled back was also gradual, which will allow the economy to adjust to the global economic scenario over a period of time.

Implementation of GST and DTC from April 2011 will boost the confidence of the global investor. Easing rules on FDI investment will be a positive for the retail and insurance sectors.

The thrust on divestment will help to control fiscal deficit. New banking licenses to be given are a positive surprise. The budget will have an overall positive impact on consumption sectors such as retail, auto, and FMCG.

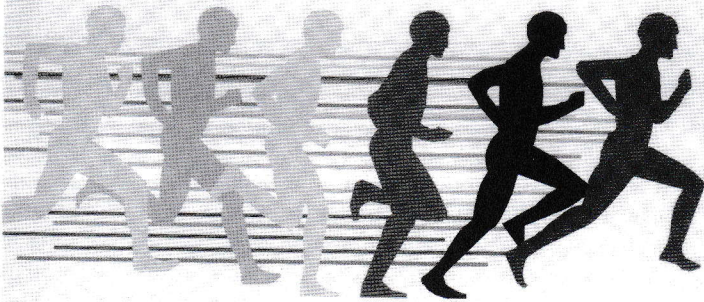
The changes will benefit infrastructure, realty and banking.

Haldia Petrochemicals Ltd (HPL) will get a new executive head shortly with a committee of directors being entrusted the responsibility of finding a replacement for Swapan Kumar Bhowmik, currently holding the MD's position.

With the course set by our Finance Minister through his Budget Statement, the Plastics Industry can look forward to an increased growth in this Year.

Sourabh Khemani
President

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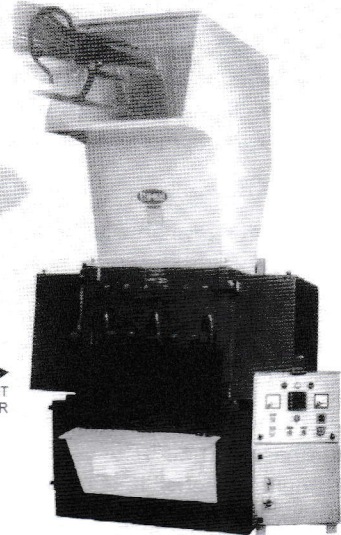
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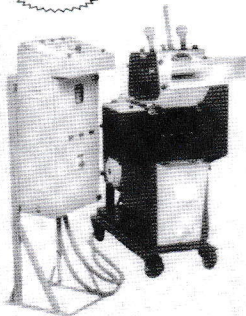


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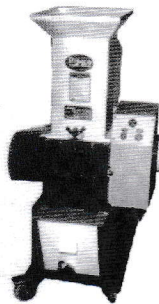


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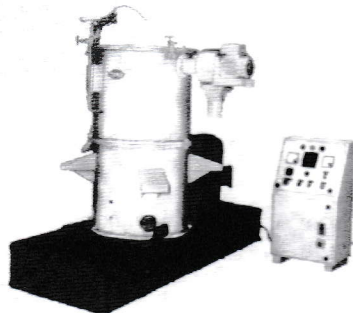
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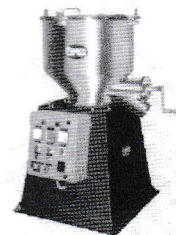
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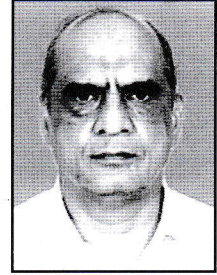
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From the Desk of

The Hony. Secretary



Dear Members,

The financial year 2009 – 10 will come to a close within a few days. For most members who depend on the domestic market the year may not have been bad. The expansion of Haldia Petrochemicals Limited (HPL) and new petrochemicals projects in the pipeline being undertaken by Indian Oil Corp. Ltd. And GAIL India Ltd indicates that the future of the polymer industry is very bright.

Keen interest has been shown by several municipalities for development of roads using plastic waste mixed with bitumen. Negotiations are going on with Ashokenagar, Chandernagore and Bidhannagar municipalities. In all likelihood in the month of March some work on road construction will be done in these municipalities. Indian Plastics Federation (IPF) has already written to Indian Centre for Plastics in the Environment (ICPE) to send their Sr. Technical Manager to Kolkata for providing necessary technical assistance for construction of these roads.

Efforts are also being made to promote source segregation and recycling in association with recognized NGOs. IPF has written to the West Bengal Pollution Control Board (WBPCB) and Department of Environment, Govt. of West Bengal seeking their support and cooperation in promoting our effort.

Our computerized Register of Members is being periodically updated by deletion of names of outstanding members who have not paid their membership dues for three years. Letters have been sent to defaulting members in this regard. I would request every member to kindly use their contacts to see that every member pays his annual subscription and new members are added. Our Federation has surrendered the old office at 13A, Govt. Place (East), Kolkata - 700 069.

With best wishes,

A handwritten signature in black ink, appearing to read 'R. Poddar'.

Ramawatar Poddar
Hony. Secretary

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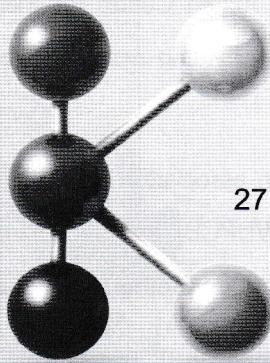


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Response Form

UNION BUDGET 2010-11

Compiled by Shri Sourabh Khemani

The Indian Finance Minister (FM), Mr. Pranab Mukherjee, presented the Budget for the year 2010-11 and the Finance Bill 2010 (Bill) in the Indian Parliament on 26 February 2010 against the backdrop of strong economic indicators provided by the Economic Survey for the year 2009-10. The FM set out three main objectives for this budget: (i) to quickly revert to the high GDP growth path of 9% and then move on to cross the "double digit growth barrier"; (ii) to harness the economic growth to consolidate the recent gains in making development more inclusive; and (iii) to address the weakness in government systems, structures and institutions at different levels of governance. It is commendable that the FM has taken up the challenge to improve the government's public delivery mechanisms and bring a quantum improvement in the delivery of justice.

The FM has reiterated the commitment towards tax reforms promised in his previous budget, and to put in place the new Direct Tax Code (DTC) by 1 April 2011, after taking into consideration various comments and suggestions received by the Government. He has also committed to introduce the Goods & Services Taxes from 1 April 2011.

In the backdrop of comfortable economic indicators, the FM has proposed a gradual withdrawal of the stimulus package by increasing the excise duty from 8% to 10% and introducing certain other indirect tax measures including substantial widening of the tax net on services. Supply of electricity from SEZ units to the domestic tariff area and non processing area of SEZ would now attract customs duty.

On the direct tax front, there are fewer changes. The FM has attempted to leave a larger disposable income in the hands of lower and middle income groups to combat the inflation in food prices, by raising the threshold taxable income from INR 150,000 to 160,000. The slabs for tax rates of 10% and 20% have been widened and the highest tax rate of 30% has been made applicable only to annual income above INR 800,000 as opposed to the previous threshold of INR 500,000. There is no change in the corporate income tax rate of 30%. While the surcharge on domestic companies has been reduced from 10% to 7.5%, the minimum alternative tax has been increased from 15% to 18%. Conversion of private and unlisted public companies into Limited Liability Partnerships (LLPs) will be tax neutral. The scope of anti-avoidance provisions has been increased by imposing tax on companies receiving assets without consideration or at a consideration which is less than market value.

Overall, the thrust of the budget seems to be on the development of the infrastructure, education, improvement in tax administration and gradual removal of the stimulus package to create an overall conducive environment for a thriving economy. However, increase in the customs duty on petroleum products could potentially have an inflationary effect.

At a glance

Income tax

- Basic exemption limit and income tax rates for individuals remain unchanged. Income slab limits have been widened.
- Basic rates of corporate tax remain unchanged for both domestic and foreign companies.
- Surcharge on domestic companies reduced from 10% to 7.5%.
- MAT rate increased from 15% to 18% (plus applicable surcharge and education cess) of book profits.
- Place of rendering services not relevant for determining the taxability of the income of a non resident by way of interest, royalty or fees for technical services.
- Deduction for payments to residents on which taxes are withheld will be allowed if taxes are paid before the due date of filing the tax return.
- Royalty and fees for technical services excluded from presumptive taxation in case of non-residents having a permanent establishment in India for certain businesses.
- Threshold limit of turnover for tax audit in case of business increased from INR 4 million to INR 6 million.
- Threshold limit of turnover for tax audit in case of profession increased from INR 1 million to INR 1.5 million.
- Threshold limit of turnover for computing profits and gains of business (other than business of plying, hiring or leasing goods carriages) on presumptive basis increased from INR 4 million to INR 6 million.
- In order to qualify for deductions for capital expenditure, the condition for proportion of pipelines to be made available for use on common carrier basis would need to be as per the regulations prescribed by PNGRB.
- Capital linked incentive deduction to be allowed to taxpayers engaged in building and operating new hotels in India of two star or above category.
- Weighted deductions for scientific research expenditure enhanced.

- Period for completion of housing projects approved on or after 1 April 2005 extended from 4 years to 5 years for availing incentive deduction for developing and building housing projects.
- Norms for built up area of shops and other commercial establishments included in eligible housing projects relaxed.
- Extension of time limit for commencement of operations of hotel or construction of convention centre in the NCT and other specified areas extended from 31 March 2010 to 31 July 2010.
- Method of computation of profits eligible for tax holiday in case of SEZ undertakings streamlined retrospectively.
- Transfer of immovable property for an inadequate consideration, by an individual or HUF, will not be taxable.
- Property received by an individual or HUF will be taxable only if it is in the nature of a capital asset in the hands of the recipient.
- Transfer of shares to a firm or a company (in which public is not substantially interested) for an inadequate or nil consideration, will now be taxable in the hands of recipient.
- Additional deduction of INR 20,000 for individuals and HUFs for investments in Central Government notified long term infrastructure bonds.
- Contribution by individuals to Central Government Health Scheme will be eligible for deduction.
- Tax neutrality (except non availability of MAT credit) on conversion of small private company or an unlisted company into LLP subject to satisfaction of stipulated conditions.
- Time limit for issue of notification to give effect to the scheme for centralized processing of returns by the Government extended to 31 March 2011.
- Maximum penalty for failure to get accounts tax audited increased from INR 100,000 to INR 150,000.
- Threshold limit of payments for applying withholding tax provisions has been raised.
- Interest on delay in payment of taxes withheld

increased to 1.5% per month.

- Certificate for taxes withheld/ collected to be furnished even after 1 April 2010.
- Assessment/ reassessment proceedings initiated on account of search and requisition of books, assets, etc to come under the purview of Settlement Commission in case the additional tax payable on income disclosed in the application exceeds INR 5 million.
- The time limit for passing an order by the Settlement Commission in case of applications filed on or after 1 June 2010 extended to 18 months (earlier 12 months) from the end of the month in which the application is filed.
- High Court empowered to condone delay for sufficient cause in filing of appeals/ reference application.
- In computing the taxable income for non life insurance companies, only realized profit or loss on investments to be included.
- Revenue authorities to allot and quote DIN for every notice, letter, order or correspondence on or after 1 July 2011.
- Exemption of income of approved research associations engaged in social science research or statistical research.
- Commissioner has been granted powers to cancel the registration obtained prior to 1 April 1996 by a trust or institution engaged in charitable activities.

Customs duty

- No change in the peak rate of BCD.
- Retrospective withdrawal of exemption with effect from 26 June 2009 leading to levy of customs duty of 16% on supply of electrical energy from SEZ to DTA and to non processing areas of SEZ.
- Project Imports status granted to certain specified projects with concessional BCD at 5%.
- Relaxations granted in relation to Settlement Commission procedures.

Excise duty

- Partial rollback of fiscal stimulus. Peak excise duty

rate for most non petroleum products from 8% to 10%.

- Provisions and procedures related to claiming refund of unutilised Cenvat credits used in relation to exported goods rationalised. Rationalisation to be effective from 14 March 2006.
- Clean energy cess will be imposed on coal, lignite and peat produced in India from a notified date.
- Relaxations granted in relation to Settlement Commission procedures.

Service tax

- No change in effective service tax rate of 10.3%.
- Service tax extended to various services including permitting use of copyrights relating to cinematographic films and sound recording, promotion of brands, health services undertaken for employees of business entities and services provided by Electricity Exchanges.
- Renting of immovable property, any service in relation to renting and use of vacant land for future construction to attract service tax from 1 June 2007.
- Amounts received from buyer prior to grant of completion certificate deemed to be construction service rendered by builder to buyer.
- Ambit of taxable IT services extended to include IT services provided for non commercial purposes.
- Sponsorship of sports to attract service tax.
- Definition of "India" for service tax to cover construction and operation of installations, structures and vessels for the purpose of prospecting, extracting or production of mineral oils and natural gas in the Continental Shelf and Exclusive Economic Zone of India.
- Condition of "service provided from India and used outside India" to qualify as export deleted. Performance based criteria for determining export of services by chartered accountant, cost accountant changed to "location of service recipient".
- Exemption from service tax to packaged or canned software intended for single use, where excise duty or customs duty has been paid on entire amount received from buyer.

- Procedures outlined and provisions amended to simplify refund of service tax for exporters.
- No penalty imposed where service tax along with interest has been paid before issuance of notice.

Sales tax

- No change in the present CST rate of 2%.
- GST proposed to be implemented with effect from 1 April 2011.

Key performance

Indicators

The Economic Survey 2009-10 reports the estimated GDP growth for this year at 7.2% as against 6.7% in 2008-09. The continued recession in the developed world, for the better part of 2009-10, meant a sluggish export recovery and a slowdown in financial flows into the economy. Yet, over the span of the year, the economy posted a remarkable recovery, not only in terms of overall growth figures but, more importantly, in terms of certain fundamentals, which justify optimism for the Indian economy in the medium to long term.

Agriculture and allied sector: The sector is estimated to have registered a negative growth of 0.2% in 2009-10 as against a growth of 1.6% in 2008-09 as a consequence of sub-normal monsoons.

Industry : The growth of the industrial sector has accelerated in the current year. The index of industrial production for 2009-10 points towards a sharp upward trend with an estimated growth of 8.2% as against 3.9% in 2008-09. The manufacturing sector registered a growth of 8.9% in 2009-10 as against a growth of 3.2% in 2008-09. Mining registered a growth of 8.7% in 2009-10 as against a growth of 1.6% in 2008-09 while electricity registered a growth of 8.2% in 2009-10 as against a growth of 3.9% in 2008-09.

Services : The growth in the sector has been mixed. Trade, hotels, restaurants, transport and communication (together) reported a growth at 8.3% in 2009-10. Construction services registered a growth of 6.5% in 2009-10 as against a growth of 5.9% of GDP in 2008-09. Community services registered a growth of 8.2% in 2009-10 as against a growth of 13.9% in 2008-09. Likewise, growth in the financial, insurance, real estate and business services registered a growth of 9.9% in 2009-10 as against a growth of 10.1% in 2008-09.

Other key economic indicators are summarized below:

The annual average rate of inflation in WPI terms for April-December 2009 was 1.6% as against 8.4% in 2008-09. A major concern during 2009-10, especially in the second half, was the emergence of high double - digit food inflation. Weekly food price inflation on a year - on - year calculation reached a maximum of 19.95% for the week ending 5 December 2009.

Net capital inflows rose from a level of USD 12 billion in April-September 2008 to USD 29.6 billion in April-September 2009. All the components, except loans and banking capital, that comprise net capital inflows showed improvement during April-September 2009 from the level in the corresponding period in 2008-09.

The net inward FDI into India remained buoyant at USD 21 billion during April-September 2009 as against USD 20.7 billion in April-September 2008. Foreign exchange reserves increased by USD 31.5 billion from USD 252 billion in end March 2009 to USD 283.5 billion in end December 2009.

Merchandise exports registered a decline of 27% in the period April-September 2009 as against a growth of 48.1% in the corresponding period in 2008-09. Import payments registered a decline by 20.6% during the period April-September 2009 as against an increase of 51% in the corresponding period in 2008-09. The decline in imports is mainly attributed to the base effect and decline in oil prices.

Fiscal deficit increased from 5.9% in 2008-09 to 6.8% of GDP in 2009 -10. Primary deficit increased from 2.5% of GDP in 2008-09 to 2.8% of GDP in 2009-10. Revenue deficit increased from 4.4% of GDP in 2008-09 to 4.6% of GDP in 2009-10.

The Indian equity markets, which had declined sharply during 2008, reflecting the volatility in international financial markets and foreign institutional investment outflows, began the year 2009 on a subdued note. The market remained range bound during April-March 2009 but exhibited signs of recovery from April 2009. With the revival of FII interest in emerging market economies including India, the equity markets gained strength during May-July 2009.

The movement in equity indices in the Indian capital market was in line with trends in major international equity markets, a sign of increasing integration. Against the backdrop of these trends in Indian equity markets, the regulatory measures initiated during the year were clearly in the direction of introducing greater transparency, protecting investors' interests and improving efficiency in the working

of Indian equity markets, while also ensuring the soundness and stability of the Indian capital market.

Recommendations of the Economic Survey 2009-10

The Economic Survey 2009-10 has recommended the following key initiatives:

Agriculture : The agriculture sector faces various challenges which have to be addressed sooner rather than later. As farm productivity is not showing desirable growth there is urgent need to focus on research as well as better agricultural practices to ensure that productivity levels are increased in the shortest time possible. The issue of efficient food stocks management and offloading of stocks in time also needs due consideration. Studies indicate adverse impact of climate change on agriculture. Crop improvement and research to develop drought-resistant, high-yielding varieties of seeds assumes importance with a view to combating adverse impact of drought on food production and to ensure food security.

Renewed attention needs to be paid to improving farm production and productivity, better utilization of agricultural inputs, proper marketing infrastructure and support, stepping up investment in agriculture with due emphasis on environmental concerns and efficient food management.

Industry : The cyclical slowdown in the industrial sector that began in 2007-08 got compounded by the twin global shocks in 2008-09. The effects lingered on briefly in the current fiscal, but growth rebound is amply evident. The improvement in the cost structure of manufacturing companies seems to have catalyzed the process of recovery. While higher prices are an incentive to the producer, they also have implications for the cost structure and the demand for manufactured products. This trade-off needs to be carefully managed.

Growth in infrastructure should also be focused upon as it not only alleviates the supply side constraints in industrial production, but also stimulates additional domestic demand required for industrial growth. Apart from the need for sustaining the high growth in labor intensive sectors, another critical challenge in this respect would be to erase the skill deficit with a multifaceted program for skill upgradation. Given the size of the Indian market and the unmet demand for industrial products, along with the growth momentum in the overall GDP, there is reasonable hope that demand would not by itself be a constraining factor. Besides, domestic financial market and external resource flows have given the impression that raising investible resources would not be a major problem. All these factors, combined with the inherent strength of industrial corporates brighten the industrial outlook in the medium term.

Finance : Institutional players and corporates constitute major players in the Indian capital market. The retail investor participation remains limited in the corporate debt market and mutual funds. The interdependence between corporate and mutual funds has recently raised concerns relating to volatility in financial markets.

The recent global financial turmoil raised many issues about governance of financial intermediaries and awareness of investors. A simultaneous and coordinated effort on both fronts would help investors take well informed financial decisions besides protecting their interests and ensuring orderly conditions in markets. Greater effort therefore is needed for investor education and promoting investors' protection.

Pension reforms in India have generated widespread interest internationally. The PFRDA faces the challenge of expanding the distribution network of the NPS to cover the entire unorganized sector in the country, educate citizens to take appropriate investment decisions, based on their risk and return profile and contribute to improved financial literacy levels. Provision of a statutory status to the pension regulator would help the PFRDA perform its regulatory and developmental roles effectively. The success of pension reforms will not only facilitate the flow of long term savings for development, but also help establish a credible and sustainable social security system in the country.

Capital market solution for catastrophe risk insurance is another area that needs focus. This essentially transfers insurance risk of natural calamities like earthquakes, hurricanes and floods to the capital markets through issue of catastrophe bonds. The instrument is widely used in advanced countries and there is scope for introducing it in countries like India to provide insurance against contingencies.

Taxes : As a proportion of gross tax revenue, direct taxes rose from a level of 19.1% in 1990-91 to reach 49.9% in 2007-08; in 2008-09 (provisional), they were at 55.5%. In terms of year-on-year growth, in 2008-09, reflecting the two distinct halves of the financial year with different economic environments, direct taxes grew by 14.3% with personal income-tax rising by 20.8% and corporate income-tax by 10.8%. There was corresponding decline in the share of indirect taxes in the period from 1990-91 to 2007-08. However, service tax has emerged as a major component with a 10% share in 2008-09. In terms of year-on-year growth, in 2008-09, indirect taxes fared poorly with decline in both excise and customs while service tax moderating to a lower growth of 18.6%.

In view of the uncertainties associated with the impact of the crisis and not so strong signs of recovery, the budget for 2009-10 continued fiscal expansion to boost demand and acknowledged of bringing about structural changes in direct taxes through the draft DTC and moving towards a harmonized GST. Based on the trends available for April-December 2009, there is likely to be a shortfall in revenue receipts on account of the large decline in indirect taxes like customs and excise and the likely lower than budgeted non tax revenues.

The largely structural nature of fiscal deficits in India, the levels of recovery in the economy and the sustainability of the recovery without fiscal stimulus call for resumption of the process of fiscal consolidation in a gradual manner. Going forward, the nature of the fiscal consolidation - whether it should rely on revenue growth, which is in turn linked to the growth recovery, or on greater expenditure cuts is important in the traditional incremental adjustment process; but lasting fiscal consolidation could accrue with reforms in the design and delivery of plan schemes, outcome focused expenditure and institutional reforms.

- **FDI policy reforms:** The Economic Survey 2009-10 offers following FDI policy reform options:
 - Liberalization of FDI in the insurance sector of health insurance and removing the 10 year disinvestment clause.
 - Liberalization of FDI in the rural banking, higher education and the animation sector.
- **External trade** : The outlook for India's trade sector in 2010 has brightened with prospects of recovery in world output and trade volumes. In the Indian scenario, while in the short term relief and stimulus measures have worked, some fundamental policy changes are needed. For the merchandise sector, these include furthering tariff reforms by lowering the peak duties from the present 10% to 7.5%, by tweaking the rates in the dominant intermediate goods category of imports besides capital goods, weeding out unnecessary customs duty exemptions, streamlining export promotion schemes, further reduction in excise duties, giving special attention to export infrastructure along with rationalization of port service charges, rationalizing the tax structure, fine tuning the trade strategy by targeting exports of dynamic products to developed markets and continuing with our proactive role in multilateral trade negotiations while taking care of livelihood concerns and the needs of the domestic sector.

Similar tax and regulatory reforms in the services sector along with systematic marketing of services, collection and dissemination of market information by setting up a portal for services and streamlining the services data system could help the services sector in making further strides.

Inflation : The upsurge in prices in the second half of 2009-10 has been more concentrated and confined to food items only. A significant part of this inflation can be explained by supply side bottlenecks in some of the essential commodities, precipitated by the delayed and sub-normal southwest monsoons. Since December 2009, there have been signs of these high food prices, together with the gradual hardening of non administered fuel product prices, getting transmitted to other non food items, thus creating some concerns about higher than anticipated generalized inflation over the next few months. Proper and timely assessment of the supply demand situation and preventive action become the essence of supply-side management.

As of now, the outlook for inflation is conditioned by supply side pressures in the near term, possible return of pricing power with stronger recovery in growth, further revival in private demand with improving consumer and business confidence and possible spurt in global commodity prices in response to recovery in advanced economies.

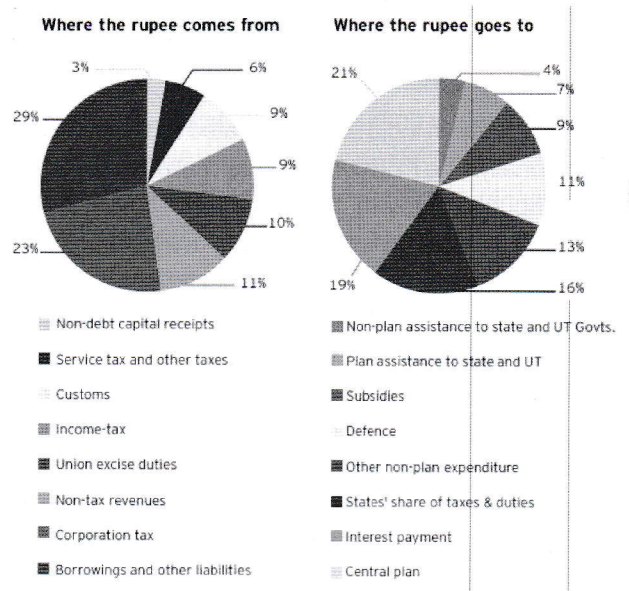
While the fiscal issues are important, the transmission of the monetary policy stance to the monetary and real sectors is equally critical. It would be necessary for the policy authorities not only to address the inflationary expectations but also to monitor and ensure that the growth in money supply and credit to productive sectors is at the envisaged levels so that the growth prospects in the near to medium terms are sustained without jeopardizing the price scenario.

- **Social sector programs** : The Government in recent years has launched several ambitious programs focused on the development of rural areas and population, in furtherance of its strategy of inclusive growth and raising the quality of life of the rural people. In spite of increased Government outlays in the social sector in recent years, lack of identity proof results in harassment and denial of services to the poor and marginalized. As a result, there are still leakages in the programs/ schemes and the benefits do not reach the intended target groups of individuals/ people in full. Providing identity proof to the poor and the marginalized through the UIAI will enhance their access to Government services, both at State and Central levels, and will enable smoother delivery of

direct benefits to the poor. Specifically, it will improve the delivery of the flagship schemes of the Central Government. This will also help in preventing leakages as well as wastages in the form of implementation of schemes with overlapping objectives and beneficiaries.

Note: All figures are as per the Economic Survey 2009-10
BE: Budget Estimates

Budget financials



- The annual financial statements of the Government for 2009-10 are set to reflect a fiscal deficit of 6.7% (6.86% inclusive of oil and fertilizer bonds) of GDP, marginally lower than the budget estimate of 6.8% (6.97% inclusive of oil and fertilizer bonds). The target fiscal deficit for 2010-11, 2011-12 and 2011-13 is 5.5%, 4.8% and 4.1% respectively, improving upon the recommended fiscal deficit estimates of the Thirteenth Finance Commission. Revenue deficit for 2010-11 is estimated at 4.0% as against the revised estimate of 5.3% for 2009-10. The Government does not plan to issue bonds to oil and fertiliser companies and intends to continue with the practice of extending Government subsidy in cash, thereby bringing all subsidy related liabilities into fiscal accounting. Earlier, issues of such bonds were referred to as "below the line" items.
- Market borrowings are expected to finance 95.28% of the Government's fiscal deficit in 2009-10 and estimated to finance 90.45% of the fiscal deficit in 2010-11. As per the revised estimates, the interest outgo as a percentage of the revenue receipts is set

to increase from 35.57% in 2008-09 to 38.02% in 2009-10 and is estimated to be 36.45% in 2010-11.

- The Union Budget 2010-11 has estimated the following:
 - Gross tax revenues at INR 7,467 billion representing a considerable increase of approximately 17.94% over the revised estimates for 2009-10 of INR 6,331 billion.
 - Plan expenditure at INR 3,731 billion representing an increase of approximately 18.38% over the revised estimates of INR 3,152 billion for 2009-10. As a proportion of the total expenditure, plan expenditure is estimated at 33.65% against the revised estimate for 2009-10 of 30.85%. Non plan expenditure is estimated to increase to INR 7,357 billion representing an increase of 4.15% over the revised estimates for 2009-10. The expenditure provisions in 2010-11 have been estimated with reference to the recommendations of the Thirteenth Finance Commission.

Budget proposals

Direct tax

Income-tax

Rates of tax

Personal tax rates

Existing		Proposed	
Income (INR)	Rate (%) [@]	Income (INR)	Rate (%) [@]
0-160,000*	Nil	0-160,000*	Nil
160,001-300,000	10	160,001-500,000	10
300,001-500,000	20	500,001-800,000	20
500,001 and above	30	800,001 and above	30

@ Education cess of 3% is leviable on the amount of income-tax, if any.

* The exemption limit is INR 190,000 in case of resident women below the age of 65 years and INR 240,000 in case of resident individuals of the age of 65 years or more.

Corporate tax rates

Basic rates of corporate tax remain unchanged for both domestic and foreign companies. However, surcharge on corporate tax for domestic companies will be reduced from 10% to 7.5%. Further, MAT will be increased from 15% to 18%.

The corporate tax rates including surcharge and education cess have been summarized below:

Description	Rate (%)
A) Domestic company	
Regular tax	33.22@
DDT	16.61
B) Foreign company	
Regular tax	42.23#

MAT is chargeable at 18% of book profits (plus applicable surcharge and cess).

@ 30.9% where the total income is equal to or less than INR 10 million

41.2% where the total income is equal to or less than INR 10 million

Definitions

Amendment to the definition of "charitable purpose"

- The definition of "charitable purpose" includes relief of the poor, education, medical relief and the advancement of any other object of general public utility.
- Presently, the term "advancement of any other object of general public utility" in the definition of charitable purpose excludes the following:
 - Activities in the nature of trade, commerce or business; or
 - Activities of rendering services in relation to trade, commerce or business.
- Now, the above exclusion will not be applicable if the receipt from such activities is less than or equal to INR 1 million.

Business income

Extension of time limit for payment of taxes withheld to avail corporate tax deduction

Presently, amounts payable to residents, on which tax is deductible and deducted in March is allowed as a deduction in the financial year provided the taxes are deposited by the due date of filing the tax return. In all other cases, it is allowed as a deduction provided the taxes are deducted and deposited by the last day of the financial year.

Now, such amounts will be allowed as a deduction provided taxes are deducted and deposited by the due date of filing the tax return irrespective of whether it is deducted in March or any other month of the year.

Also, the amount on which taxes have been deducted in the subsequent year or deducted during the financial year

but deposited after the due date of filing the tax return, will be allowed as a deduction in the year in which the taxes have been paid.

This amendment will take effect retrospectively from 1 April 2009

Presumptive taxation

Exclusion of royalty and fees for technical services from presumptive taxation for certain businesses

- Presently, in the case of non residents engaged in the business of providing services or facilities, or supplying plant and machinery on hire, used in prospecting, extraction or production of mineral oils, 10% of the specified amounts can be treated as income taxable in India on a presumptive basis. The specified amount includes amounts in connection with provision of services and facilities.

Further, royalty and fees for technical services arising to non residents having a permanent establishment in India, to which the right, property or contracts giving rise to such royalty or fees are effectively connected, are taxed as business income.

- Now, royalty and fees for technical services are excluded from presumptive taxation for non residents engaged in providing services or facilities, or supplying plant and machinery on hire, used in prospecting, extraction or production of mineral oils.

Tax audit

Turnover limits for the purpose of tax audit increased as under:

Particulars	Existing limits (INR)	Proposed limits (INR)
Person carrying on business	4,000,000	6,000,000
Person carrying on profession	1,000,000	1,500,000

Presumptive taxation

The threshold limit of turnover for computing profits and gains of business (other than business of plying, hiring or leasing goods carriages) on presumptive basis is increased from INR 4 million to INR 6 million.

Deductions from business income

Deduction for capital expenditure for specified businesses

- Presently, deduction is allowed for capital expenditure incurred by a taxpayer for the purpose of business of laying and operating of a cross-country natural gas, crude or petroleum oil pipeline, if at least one third of total pipeline capacity is made available for use on common carried basis.

Now for claiming a deduction for capital expenditure, the proportion of pipelines to be made available for use on common carrier basis would need to be as per the regulations prescribed by PNGRB.

- The deduction for capital expenditure will also be allowed to taxpayers engaged in building and operating new hotels of two star or above category, as classified by Central Government in India.
- Once the above deductions are claimed and allowed, the same will not be eligible for deduction under other provisions of the Income-tax Act.

Weighted deduction for expenditure on scientific research

- Presently, a weighted deduction of 125% is allowed for any sum paid to a scientific research association, national laboratory, etc for the purpose of scientific research.

The weighted deduction will now be enhanced to 175%.

- Presently, a weighted deduction of 150% is allowed to companies for expenditure incurred on scientific research or an approved in-house research and development facility.

The weighted deduction will now be enhanced to 200%.

- Presently, a weighted deduction of 125% is allowed for payments to approved university, college or institution for research in social science or statistical research. The above deduction will be extended for payments made to approved and notified research associations which have the object of undertaking social science research or statistical research.

Deduction for undertakings engaged in developing and building housing projects

- Presently, an undertaking engaged in developing and building of housing projects approved on or after 1 April 2005 can avail deduction if project is completed within 4 years from end of the financial year in which project is approved by the local authority. Now, the time limit for completion is extended to 5 years.

- The norms of built up area of shops and other commercial establishments in housing projects has been amended from 5% of the total built up area or 2,000 sq ft whichever is lower to 3% of the total built up area or 5,000 sq ft whichever is higher.

This amendment will take effect retrospectively from 1 April 2009.

Deduction of profits of a hotel or a convention centre
Presently, a deduction is available in respect of profits derived by an undertaking from business of hotels or convention centres in NCT and other specified areas if the hotel starts functioning or the convention centre is constructed between 1 April 2007 to 31 March 2010. Now, the time limit for start of functioning of hotel or construction of convention centre is extended from 31 March 2010 to 31 July 2010. Computation of profits eligible for tax holiday in case of SEZ undertakings

Profits eligible for tax holiday in case of SEZ undertakings are to be computed as follows:

$$\frac{\text{Profits of the business of the SEZ undertaking} \times \text{Export turnover of the SEZ undertaking}}{\text{Total turnover of the SEZ undertaking}}$$

It is clarified that the above manner of computing profits eligible for tax holiday is applicable retrospectively with effect from 1 April 2005.

Income from other sources

Taxation of transactions for inadequate consideration

- Presently, immovable property received by an individual or HUFs for an inadequate or nil consideration (in excess of INR 50,000) is taxable. Now, transfer of immovable property received by an individual or HUF for an inadequate consideration will not be taxable.

The above amendment will take effect retrospectively from 1 October 2009.

Definition of "property"

- The definition of "property" has been restricted to include property which is in the nature of capital asset in the hands of the recipient individual/ HUF.

The above amendment will take effect retrospectively from 1 October 2009.

- In the case of an individual/ HUF, the definition of property has been widened to include "bullion".

The above amendment will take effect from 1 June 2010.

Transfer of unlisted shares to a firm/ company

- Transfer of shares (other than specifically exempted) to a firm or a company (in which public are not substantially interested) for an inadequate or nil consideration, will now be taxable if the difference between the fair market value and the consideration exceeds INR 50,000.
- The consideration or fair market value, as the case may be, would be considered as cost of acquisition for computing capital gains.

The above amendment will take effect from 1 June 2010.

Reference to valuation officer

- In case of transfer of a property (being a capital asset) or share, the assessing officer may refer to the valuation officer for determining fair market value.

The above amendment will take effect from 1 July 2010.

Other deductions under Chapter VIA

Additional deduction for investment in notified long term infrastructure bonds

- Deduction of INR 20,000 will be available to individuals and HUF in respect of investment in long term infrastructure bonds notified by the Government. This is in addition to the existing limit of INR 100,000 for specified investments.

Contributions to the Central Government Health Scheme

- Presently, a deduction of INR 15,000 (INR 20,000 for senior citizens) is available to an individual for payments towards health insurance policy for self, spouse and dependent children.

Now, contribution made to Central Government Health Scheme will also be eligible for such deduction within the limit mentioned above.

MAT

Increase in MAT rate

- Presently, the rate prescribed for MAT is 15% of book profits (plus applicable surcharge and education cess).

Now, the MAT rate has been increased to 18% of book profits (plus applicable surcharge and education cess).

Provisions relating to LLP taxation

Provisions relating to conversion of private company or unlisted public company into an LLP

- Conversion of private company or unlisted public company into an LLP will not be regarded as transfer where following conditions are satisfied:
 - All assets and liabilities of the company become assets and liabilities of the LLP;
 - Shareholders of the company become partners of the LLP in the same proportion as their shareholding in the company;
 - No consideration other than share in profit and capital contribution in the LLP arises to the partners;
 - Erstwhile shareholders of the company continue to be entitled to receive at least 50% of profits of the LLP for a period of five years from the date of conversion;
 - Total sales, turnover or gross receipts in the business of the company do not exceed INR 6 million in any of the three preceding years; and
 - No amount is paid, either directly or indirectly, to any partner out of the accumulated profit of the company for a period of three years from the date of conversion.
- If the stipulated conditions are not complied with :
 - The amount of profits or gains arising from transfer of capital assets by the private company or unlisted public company to the LLP on conversion will be deemed to be the profits and gains chargeable to tax of the LLP in the financial year in which the conditions are not complied with;
 - The set-off of loss or allowance of depreciation which had been allowed will be deemed to be income of the LLP in the financial year in which the conditions are not complied with.
- The accumulated loss and unabsorbed depreciation of the private company or unlisted public company will be deemed to be loss or allowance for depreciation of the LLP for the financial year in which the business reorganization was effected.

- Actual cost of the block of assets in case of LLP will be the written down value of the block of assets as in the case of the company on the date of conversion.
- The cost of acquisition of capital assets for the LLP will be deemed to be the cost for which the company acquired it.
- MAT credit of the company will not be available to the LLP.

Depreciation allowance on conversion of private or unlisted public company into LLP

- Like in the case of amalgamation and demerger of companies, in case of succession of a private company or unlisted public company into LLP, the total depreciation allowable to the predecessor company and successor LLP will not exceed the total depreciation that would have been allowed if no succession had taken place.

Extension of amortization of expenditure incurred under VRS to successor LLP in case of reorganization of business

- Presently, in case of transfer of an undertaking of a company or reorganization of business of a partnership firm or a proprietary concern, the deduction for expenditure incurred on the VRS is available to the amalgamated or the resultant or the successor company.
- Now, the above benefit will be extended to reorganization of business, where a private company or an unlisted company is succeeded by an LLP, as if the reorganization had not taken place.
- No deduction will be available to the company during the year in which the company is being succeeded by an LLP.

Assessment procedures

Centralized processing of returns

- Presently, the Government is empowered to issue a notification for giving effect to the scheme for centralized processing of returns till 31 March 2010.

The time limit for issue of such notification has been extended to 31 March 2011.

Penalty

Penalty for failure to get accounts audited increased

- Presently, if the taxpayer fails to get the accounts tax audited or fails to furnish a tax audit report as

required, penalty equal to 0.5% of total sales, turnover or gross receipts in business or 0.5% of gross receipts in profession is leviable subject to a maximum of INR 100,000.

Now, the limit has been increased from INR 100,000 to INR 150,000.

Withholding tax

Threshold limit for withholding taxes

- Threshold limit of payments for withholding taxes has been raised:

Particulars	Existing threshold limit (INR)	Proposed threshold limit (INR)
Winnings from lottery or crossword puzzles	5,000	10,000
Winnings from horse races	2,500	5,000
Payment to contractors:		
▶ For single transaction	20,000	30,000
▶ For aggregate transactions during a financial year	50,000	75,000
Insurance commission	5,000	20,000
Commission or brokerage	2,500	5,000
Rent	120,000	180,000
Fees for professional or technical services	20,000	30,000

These above amendments will take effect from 1 July 2010. Provisions relating to levy of interest on delay in deduction or deposit of taxes

- Presently, where tax has not been deducted or deposited, simple interest at the rate of 1% for every month or part of the month is levied on the amount of tax from the date on which such tax was deductible to the date on which such tax is actually paid. Now, simple interest on the amount of tax shall be levied as follows:
 - at the rate of 1% for every month or part of the month from the date on which such tax was deductible to the date on which such tax is actually deducted; and
 - at the rate of 1.5% for every month or part of the month from the date on which such tax was deducted to the date on which such tax is actually paid.

This amendment will take effect from 1 July 2010.

Requirement to issue tax withholding/ collection certificates

- Presently, there is a requirement to issue tax withholding/ collection certificates for taxes withheld/ collected only up to 31 March 2010. Now, tax withholding/ collection certificates will have to be issued for taxes withheld/ collected even on or after 1 April 2010.

Special provisions relating to non residents

Place of rendering services not relevant for determining taxability in India

- Presently, the income of a non resident by way of interest, royalty or fees for technical services, if deemed to accrue or arise in India, is includible in the total income of the non resident, whether or not the non resident has a residence or a place of business or business connection in India.
- Now, it is clarified that such income of the non resident shall be deemed to accrue or arise in India and shall be included in the total income, whether or not:
 - the non resident has a residence or a place of business or a business connection in India; or
 - has rendered services in India.
- The issue of relevance of the situs of rendering services for determining the taxability of such income in India has been a matter of litigation. This explanation seeks to overrule the judicial precedents which held that the income of a non resident from rendering services outside India but utilized in India are not taxable in India.

This amendment will take effect retrospectively from 1 June 1976.

Settlement Commission

Scope of Settlement Commission extended

- Presently, the Settlement Commission provisions exclude assessment/ reassessment proceedings resulting from a search or from requisition of books, assets, etc. Now, the scope of Settlement Commission provisions is extended to such proceedings. The date of issue of notice initiating such proceedings will be considered as date of commencement of the assessment/ reassessment proceedings.
- Similar provisions will also be incorporated in the Wealth-tax Act. Increase in eligibility limit
- Presently, an application to the Settlement Commission can be made only in cases where the additional tax payable on income disclosed in the application exceeds

INR 300,000. Now, the application can be made only if the said tax payable exceeds INR 1 million.

- Further, in cases of assessment/ reassessment proceedings resulting from a search or from requisition of books, assets, etc, application can be made if the additional tax payable exceeds INR 5 million. Time limit for passing orders by Settlement Commission
- Presently, the Settlement Commission has to pass an order within 12 months from the end of the month in which the application is filed. Now, for applications filed on or after 1 June 2010, the order should be passed within 18 months from the end of the month in which the application is filed.
- Similar provisions will also be incorporated in the Wealth-tax Act. The above amendments pertaining to Settlement Commission will take effect from 1 June 2010.

Appeals

Power of High Court to condone delay in filing appeals

- The High Court is now empowered to admit an appeal after the expiry of 120 days, if satisfied that there was sufficient cause for not filing the appeal within such period.
- A similar amendment has also been proposed in the Wealth-tax Act.

The above amendment will take effect retrospectively from 1 October 1998.

High Court empowered to condone delay in application

- For ITAT orders passed before 1 October 1998, the taxpayer/ Revenue authorities can file an application before the High Court within six months, requiring the ITAT to refer the case to the High Court.
- The High Court is now empowered to admit the above application beyond a period of six months, if satisfied that there was sufficient cause for not filing the statement of case within such period.
- A similar amendment has been proposed in the Wealth-tax Act.

This provision will take effect retrospectively from 1 June 1981.

Others

Profit or loss on realization or revaluation of investments of non life insurance companies

- Presently, the income of non life insurance business is taken as per the profit and loss account of the company

prepared in accordance with the regulations made by the IRDA. Profit on revaluation or realization of investments of non life insurance companies is argued to be not taxable.

- Now, any gain or loss on realization of investments would be taxable/ deductible. Any such gain or loss which is not included in the profit and loss account would be included in computing the taxable income of such taxpayers. A provision for diminution in the value of investment which is debited to the profit and loss account will be added back in computing the taxable income of such taxpayers. Mandatory usage of DIN
- Revenue authorities will be required to allot and quote a DIN in respect of every notice, order, letter or any correspondence issued to any person including any other Revenue authority, on or after 1 July 2011.
- Any notice, order, letter or any correspondence received on or after 1 July 2011 by the Revenue authorities or on their behalf, will be accepted and valid only after allotting and quoting a DIN. Exemption of income of research associations
- Presently, an exemption is available in respect of income of approved scientific research associations. The exemption has now been extended to include approved research associations engaged in social science research or statistical research.
- Presently, deduction is allowed in respect of donations made to a university, college or other institution. Now, the deduction will also be available for payments made to a research association whose objective is to undertake research in social science or statistical research. Power of the Commissioner to cancel the registration of a trust or institution engaged in charitable activities
- Presently, there is an ambiguity on whether the Commissioner has power to cancel the registration obtained prior to 1 April 1996 by a trust or institution.
- Now, the Commissioner has been granted powers to cancel the registration obtained prior to 1 April 1996.

The above amendment will take effect from 1 June 2010.

Indirect tax

Customs duty

Policy changes

- Peak rate of BCD remains unchanged at 10%.
- Retrospective withdrawal of exemption with effect from

26 June 2009 leading to levy of customs duty of 16% and Nil special CVD on supply of electrical energy from SEZ to DTA and to non processing areas of SEZ.

- Import of goods covered under Medicinal and Toilet Preparations (Excise Duties) Act, 1955 liable to CVD on RSP less abatement, to be effective on enactment of the Finance Bill.
- Relaxations granted in relation to Settlement Commission procedures as follows:
- Applications in case of misdeclaration, suppression, etc allowed.
- Restriction for assesseees to seek only one time settlement relaxed.
- Settlement Commission empowered to extend the time limit of 9 months for disposal of applications by another 3 months.

Other changes

SACD exemption granted to the following:

- goods imported in pre packaged form and intended for retail sale requiring declaration of RSP;
- readymade garments, mobile phones and watches;
- carbon black feedstock, waste paper and paper scrap.
- Project import status granted to the following projects with BCD at 5%:
- Mono rail projects for urban public transport
- Installation of mechanised handling systems and pallet racking systems, in mandis or warehouses for food grains and sugar. These projects are also eligible for exemption from CVD and SACD.
- Cold storage, cold room (including farm pre-cooling) or industrial projects for preservation, storage or processing of agricultural, apriary, horticultural, dairy, poultry, aquatic and marine produce and meat.
- Setting up of digital headend. These projects are also eligible for exemption from SACD.
- Import of digital masters/ stampers of films and import of music and gaming software (other than in prepackaged form) on digital media for duplication to attract customs duty only on the value of carrier medium and customs duty on balance value to be exempt. However, customs duty payable on transaction value where imported for retail sale.
- Promotional materials such as trailers, making of films imported free of cost in the form of electronic promotion kits/ betacams exempted from BCD and CVD.

- Ambit of exemption in relation to transfer of right to use canned or packaged software is extended to all transfer of right to use including transaction where transfer of right to use is not for commercial exploitation.
- Parts for manufacture of accessories of mobile phones, such as battery chargers and hands free head phones exempted from all custom duties.
- Parts imported for manufacture of mobile phones and accessories exempted from SACD up to 31 March 2011.
- Additional specified capital goods and raw materials for manufacture of electronic hardware exempted from all customs duties.
- Tunnel boring machine for hydro electric power projects exempted from all custom duties.
- Machinery, instruments and appliances required for setting up solar power generation projects or facilities eligible for concessional BCD at 5% with full exemption from CVD.
- Ground source heat pump for geo thermal energy applications exempted from BCD and SACD.
- Specified items imported for manufacturing all categories of electrical vehicles exempted from BCD and SACD up to 31 March 2013, Only CVD to apply at 4%.
- Truck refrigeration units for manufacture of refrigerated vans/ trucks exempted from BCD.
- Sale or disposal of exempted specified road construction machinery permitted on payment of custom duties on depreciated value at applicable rate at the time of import, subject to specified conditions.
- All medical equipments (with some exceptions) exempted from SACD and to attract BCD at 5% and CVD at 4%.
- Parts required for manufacture and accessories of medical equipment to attract BCD at 5% and exempted from CVD.
- Spares for maintenance of medical equipment not eligible for concessional BCD (except in specified cases).
- Cobalt-chrome alloys, special grade stainless steel, etc for manufacture of orthopaedic implants exempted from BCD subject to actual user condition.
- Concessional BCD of 5% for specified machinery for tea, coffee and rubber plantation up to 31 March 2011.
- Gold ore and concentrate exempted from BCD and SACD and chargeable to CVD at INR 140 per 10 gram of old content subject to actual user condition.
- Limit for duty free import of samples extended from INR 100,000 to INR 300,000.

- BCD exemption extended to certain additional specified components, raw materials and accessories for manufacture of sports goods.

Rate movement

- Changes in the basic rates of customs duty on some key items are set out below :

Items	Rate movement (%)		
	Basic Duty		Movement
	From	To	
Crude petroleum	Nil	5	↑
Petrol and diesel	2.5	7.5	↑
Specified petroleum products	5	10	↑
Serially numbered gold bars (Other than to a bars) and gold coins	INR 200 per 10 gram	INR 300 per 10 gram	↑
Gold in any form (other than specified above)	INR 500 per 10 gram	INR 750 per 10 gram	↑
Silver in any form	INR 1000 per kilogram	INR 1500 per kilogram	↑
Platinum	INR 200 per 10 gram	INR 300 per 10 gram	↑
Specified agricultural machinery	7.5	5	↓
Long pepper	70	30	↓
Asafoetida (heeng)	30	20	↓
Bio polymer/ bio plastics	10	Nil	↓
Magnetrons of up to 1000 kw for manufacture of microwave ovens	10	5	↓
Rhodium	10	2	↓

Excise duty

Policy changes

- **Partial rollback of fiscal stimulus. Peak excise duty rate for most non petroleum products from 8% to 10%.**
- Excise duty of 4% imposed on specific parts used in manufacture of electrical vehicles including cars, two wheelers and three wheelers.
- Corresponding excise duty of 4% also imposed on above electrically operated vehicles.
- Exemption from excise duty extended to goods supplied under international competitive bidding to mega power projects where power supply is tied up through tariff based competitive bidding.
- Cenvat credit to be allowed on inputs and input services used by manufacturer of exempted goods supplied to

mega power projects from which power has been tied through the specified competitive bidding.

- Raw material required for manufacture of rotor blades for wind operated electricity generators exempted.
- Small scale units will be eligible in receipt of capital goods and will have the facility to pay excise duty on quarterly basis.
- Accelerated depreciation rates prescribed for computers and its peripherals, cleared after use, while computing the amount to be paid on removal of such goods.
- Cenvat credit allowed in respect of jigs, fixtures, moulds and dies sent by one manufacturer to another manufacturer for production of goods.
- Chewing tobacco and branded unmanufactured tobacco is brought under the compounded levy scheme. This amendment will take place with effect from 8 March 2010.
- Ambit of exemption in relation to transfer of right to use canned or packaged software is extended to all transfer of right to use including transaction where transfer of right to use is not for commercial exploitation.
- Machinery, instruments and appliances required for setting up solar power generation projects or facilities granted exemption from excise duty.
- Clean energy cess will be imposed on coal, lignite and peat produced in India from a notified date.

The key changes mentioned below will take effect on enactment of the Finance Bill:

- In case of pending disputes, manufacturer of exempted and dutiable goods is allowed to reverse an amount equivalent to the credit attributable to goods/ services used for production of exempt goods based on certification by chartered accountant. This option available on clearances of exempted and dutiable goods from 1 September 1996 to 31 March 2008.
- Provisions and procedures related to claiming refund of unutilised Cenvat credits used in relation to exported goods rationalised. Rationalisation to be effective from 14 March 2006.
- Penalty not to be imposed in case duty along with interest is paid before the issuance of the demand notice.
- Relaxations granted in relation to Settlement Commission procedures as follows:
- Applications in case of misdeclaration, suppression, etc allowed.

- Restriction for assesseees to seek only one time settlement relaxed.
- Settlement Commission empowered to extend the time limit of 9 months for disposal of applications by another 3 months.
- Central Government empowered to make rules for withdrawal of facilities/ imposition of restrictions on utilisation of cenvat credit on manufacturer/ exporter or suspension of registration of a dealer for dealing with evasion of duty or misuse of cenvat credit.

Rate movement

- For most non petroleum products duty rates enhanced from 8% to 10%
- In addition to above, changes in duty rates on some key items are set out below:

Items CENVAT	Rate movement (%)		Movement
	Basic Duty From	To	
Cement manufactured in a mini plant : Cleared in packaged form			
a) Where RSP does not exceed INR 190 per 50 kilogram bag	INR 145 per tonne	INR 185 per tonne	↑
b) Where RSP exceeds INR 190 per 50 kilogram bag	INR 250 per tonne	INR 315 per tonne	↑
Cleared other than in packaged form	INR 170 per tonne	INR 215 per tonne	↑
Cement manufactured other than in a mini plant : Cleared in packaged form			
a) Where RSP does not exceed INR 190 per 50 kilogram bag	INR 230 per tonne	INR 290 per tonne	↑
b) Where RSP exceeds INR 190 per 50 kilogram bag	8	10	↑
Cleared other than in packaged form	Higher of 8 or INR 230 per tonne	Higher of 10 or INR 290 per tonne	↑
Cement Clinker	INR 300 per tonne	INR 375 per tonne	↑
Electronically operated vehicles, including two and three wheeled electric motor	Nil	4	↑

Items CENVAT	Rate movement (%)		Movement
	Basic Duty From	To	
Vehicles and battery operated cars			
Goggles other than those used for correcting vision	4	10	↑
High speed diesel intended for sale without a brand name	INR 3.60 per litre	INR 4.60 per litre	↑
High speed diesel intended for sale with a brand name	INR 4.75 per litre	INR 5.75 per litre	↑
Information technology software	8	10	↑
LED lights / lighting fixtures	8	4	↓
Microprocessor (other than motherboards), floppy disc drives, CD drives, DVD drives/ DVD writers etc. when meant for external use with a computer or laptop as a plug in device	Nil	4	↑
Mosquito nets impregnated with insecticide	Nil	4	↑
Motor spirit intended for sale without a brand name	INR 13.35 per litre	INR 14.35 per litre	↑
Motor spirit intended for sale with a brand name	INR 14.50 per litre	INR 15.50 per litre	↑
Parts, components of battery Chargers and hands free headphones of mobile handsets	8	Nil	↓
Plain gold jewellery manufactured by EOU and cleared to DTA	INR 500 per 10 gram	INR 750 per 10 gram	↑
Plain silver jewellery manufactured by EOU and cleared to DTA	INR 1000 per kilogram	INR 1500 per kilogram	↑

Items CENVAT	Rate movement (%)		Movement
	Basic Duty From	To	
Sanitary napkins, baby diapers and clinical diapers	Nil	10	↑
Self loading or self unloading trailers and semi-trailers for agricultural purposes	8	Nil	↓

Service tax

Effective service tax rate remains unchanged

- Effective service tax rate remains unchanged at 10.3%.
The key changes mentioned below will take effect from a date to be notified after the enactment of the Finance Bill:

- Service tax will be levied on the following additional services:
- Temporary transfer or permitting the use of copyrights relating to cinematographic films and sound recording other than original literary, dramatic, musical and artistic works.
- Promotion of "brand" of goods, services, events, endorsement of name including trade name of business entities.
- Providing preferential location or development of complexes on extra charges to prospective buyers.
- Permitting commercial use or exploitation of any event.
- Maintenance or storage of medical records of employees of business entity.
- Health services undertaken by hospitals or medical establishments for employees of business entities and under health insurance schemes (on payments made directly by the business entity or insurance company).
- Services provided by Electricity Exchanges.
- The scope of existing taxable services will be amended as follows:
- Renting of immovable property for use in business, any other service in relation to such renting and vacant land given on lease or license for future construction will attract service tax. This amendment will take effect retrospectively from 1 June 2007. Accordingly, Delhi High Court judgement in the case of Home Solutions Private Limited on the relevant issue will be nullified.
- Construction of complex and commercial or industrial construction will be deemed to be service provided by a builder to the buyer where any sum is received from buyer before grant of completion certificate.
- Information technology software services will now also include services provided for other than business purpose.
- Air passenger transport service will include domestic and international journeys in any class.
- Sponsorship service will cover sponsorship of sports events.
- Services of promoting, marketing or organisation of games of chance, including lottery now taxable under a separate category (earlier covered under business auxiliary service).
- Port or airport service category will cover all services provided entirely within the port or airport, by any person.
- Commercial training or coaching services will cover services provided for a consideration, irrespective of profit motive. This amendment will be applicable with retrospective effect from 1 July 2003.
- Exclusion for auction services by Government to cover auction of Government property by any auctioneer.
- Value of taxable service for management of investment under Unit Linked Insurance Plan will be higher of actual amount charged by insurer or maximum amount of fund management charges fixed by regulatory authority.
- Definition of "business entity" to include association of persons, body of individuals, company or firm excluding an individual.
- No penalty to be imposed where service tax along with interest has been paid before issuance of notice. This change will take effect on enactment of the Finance Bill.

The following changes will be effective from 27 February 2010:

- Definition of "India" will be amended to cover construction and operation of installations, structures and vessels for the purpose of prospecting or extraction or production of mineral oils and natural gas in the Continental Shelf and Exclusive Economic Zone and services connected with the said activity.
- Similar amendment will be made to the definition of "India" under Taxation of Services (provided from outside India and received in India) Rules, 2006 and Export of Services Rules, 2005.
- Exemption from service tax to packaged or canned software intended for single use, where the manufacturer, duplicator, importer or person holding copyright to software has paid appropriate excise duty or customs duty on entire amount received from buyer.
- Export of Services Rules, 2005 will be amended as follows:
- Condition of "service is provided from India and used outside India" will be deleted thereby reducing ambiguities in determining export of services.
- Performance based criteria for determining export of "mandap keeper services" will be changed to "location of immovable property".
- Performance based criteria for determining export of "chartered accountant/ cost accountant/ company secretary services" will be changed to "location of recipient of service".

- Procedures outlined and provisions to be amended to simplify refund of service tax for exporters including certification of refund claims by auditors.
- Statutory taxes charged by any Government on air passengers will be excluded from taxable value.
- Exemption from service tax to transmission of electricity.
- Exemption from service tax to erection, commissioning or installation of mechanised food grain handling systems, equipments for cold storage or processing of products such as agricultural, dairy and poultry.
- Exemption from service tax will be extended to transport by road of food grains and pulses.
- Exemption from service tax to specified news agencies under online information and database retrieval services and business auxiliary services.
- Exemption from service tax to technical testing and certification services for seeds provided by specified Central and State agencies.
- Definition of "vocational training institute" will cover only Industrial Training Institute or Industrial Training Centre offering courses in designated trades, as notified.
- Exemption from service tax to group personal accident scheme provided by Government of Rajasthan will be withdrawn.
- Service tax on transportation of goods by rail restored with abatement of 70% on gross value and full exemption to certain category of goods such as defence equipment, passenger luggage and food grains transported by rail. This change will take effect from 1 April 2010.

Central sales tax

- The CST rate remains unchanged at 2%.

Goods and service tax

- GST proposed to be implemented with effect from 1 April 2011.

Other key policy

Initiatives

The Government has proposed various policy initiatives in Budget 2010. Some of the key initiatives are as follows:

Industry

- The Government has approved a nutrient based subsidy policy instead of the current product based pricing subsidy regime which will become effective from 1 April

2010. This is expected to lead to an increase in agricultural productivity and reduce volatility in the demand for fertiliser subsidy. The new policy will also move towards direct transfer of subsidies to farmers.

- The expert group, constituted to advise the Government on a viable and sustainable system of pricing of petroleum products, has submitted its recommendations. The Ministry of Petroleum and Natural Gas will decide on these recommendations in due course.
- The interest subvention of 2% on pre-shipment credit for exports covering handicrafts, carpets, handlooms and small and medium enterprises is proposed to be extended from 31 March 2010 to 31 March 2011.
- To provide further impetus to the development of the food processing sector, the Government has decided to set up 5 more mega food park projects, in addition to the 10 parks already being set up.

Infrastructure

- The Government will provide INR 1,735.52 billion for accelerating the development of high quality infrastructure such as roads, ports and railways.
- The Government will raise the allocation of road transport from INR 175.20 billion to INR 198.94 billion.
- The Government has established IIFCL to provide long term financial assistance to infrastructure projects. The disbursements by IIFCL will touch INR 90 billion by March 2010 and INR 200 billion by March 2011. The take-out financing scheme will provide finance for about INR 250 million in the next three years.
- The Government will increase the plan allocation for the power sector from INR 22.30 billion in 2009-10 to INR 51.30 billion in 2010-11.
- The Government will introduce a competitive bidding process for allocating coal blocks for captive mining to ensure greater transparency and increased participation in production of coal.
- The Government will set up a Coal Regulatory Authority to create a level playing field in the coal sector and to facilitate resolution of issues like economic pricing of coal and benchmarking of standards of performance.
- The Government will establish a National Clean Energy fund for funding research and innovative projects in clean energy technologies.
- The Government will develop a project at Sagar Island to have an alternate port facility in West Bengal.

- The Government will increase the allocation for school education from INR 268 million in 2009-10 to INR 310.36 billion in 2010-11.
- The Government has provided INR 167 billion to modernize and expand the railway network. Preparatory activities under the Delhi-Mumbai Industrial Corridor have been completed for creation of six industrial investment nodes with eco-friendly world class infrastructure.
- The Government increased the outlay for the Ministry of New and Renewable Energy from INR 62 billion to INR 100 billion, to facilitate reaching the target of 20,000 MW of solar power by 2022 under the Jawaharlal Nehru National Solar Mission.

Banking sector

- The Government has decided to set up an apex level Financial Stability and Development Council to strengthen and institutionalize the mechanisms for maintaining financial stability. This Council would monitor macro prudential supervision of the economy, including functioning of large financial conglomerates and address inter-regulatory coordination issues without prejudice to the autonomy of present regulators.
- To increase geographical coverage and ensure that it grows in size to meet the needs of a modern economy, RBI is considering giving some additional banking licenses to private sector players and NBFCs. The license to NBFCs would be subject to satisfaction of RBI's eligibility criteria.
- The Government will set up a financial sector legislative reform commission to rewrite and clean up the financial sector laws, to bring them in line with the requirement of the sector.
- Budgetary allocation to the program for linking self help groups with the banking system will be increased to INR 4 billion. To extend the benefits of banking services to the common man, it has been decided to provide appropriate banking facilities to habitations having population in excess of 2,000 by March 2012. It is also proposed to extend insurance and other services to the targeted beneficiaries.

Capital markets

- The Government has announced its intention to list National Mineral Development Corporation and Satluj Jal Vidyut Nigam during the financial year 2010-11. The proceeds from the divestment of equity will be utilized to

meet the capital expenditure requirements of social sector schemes for creating new assets.

Urban development

- Budgetary allocation to the Swarna Jayanti Shahari Rozgar Yozna, aimed to create employment opportunities in urban areas, will be increased by more than 75% from INR 30.60 billion to INR 54 billion.
- The budgetary allocation for housing and provision of basic amenities to urban poor including for Rajiv Awas Yojana, a scheme that was announced for making the country slum free in the financial year 2009-10, is increased to INR 12.7 billion.

Rural development

- To increase the employment opportunities under the National Rural Employment Guarantee Scheme, the Government will increase the budgetary allocation to INR 401 billion.
- The Government will make a budgetary allocation of INR 480 billion to Bharat Nirman program, which has made a substantial contribution to the upgradation of rural infrastructure.
- The Government will increase budgetary allocation to Indira Awas Yojana, aimed at providing rural houses for weaker sections to INR 100 billion.
- The budgetary allocation to Backward Region Grant Fund, aimed at bridging the infrastructure gap in the backward districts of the country, will be increased by 26% from INR 58 billion to INR 73 billion.

Others

- Government plans to target an explicit reduction in public debt-GDP ratio and is aiming to bring out a status report giving a detailed analysis of the current situation and a road map for curtailing the overall public debt. This would be followed by an annual report on the subject.
- The Government has laid special emphasis to spur the growth of the agricultural sector and has drawn up a strategy which covers the following:
 - Increase in agricultural production, which includes extension of green revolution to eastern region of the country and organizing 60,000 pulses and oil seeds villages in rain fed areas.
 - Initiatives to reduce wastage of storage.
 - Improving the availability of credit to farmers which includes increase in farm loans, extension of repayment

period under Debt Waiver and Debt Relief Scheme for farmers from 31 December 2009 to 30 June 2010 and 2% interest subvention for timely repayment of farm loans.

- Budgetary allocation to the Micro, Small and Medium Enterprises sector will be increased from INR 17.94 billion to INR 24 billion.
- The Government will increase budgetary allocation to the defense sector to INR 1,473.44 billion.
- The Government will increase budgetary allocation to UIAI to INR 19 billion.
- The Government will set up a National Social Security Fund for provision of social security to unorganized sector with a budgetary allocation of INR 10 billion.
- The Government will enhance the plan outlay of the Ministry of Social Justice and Empowerment to INR 45 billion to support programs for the benefit of scheduled castes, other backward castes, persons with disabilities, senior citizens, etc.
- The Government will set up a Technology Advisory Group for unique IT projects such as Tax Information Network, NPS, National Treasury Management Agency, Expenditure Information Network, GST.
- The Government will set up an Independent Evaluation Office to undertake impartial and objective assessments of the various public programs to improve the effectiveness of public interventions.
- The Government will set up the National Mission for Delivery of Justice and Legal Reforms to provide timely delivery of justice. Its objective is to help to reduce legal backlog in courts from an average of 15 years to 3 years by 2012.
- An annual health survey to prepare the district health profile of all the districts shall be conducted in financial year 2010-11. This survey would benefit the major public health initiatives particularly the National Rural Health Mission.
- The Government will launch an extensive skill development programme for the textile and garment sector by leveraging on the strength of existing institution of the Ministry of Textile. The resources of the private sector would also be harnessed by incentivising training through an outcome-based approach. Through these instruments, the Ministry of Textiles has set a target of covering 3 million people over 5 years.
- The Government will increase the plan allocation for

school education from INR 268 billion in 2009-10 to INR 310.36 billion in 2010-11.

Recent policy changes

Significant policy initiatives during the period 16 June 2009 to 15 February 2010 have been summarized in the following paragraphs. Some of these initiatives may be impacted by the proposals announced in the Budget speech of the Finance Minister.

Foreign investment policy

With a view to further liberalize India's foreign investment policy, the following key changes have been made:

- FDI in MSE allowed subject to equity caps, entry route and other relevant sectoral regulations.
- FDI up to 24% allowed in an entity (not an MSE) manufacturing items reserved for MSE, under the automatic route. Investment beyond 24% requires prior FIPB approval. The entity would be required to obtain an industrial license for manufacturing items reserved for MSE sector and undertake to export 50% of the new or additional annual production of the MSE reserved items, to be achieved within a maximum period of three years.
- FDI up to 49% allowed in commodity exchanges with prior FIPB approval. In case of investment in a listed company, FII investment would be restricted up to 23% within the overall limit of 49% subject to specified conditions. An existing company having FDI in excess of 49% is required to comply with these conditions by 31 March 2010.
- Payments for royalty, lumpsum fee for transfer of technology and payments for use of trademark/ brand name allowed under the automatic route without any limits, subject to Foreign Exchange Management (Current Account Transactions) Rules 2000. With a view to expedite foreign investment inflow into the country and also to save time and efforts for the FIPB/ CCEA, it has been decided that henceforth:
- Finance Minister will approve proposals (recommended by the FIPB) where the total foreign equity investment is less than INR 12 billion.
- CCEA would consider the proposals where total foreign equity investment is INR 12 billion and above.
- Additionally, for the following cases, where prior approval of FIPB/ CCEA for making initial investment has already been taken, any further approval from the FIPB/ CCEA

would not be required:

- Proposals where activities earlier required prior approval of the FIPB/ CCEA but subsequently such activities/ sectors have been placed under the automatic route;
- Proposals where activities attracted sectoral caps earlier but subsequently such caps were removed or increased and the activity was placed under the automatic route; and
- Proposals where prior approval of the FIPB/ CCEA had been obtained due to requirement of Press Note 18 (1998 Series)/ Press Note 1 (2005 Series) and are now proposing additional foreign investment.

Foreign exchange regulations

FEMA

- The RBI has clarified that all categories of earners of foreign exchange can credit up to 100% of their foreign exchange earnings to their EEFC account.
- The RBI has further liberalized the exchange control regulations by permitting a foreign/ Indian citizen employed by a foreign company outside India, who is on deputation to a LO/ BO/ JV/ subsidiary in India of such foreign company, to receive the entire post-tax salary in a foreign currency account opened/ maintained by him outside India.
- Foreign citizens, who are employed by an Indian company, have been permitted to remit outside India their entire post-tax salary received in India in INR.

Inbound/ outbound investments

- The Government has issued IDR rules to facilitate eligible companies resident outside India to issue IDRs through a domestic depository and to permit residents in and outside India to purchase, possess, transfer and redeem IDRs. For raising the funds through IDRs by financial/ banking companies which have a presence in India, either through branch or subsidiary, the approval of sectoral regulator(s) will be required before the issue of the IDRs.
- FEMA regulations shall not be applicable to persons resident in India for investments in IDRs and their subsequent transfer arising out of transaction on a recognized stock exchange.
- NRIs and FIIs, including their SEBI approved subaccounts also have been allowed to invest, purchase, hold and transfer IDRs. Further, NRIs are allowed to invest in IDRs out of funds held in their NRE/ FCNR(B) account maintained with an AD.

- FEMA provisions shall not apply to holding of the underlying shares on redemption of IDRs by the FIIs including their SEBI approved sub-accounts and NRIs.

ECBs

- Corporates engaged in development of integrated townships were permitted to avail ECBs under the approval route, till 30 June 2009. This facility has now been extended till 31 December 2010.
- The RBI has permitted NBFCs exclusively involved in financing the infrastructure sector to avail of ECB from recognized eligible lenders including international banks under the approval route, subject to prescribed conditions.
- The RBI has dispensed with the requirement of maintenance of a minimum ratio of 3:1 between the direct lending portfolio for infrastructure projects in India by recognized lenders vis-à-vis their total ECB lending to NBFCs at any point of time.
- SEZ developers are now permitted to avail ECB under the approval route for providing infrastructure facilities (as defined in the ECB policy) within the SEZ. However, ECB shall not be permissible for development of integrated township and commercial real estate within the SEZ.
- Successful bidders in the telecom sector have been permitted to fund the payment for 3G spectrum allocation initially out of their INR resources and to refinance the same subsequently with a long term ECB, under the approval route, subject to specified conditions.
- Where loan agreements have been signed on or after 1 January 2010, the all-in-cost ceiling over 6 months LIBOR for ECBs under approval route, would be as follows:

Average maturity	period All-in-cost ceilings over six months
More than three years and	300 basis points
More than five years	500 basis points

- With effect from 1 January 2010, the RBI has discontinued the facility provided to Indian companies to buy back their FCCBs both under automatic and approval route.
- As a measure of simplification, AD Category-I banks have been permitted to approve certain requests, such as change in draw down or repayment schedule, change in currency of borrowings etc, from ECB borrowers, subject to specified conditions.

Offices in India

- With the objective of achieving transparency, the RBI has announced the eligibility criteria for setting up and other procedural guidelines regarding functioning of BO and LO in India. The key elements of the same are discussed in the following paragraphs:
- Applications from foreign banks and insurance companies for opening of BOs/ LOs will continue to be received/ examined by the DBOD of RBI and the IRDA respectively.
- The RBI will also consider BO/ LO applications where the principal business of the foreign entity falls under sectors where 100% FDI is permitted. The RBI will consider other applications in consultation with the Government.
- Applications by foreign entities (other than foreign banks and insurance companies) are to be routed to the RBI through a designated AD Category-I bank.
- The designated AD Category-I bank after exercising due diligence in respect of the foreign entity would forward the application together with their comments/ recommendations to the RBI.
- Additional criteria such as net worth and profitability would be considered by RBI for granting approval.
- Approval of RBI would not be required to establish a BO in a SEZ for undertaking manufacturing/ service activities, subject to compliance with certain conditions. Extension and closure of BO/ LO
- With a view to liberalize the existing procedure, certain powers have been delegated to the designated AD Category-I banks. Accordingly, with effect from 1 February 2010, AD Category-I banks would, inter alia, be permitted to undertake the following:
 - Extend the validity period of LOs (except LOs of foreign entities which are NBFCs and those engaged in construction and development sectors) for a period of 3 years from the date of expiry of the original approval/ extension granted, subject to prescribed conditions; and
 - Allow closure of the BO/ LO by closing the account maintained with them and remit the proceeds to the overseas entity, subject to prescribed conditions.
 - In the event of any adverse findings being reported by the auditor of the BO/ LO or noticed by the designated AD Category-I bank, the same would need to be reported immediately to the RBI.

Securities law and regulations

Listing agreement

- Listed companies are now prohibited from issuing shares with superior voting/ dividend rights vis-à-vis rights on equity shares that are already listed.

SEBI (Issue of Capital and Disclosure Requirements)

Regulations, 2009

- ICDR Regulations notified in place of SEBI DIP Guidelines. Key provisions are as follows:
 - "Group companies" are now defined to mean companies, firms, ventures, etc promoted by the promoters of the issuer, irrespective of whether or not they are "bodies corporate under same management" as per the Companies Act, 1956.
 - Eligibility norms for IPOs are now uniformly applicable to all types of issuers. Exemptions earlier available to banking companies, corresponding new banks and infrastructure companies have been removed.
 - Companies are now prohibited from making an issue of securities if the issuer, any of its promoter, promoter group, director or person in control is debarred from accessing the capital market by SEBI. This shall also apply if such person is or was a promoter, director or person in control of any other company which is debarred by SEBI from accessing the capital markets. Earlier, this applied only to companies prohibited under any order or direction of SEBI.
 - Regulations governing offer for sale by listed companies have been now incorporated.
 - Reservation on competitive basis in public issues are now provided for shareholders (other than promoters) of listed promoting companies in case of new issuers and listed group companies in case of existing issuers.
 - Book building process now needs to be followed for 100% of issue size. Option of following the process for 75% of issue size has been omitted.
 - It has been clarified that upfront payment made in respect of unexercised warrants shall be forfeited.
 - In case of an IPO, all outstanding convertible instruments held by any person are now required to be compulsorily converted. Earlier, this requirement applied only in respect of outstanding convertible instruments held by promoters or shareholders.

- Lock-in provisions shall apply to preferential issue of equity shares made pursuant to a High Court approved scheme and to preferential issue made pursuant to conversion of loan/ option attached to convertible debt instruments under the Companies Act, 1956.
- Other provisions incorporated in ICDR Regulations are as follows:
- In case of conversion of fully paid compulsorily convertible securities (including depository receipts) into equity shares and subsequent offer for sale, the holding period of such convertible securities as well as that of resultant equity shares shall now be considered for the purpose of calculation of eligibility period.
- A new concept of "anchor investor" has been introduced in case of public issues through book building process. Subject to certain specified conditions, up to 30% of the portion allocated to QIBs will be available for allocation to anchor investors.

SEBI (Substantial Acquisition of Shares and Takeovers)

Regulations, 1997

- The following clarifications have been made in case of an acquirer who together with persons acting in concert with him, holds 55% or more but less than 75% of the shares or voting rights in a target company:
- Shares or voting rights up to a maximum of 5% (in addition to the existing annual "creeping acquisition" limit of 5% up to 55%) in the target company may be acquired by such acquirer in one or more tranches without making a public announcement. No restriction shall apply on the time frame within which such shares or voting rights can be acquired.
- Consequent to acquisition of such 5% voting rights, the percentage of shareholding/ voting rights of the acquirer, together with persons acting in concert with him, in the target company, shall not increase beyond 75%.

Financial services

Banking

- The RBI has increased the daily limit for mobile banking transactions for both funds transfer and transactions involving purchase of goods/ services from the present caps of INR 5,000 and INR 10,000, respectively to INR 50,000 per customer. The RBI has also prescribed guidelines for facilitating the use of mobile phones for remittance of cash.

FIs/ sub-accounts

- SEBI has decided to allocate the unutilized investment limits for Government debt among FIs in the same manner as currently applicable for corporate debt.
- A single FI shall not be allocated more than INR 8 billion of the Government debt investment limit.

Mutual funds

- SEBI has directed mutual funds that they should not make any distinction among unit holders on the basis of amount of subscription while charging exit loads.
- In order to address the need for enhancing the geographic reach of mutual fund schemes, SEBI has permitted units of mutual fund schemes to be transacted on recognized stock exchanges through registered stock brokers.
- SEBI has permitted mutual funds to invest in IDRs subject to compliance with the mutual fund regulations.

NBFCs

- The RBI has made it mandatory for NBFCs to comply with directions applicable to NBFC-ND-SIs once their asset size reaches INR 1 billion even if their asset size was below the said threshold as at the last audited balance sheet date. Further, the RBI has clarified that NBFC-ND-SIs need to continue to comply with the RBI directions until the submission of the next balance sheet even if their asset size falls below INR one billion.
- The RBI has issued Non Banking Financial Companies (Deposit Accepting) (Approval of Acquisition or Transfer of Control) Directions, 2009. Under the said directions, any acquisition of shares/ reorganization event that transfers control of a deposit taking NBFC would require prior permission of the RBI.
- The RBI has introduced a fourth category of NBFCs as "Infrastructure Finance Companies". An NBFC-ND-SI satisfying certain additional conditions shall be eligible for classification under the new category. IFCs have been permitted to exceed the concentration of credit norms presently applicable to NBFC-ND-SIs (not being IFCs).
- The RBI has permitted NBFCs to participate in the trading of IRFs on recognized stock exchanges for the purpose of hedging their underlying exposures and subject to RBI/ SEBI guidelines.

Foreign Venture Capital Investors

- In order to bring parity between FVCIs and domestic Venture Capital Funds, SEBI has made it mandatory for

applicants seeking registration as FVCIs to obtain firm commitment from their investors for contribution of an amount of at least USD 1 million at the time of submission of applications to SEBI.

Insurance

- IRDA has issued a circular allowing life insurance companies having a deficit in their life fund, to pay bonus to the policy holders for a period of 10 years commencing from the year in which the life insurance business operations are started. Prior to the issuance of the circular this period was restricted to seven years.
- IRDA has made it mandatory for insurance companies to cap charges on ULIPs at specified levels. The limits specified are represented as caps on the maximum difference between gross yield and net yield. Based on the tenor of the insurance contract, the limits specified are as follows:
 - Tenor up to 10 years, 300 basis points.
 - Tenor of more than 10 years, 225 basis points. In both the above cases, irrespective of the tenor of the contract, the fund management charges should not exceed 135 basis points. Further, surrender charge cannot be levied for policies surrendered from the fifth year of the policy.
- IRDA has issued guidelines on "Corporate Governance for the Insurance sector" and has directed that insurance companies should take necessary action to comply with their guidelines starting from the financial year 2009-2010.
- IRDA has clarified that investments in IDRs by insurance companies would amount to an indirect investment made outside the country and hence is not permitted.
- IRDA has made it mandatory for insurance companies to collect PAN from all persons where the contracted annual premium per insurance policy exceeds INR 100,000. Insurance companies have also been advised to collect a signed declaration from persons exempted from the requirement of PAN, stating the provisions of the Income-tax Act under which they have been exempted.

Information technology

- The IT (Amendment) Act, 2008, along with the IT Rules, 2009, has come into force on 27 October 2009.
- The Government has taken the following key steps under the framework of this legislation:
 - Constitution of "Indian Computer Emergency Response

Team" to serve as the national nodal agency in the area of cyber security.

- Set-up of a Cyber Appellate Tribunal with the powers of a civil court, to hear appeals arising out of decisions on cyber contraventions.
- Procedures and safeguards have been notified for matters such as interception, monitoring and decryption of information, blocking for access of information by public and monitoring and collecting traffic data or information.

Retail and consumer products

- The Legal Metrology Bill, 2009 has been passed by the Rajya Sabha on 1 December 2009 to establish and enforce standards of weights and measures, regulate trade and commerce in weights, measures and other goods which are sold or distributed by weight, measure or number and for related matters. The Bill inter alia provides for regulation of weight or measure used in transaction, approval of model of weight or measure, verification of prescribed weight or measure by Government approved test centre and prescribing qualification of legal metrology officers appointed by the Central or the State Governments.
- The Rubber (Amendment) Bill, 2009 has been passed by Rajya Sabha to amend the Rubber Act, 1947 and to introduce suitable amendments in light of the several developments and changes in the rubber industry since the inception of the principal Act. Accordingly, the Bill seeks to delete the obsolete provisions and substitute some of the existing provisions in the Rubber Act, 1947 in order to strengthen it to meet the revised economic conditions.
- The Government has indicated (Press Note dated 16 December 2009) the Government has indicated that it proposes to put a regulatory framework in place in the form of Marine Fisheries (Regulation and Management Act). The objective of the legislation is to ensure that there is no unregulated fishing in the Exclusive Economic Zone beyond territorial waters of India, and to conserve fisheries resources through a fisheries management plan.

Media

Broadcasting

Suspension of applications for up linking/ down linking license

- MIB has decided to temporarily suspend receiving applications for permission to up link television channels

from India and down link television channels in India. The applications which have already been received by MIB before 8 October 2009 will be processed according to the procedures.

Status of channels up linked from India before 2 December 2005

- All 164 television channels permitted to be up linked from India before 2 December 2005 were not registered to be down linked in India as there was no provision to register them at that time. The MIB has clarified that permission granted to channels shall be treated as registered television channel and can be carried or included in the cable service. Further, the period of registration would be taken as five years from the date of guidelines ie 11 November 2005 and any renewal would be considered from such date.

Headend-In-The-Sky guidelines

- The Government has issued guidelines for HITS broadcasting service. HITS operator will operate like a conventional Multi System Operator, except virtually the headend is in the sky, instead of being located on the ground.
- Permission for providing the HITS service will be valid for a period of 10 years from the date of issue of license.
- The Government has imposed a cross media restriction of 20% of the total paid up equity for various segments of broadcasting services to avoid vertical integration and promote competition.
- Total foreign investment including portfolio and FDI into the licensed company should not exceed 74%, which needs to be certified every year. FDI up to 49% will be under automatic route.

Health sciences

- The CDSCO has issued a set of new rules containing 17 norms for pharma exporters. The rules which are effective from 1 January 2010, inter alia mandates obtaining NOC from ADC for export of drugs and cosmetics.
- The Union Cabinet has approved the Clinical Establishments (Registration and Regulation) Bill and the same is expected to be presented in the budget session of Parliament. The Bill provides for mandatory registration of all clinical establishments and prescribes enhanced penalty for defaulters. The Bill also prescribes minimum standards of facilities and services which may be provided by clinical establishments.

- The DCGI has introduced a new set of guidelines in respect of the BE studies conducted for export purposes. The new guidelines provides that all BE studies for export purposes should be conducted in the BE study centres approved by CDSCO. The new guidelines also seek to streamline the application process for conducting such BE studies.
- The Centre has revised CLCSS guidelines to enable SSI units to avail benefit of the scheme for financial assistance for an expanded list of machineries/ equipment recommended for drugs and pharmaceuticals products from 32 to 179.
- The Union Cabinet has approved the Union Health Ministry's proposal to amend the Transplantation of Human Organs Act, 1994 in order to make organ transplantations more transparent and patient friendly, and to impose stringent penalties on persons/ hospitals violating the provisions of the above Act.
- The Government has issued draft Drugs and Cosmetics (4th Amendment) Rules, 2009 which provides for the product licenses for narcotic drugs and psychotropic substances to be issued by the CLAA which were earlier issued by SLAs.
- The DCGI has directed SLAs to issue CoPP till the Madras High Court delivers its verdict on the petition filed against the DCGI's earlier order to issue CoPP by the CDSCO.

Real estate

- The RBI increased the risk weightage on loans to CRE sector from 0.4% to 1% in November 2009.
- The Ministry of Housing has issued a draft of the new Model Real Estate (Regulation of Development) Act with a view to increase transparency in the real estate industry. Some of the key features of the draft bill are as follows:
 - Mandatory registration with the Real Estate Regulatory Authority for real estate projects before their promotion by the developers.
 - Formal sale agreement to be entered into with the buyer prior to accepting any advances.
 - Bank guarantee of 5% of the total project cost to be furnished. The same would be encashable on failure to complete the project on time or on violation of the provisions of the Model Real Estate (Regulation of Development) Act.
 - Any amount collected from buyers as deposit/ advance

shall not be utilized for any purpose other than for completion of the project.

- The RBI has extended the permission granted to corporates to avail ECB for development of integrated townships from 31 December 2009 to 31 December 2010 (under the approval route).
- The RBI has issued the final guidelines clarifying the exposures to be classified as CRE. As per the guidelines, where repayment of funding is primarily dependent on the cash flows generated by real estate assets, the exposure would be classified as CRE.

Hospitality

- Overseas payouts towards royalty, transfer of technology and management fee by hotels were subject to limits under the FDI policy. The limits have been removed by Press Note 8 (2009 Series) dated 16 December 2009.
- The Ministry of Tourism has introduced a scheme of Assistance for Large Revenue Generating Projects. Under this scheme, PPP projects would be eligible for an assistance which is lower of:
 - Subsidy up to INR 500 million; or
 - 25% of total project cost; or
 - 50% of equity contribution of promoter. Projects such as tourist trains, cruise vessels, cruise terminals, convention centres and golf courses would be covered under this scheme.
- The Ministry of Tourism has introduced the "Visa on Arrival" scheme. Currently the scheme is introduced on a pilot basis for one year for tourists coming from Singapore, Finland, New Zealand, Luxembourg and Japan.
- The RBI has clarified that loans to entrepreneurs who would operate hotels would not fall within the CRE exposure.

Oil and gas

- PNGRB has recently notified the technical standards and specifications for natural gas pipelines which are applicable to all entities authorized to lay, build, operate or expand natural gas pipelines. These standards are intended to ensure uniform application of design principles and shall primarily focus on safety aspects.
- The Kirit Parikh Committee has recently submitted its report on pricing of petroleum products. The committee has recommended immediate deregulation of pricing of

transport fuel. In addition, the committee has recommended a marginal hike in price of domestic LPG and kerosene.

Mining

- The Government has introduced new mining royalty rates for 50 minerals with effect from 13 August 2009. The new rate structure primarily prescribes ad valorem rates.
- Export duty stands revised with effect from 24 December 2009 as follows:
 - On iron ore and concentrates, all sorts (except iron ore fines) it has been increased from 5% to 10%.
 - 5% ad valorem has been imposed on export of iron ore fines by removing the exemption which was earlier being granted.
- In order to implement the comprehensive reforms stated in National Minerals Policy, 2008 the existing Mines and Minerals (Development and Regulation Act), 1957 is in the process of being revised.

Infrastructure and transportation

- The Ministry of Shipping has issued draft policy guidelines to be adhered by major ports while awarding of port facilities under PPP mode for preventing private sector monopoly. The key features are as follows:
 - Existing private terminal operator (being the only operator) in the port for specific cargo will not be allowed to bid for the next terminal/ berth for the same cargo in the same port.
 - Existing private port operator will not be awarded the project if it has more than two BOT projects.
 - Replacing the existing rates circular in November 2009, the Ministry of Railways has issued new policy guidelines on freight incentive scheme. The scheme will be applicable for freight traffic booked under provisions of Goods Tariff. Rail users already availing freight concession under notification issued by zonal railways may continue with the existing arrangement till completion of the contract period.
- In November 2009, the Ministry of Road Transport and Highway has relaxed the norms for executing National Highway projects and has inter alia approved the following modifications to the existing Model Concession Agreement, Request for quotation and Request for proposal for executing National Highway Projects:
 - Increase in equity grant to 40% by merging 20% equity

and 20% Operation & Management grant into equity grant.

- Termination provisions in Road Concession Agreements.
- Exit policy for (Developer) Concessionaire in Ministry of Civil Aviation.
- Under the Request for quotation process, project wise pre-qualification to be substituted with annual/ periodic pre-qualification.
- In September 2009, DGCA has constituted Aviation Regulations Advisory Panel to advise on areas such as airworthiness, flight operations, flight safety, licensing of personnel, air transport services, aerodrome and air navigation services.
- The MCA has accorded Miniratna Category-I status to AAI. AAI can now exercise enhanced autonomy, financial power, etc as per instructions issued by the Central Government from time to time and can implement projects costing up to INR 5 billion with the approval of its own board.

Power

- CERC has notified the open access regulations for inter state transmission for medium term and long term connectivity with a view to provide different varieties of transmission products, standardization of procedures and ensuring level playing field among different categories of market players. According to the regulations, it is mandatory to grant open access to any generating plant or bulk consumer having specified installed capacity, on making an application.
- The Cabinet has approved modifications to the existing mega power policy. The salient features of the amended policy are as follows:
 - Policy would be applicable to thermal projects of 1,000 MW or more and hydel projects of 500 MW or more.
 - Conditions requiring inter-state sale of power for getting mega power status removed.
 - Mega power projects would be required to tie up power supply through long term PPAs.
 - Mega power policy benefits to be available to brownfield expansion of existing mega projects.
 - Power purchasing state should have constituted Regulatory Commissions and shall undertake to carry out distribution reforms.

- 15% price preference to domestic bidders not to apply for tariff based competitively bid projects of PSUs
- CERC has issued new regulations fixing the trading margin for short term inter-state trading in electricity.
- The Government has approved a new policy on the development of solar energy by launching the Jawaharlal Nehru National Solar Mission. The program calls for the development of 1.3 GW of solar power over the next three years and 20 GW by 2022 through a national feed-in tariff for solar energy.
- The Ministry of New and Renewable Energy has announced generation based incentive for grid interactive wind power projects. The incentive will be provided to wind electricity producers at INR 0.50 per unit of electricity fed into the grid for a period of 4 to 10 years. The financial outlay for the scheme during the Eleventh Plan period is INR 3.8 billion and will cover a maximum of 4 GW of wind projects. A project can claim either accelerated depreciation benefit ie 80% in the first year or the incentive. Wind projects feeding the grid at regulated rates and captive projects are eligible for the incentive.

SEZ

- Guidelines issued for exemption from stamp duty on instruments executed for purchase of land in SEZ area by SEZ developer units.
- Guidelines issued for Transfer of in-principle or formal approval issued by a SEZ developer to its subsidiary or special purpose vehicle
- Guidelines issued for change in area of SEZ.
- Clarifications issued for calculation of NFE that provides for NFE to be calculated in rupee terms only.
- SEZ developers allowed to credit up to 100% of specified foreign earnings to EEFC account.
- SEZ developers allowed to avail ECB for providing infrastructure facilities within SEZ. However, ECB not permissible for integrated township and commercial real estate within SEZ.
- Guidelines issued for consideration of proposals for authorized operations by the BoA.
- Norms issued for building infrastructure within non processing area of SEZ.

Indirect tax**Customs duty**

- BCD on import of goods for expansion of mega power projects reduced to 2.5%.
- Mega power projects exempted from CVD, SAD and education cess.
- Concessional rate of BCD on goods imported under Free Trade Agreement from ASEAN countries.

Service tax

- Clarification issued for refund of input service tax credit for export of services with an additional requirement of a certified correlation statement between input services and services exported.

Foreign trade policy

- The new FTP replaces the FTP 2004-09 with effect from 27 August 2009.
- 26 new countries included in the Focus Market Scheme, including Latin America and Asia-Oceania.
- The Incentive under the Focus Market Scheme increased from 2.5% to 3%.
- Benefit under Focus Product Scheme extended to a large number of products such as agricultural machinery, clock and watches, railway locomotives, wind mills, wind turbines and electric operated vehicles.
- Incentive under Focus Product Scheme increased from 1.25% to 2%. Special focus products such as sports goods, toys and handicrafts entitled to credit scrips at higher rate of 5%.
- EPCG scheme at zero duty extended till 31 March 2011. Application and redemption forms under EPCG scheme simplified.
- Export obligation on import of spares, moulds etc under EPCG Scheme reduced to 50% of the normal specific export obligation.
- DEPB scheme extended from 31 December 2009 to 31 December 2010.
- Service providers in telecom sector and foreign exchange remittances for services provided by airline and shipping lines not entitled to benefit under the "Served from India Scheme". Hotels, restaurants, other service providers in tourism sector entitled to duty credit scrip equivalent to 10% of free foreign exchange.

Others**Visa**

- Business (B) visa to be issued only for specified set of activities like attending board meetings, project monitoring, trade exhibitions, exploring business ventures, procurement of goods and services from India etc.
- Employment (E) visa to be granted only to skilled and qualified professionals keeping in mind the availability of comparable resources in India. Indian Missions empowered to issue E Visas up to 1% of the visa sponsor's Indian workforce subject to a maximum of 20 (40 in case of power and steel sector up to June 2010). No restrictions up to 5 E Visas. Visas in excess of 1%/20 employees, to be approved by Ministry of Labour & Employment.

Social security agreement

- India's SSAs with Belgium and Germany have now entered into force. In addition, India has now signed SSA with France, Switzerland, Netherlands, Luxembourg and Denmark that are yet to enter into force.

Global tax update

The world of tax has seen some very significant developments in recent times. Even though officially recession seems to be fading away, the global tax landscape has undergone an unprecedented change in the last one year on account of the measures taken by Governments to provide fiscal stimulus. Governments are addressing this new environment by trying to protect revenues and collaborate with one another like never before. A number of countries have tax reform process underway or are about to start the process.

Obama Administration's financial year 2011 tax proposals

The Obama Administration's budget for financial year 2011 contains a number of proposals from last year as well as some significant new provisions. Like last year's budget, the new budget released on 1 February 2010 would make permanent the research credit, codify the economic substance doctrine, tax carried interest as ordinary income, etc. New in this year's budget are proposals to impose a "financial crisis responsibility fee" on large financial institutions, restrict ability to transfer intangible property to offshore subsidiaries, etc. The budget does not include a proposal from last year to curtail the use of the "entity classification rules".

These changes, if enacted, could dramatically change the competitive position of US multinational businesses across all industries.

Developments in China

On 16 December 2009, the China State Administration on Taxation announced Circular 698 which provides guidance on taxation of gains derived by non residents on sale of shares. The circular imposes an obligation on non residents to supply information and documents regarding indirect sales.

If a non resident investor indirectly disposes of a Chinese resident company's shares by selling the shares of an intermediate holding company located in a jurisdiction where the effective tax rate is less than 12.5% or which exempts offshore income from tax, Circular 698 requires the seller to submit information and documents to the tax authority within 30 days of the conclusion of the share transfer agreement. If the existence of the intermediate holding company is found to have no commercial purpose except the avoidance of tax liabilities, Circular 698 asserts the Chinese right to invoke general anti-avoidance rules and disregard the intermediate holding company.

The China State Administration on Taxation also issued Circular 601 in October 2009 which clarifies beneficial ownership status for treaty benefits for incomes in the nature of royalty, interest and dividends. The circular states that a beneficial owner is a person who has the ownership and control rights of such income or of the rights or property that result in the income. The circular further states that treaty intent and substance over form principle must be used to determine the status of the beneficial owner on a case by case basis.

Reform of CFC regimes

The 2009 UK budget included a number of significant international tax changes. UK companies will no longer be taxable on dividends received on or after 1 July 2009 from both UK and non UK sources, subject to conditions. Building on the dividend exemption regime, the UK Revenue has been working on the new CFC regime and has published a 'direction of policy' document. The UK Revenue has now issued a discussion document as well.

In January 2010, the Australian Government released a consultation paper setting out proposed reform of the CFC rules. The reforms were initially announced in May 2009 as part of broader reforms to Australia's international tax regime.

Transfer pricing update

On 9 September 2009 the OECD released the proposed revision of the Transfer Pricing Guidelines. The main changes contained in the proposed revision are as follows:

- Replacement of the hierarchy of transfer pricing methods with the most appropriate method.
- Detailed discussion on importance and requirements of a comparability analysis.
- Guidance on application of transaction profit methods. This represents an important update of the existing guidance and once finalized, it should provide greater clarity to taxpayers and the tax administration on application of transfer pricing rules.

In another development, a meeting of a UN transfer pricing subcommittee was convened to discuss transfer pricing issues from a developing countries perspective. The work of the subcommittee is expected to result in the development of a UN manual on transfer pricing.

There was a significant setback to the arm's length principle in the recent US Court of Appeal decision in the case of Xilinx Inc. The appeals court, however, subsequently withdrew its controversial opinion early this year.

Global transparency and tax information exchange International tax evasion and the implementation of the OECD's internationally agreed tax standards have continued to take high position on the global political agenda. All 84 countries surveyed by the OECD have now endorsed the OECD standards and have agreed to implement them. In addition, there has been a rapid increase in the number of tax information exchange agreements signed by countries.

Other developments

- UK's pre-budget report released in December 2009 has proposed a 50% bank payroll tax (a windfall tax payable on bonuses in excess of GBP 25,000). However, there remains considerable uncertainty over the precise coverage and further development is expected.
- The UK Revenue is also exploring an ADR mechanism. It is anticipated that the ADR mechanism will follow the same arbitration and reconciliation approach that has been adopted for other legal disputes.
- France has continued with its tax reform package, begun in 2007, with introduction of new anti-avoidance and CFC rules.

- The US Internal Revenue Service has announced that it is developing a new schedule intended for use by business taxpayers with assets over USD 10 million to disclose uncertain tax positions on their tax returns. The schedule will require a concise description of each uncertain tax position and the maximum amount of potential federal tax liability attributable to those positions.
- Indirect tax reform is also high on the agenda of Governments. Around the world many countries have introduced or are anticipating major reforms to their VAT/

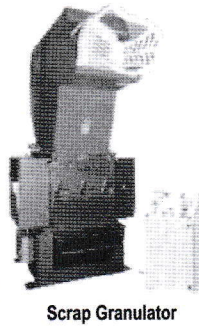
GST systems. Even well established VAT/ GST systems are not immune to significant changes. The EU and Switzerland, for example, have both introduced major VAT changes on 1 January 2010 that have a significant impact on the VAT treatment of a range of international services. The past year has witnessed a dizzying array of tax legislation, reforms and stepped up tax enforcement efforts in virtually every jurisdiction around the world. The pace of change may only accelerate as Governments and businesses reflect on lessons learned from the global economic crisis.

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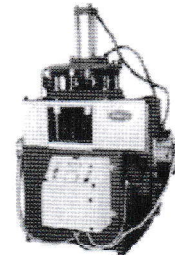
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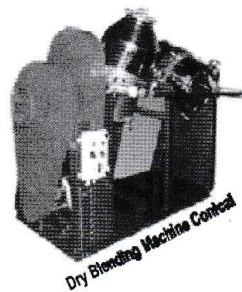
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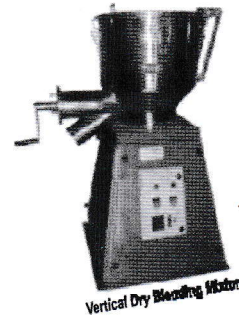
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Medical devices continue to be forerunners in the adoption of antimicrobial plastics

Antimicrobial plastics markets are currently in the development stage with healthcare segments such as utilities and medical devices continuing to be forerunners in the adoption of these products as per Frost & Sullivan. Antimicrobial plastics have proved hugely beneficial for the healthcare industry. With the alarming rise in hospital-acquired infections, antimicrobial plastics are being used in areas such as air vents to prevent the transfer of communicable diseases. The buildup of awareness on the advantages proffered by these products has been largely responsible for this growth spurt. The healthcare sector is an established market for antimicrobial plastics, with many emerging applications in this particular arena. The spawning of new applications in the industrial and consumer product sectors has enabled the market to continue on its current upward trajectory. Opportunities abound in the industrial segment, which is in the initial stages of growth, and customers are realizing the benefits of using an antimicrobial-incorporated product. Compared to the medical and healthcare segment, this is a less regulated space except for packaging applications that cater to the food and beverage industry and other food contact vessels and equipment. Other high-growth areas include the sportswear and equipment segments, particularly in North America and Europe, where high awareness levels have translated into better product uptake. Moreover, high per capita income in these regions favors the use of antimicrobial plastics in sports equipment. Original equipment manufacturers (OEMs) within the consumer goods sector consider the antimicrobial property to be a perfect value addition to their product lines, and this has proved to be a good marketing tool. Although the North American and European markets have witnessed robust growth, the Asian markets, particularly India and China, are the new hotspots, where untapped potential must be harnessed. Most Asian countries have high population density and low per capita income, resulting in poor hygienic conditions, greatly amplifying the need for antimicrobial plastics in these countries. However, issues surrounding affordability and low awareness hamper progress in the Asian markets. Further, the lack of stringent regulations in the antimicrobial consumer products segment has encouraged some manufacturers to make false claims regarding the antimicrobial property and performance of their product. As some products have fallen short of expectations, the rising level of angst among customers is reigning in market growth. Strategies adopted by a few companies to reduce the cost of end products are likely to result in the removal of antimicrobial protection from these products. This aspect is also negatively impacting market dynamics. Due to the global economic slowdown, manufacturers of consumer products are forced to resort to measures to ensure that products remain cost-effective for consumers. Consequently, manufacturers of high-volume regions especially Asia, neglect the addition of antimicrobial protection as it would keep product costs at the minimum. Participants must identify application areas that are not cost sensitive, such as heating, ventilation, air conditioning (HVAC), to circumvent price challenges and navigate a path to profitable growth. In addition, resin manufacturers should identify application areas in regions such as Asia, Africa and Latin America that are not too cost sensitive

Antimicrobial plastics used in medical devices prevent hospital related infections

The market for plastic medical devices is growing despite the global economic slowdown. The medical device market is therefore quite optimistic to achieve double digit growth at 15% in Asia, 10-12% in America, and 6-8% in Europe for 2009 and 2010. Although medical devices may differ widely in design and use characteristics, certain factors determine susceptibility of a device to microbial contamination and biofilm formation: duration of use, number and type of organisms to which the device is exposed, flow rate and composition of the medium in or on the device, device material construction and conditioning films on the device. 5-10% of hospital patients acquire hospital related infections in the United States alone. The most common post operative infections are urinary tract infection, surgical site infection and pneumonia. These post operative infections prolong the patient's hospital stay by about 4-5 days, increasing cost of hospitalisation. Almost 30% of these infections are considered to be preventable. Many of these infections occur due to formation of biofilms of implanted medical devices. Microbial biofilms develop when microorganisms adhere to a submerged surface and produce extracellular polymers that facilitate adhesion to a surface that may be inert, nonliving material or living tissue. Biofilms can develop on the simplest of medical devices, such as contact lenses, or on more complex items such as prosthetic joints, mechanical

heart valves and pacemakers. Hence, the medical device industry is challenged to develop biomaterials with inbuilt antimicrobial surface properties without deterioration in processability and low surface migration or lower leachable substances, for reducing device-centered infection. But most approaches to date have used drug-eluting compounds or coatings that are eventually consumed. It is much more desirable to have easily processed biomaterials with good wet-strength and long-term efficacy without leachable additives, drugs or biocides. A growing risk of hospital originated infections is causing the industry to increasingly turn to antimicrobial plastics for application in medical devices that can protect against pathogens while remaining cost-effective. The basic requirements for antimicrobials used as either biostabilizers or active ingredients are:

- Low toxicity to humans, animals, and the environment (during manufacture and under conditions of use)
- Easy application
- Compatibility with processing aids, other additives
- No negative impact on properties or appearance of the plastic article, its storage stability, or useful life

To make plastic products antimicrobial, self-assembling monolayer end groups (SAMEs) are emerging as a solution. These two-dimensional SAME end groups use nanotechnologies. These terminal SAME groups are added to the backbone of polymer provide antimicrobial properties. Self assembling monolayer end groups (SAME) technology is the second generation of surface modifying end groups (SMEs). Bioactive SAME groups could include drug functionality such as heparin, biological groups such as peptides, or surface functionality for post device fabrication surface reactions. Self assembling monolayer (SAM) technology has demonstrated that bioactive 'head groups' can be appended to alkane chains as a method of creating model surfaces for in vitro research. Ideally, the chemistry used during such model studies could then be applied to actual medical devices to further improve clinical outcomes. However, SAM technologies are not easily transferred to medical device applications due to the fragility of such systems. SAME technology is a breakthrough that is capable of providing polymers with "SAM-like" engineered surfaces. Relative to backbone chains, polymer end groups are more mobile, in part because they are often tethered to the backbone by a single, flexible covalent bond. Their mobility allows them to diffuse from the bulk, and assemble in the polymer surface to affect surface composition. This occurs spontaneously if the presence of the end groups in the surface reduces system interfacial energy. Simple hydrophobic end group may diffuse to an air interface, while purely hydrophilic end groups may enrich a polymer surface when exposed to aqueous body fluids. SAME technology utilizes very specific hydrophobic or hydrophilic spacer groups, and a head group chemistry chosen for the particular application. The spacer groups will "self-assemble" at the surface through either hydrophobic or hydrophilic interactions, and thus present the head group as the outermost monolayer of the polymer. A polyurethane material with permanently bonded antimicrobial surface properties has been developed by DSM PTG (Polymer Technology Group). The polymer with surface-active alkyl ammonium chloride end groups has demonstrated antimicrobial action against gram-positive bacteria in a range of laboratory studies. Very small amounts of biologically active end groups are permanently incorporated into the polymer during its synthesis. After being extruded or molded into a medical device, the new material modifies its own surface as a result of the polymer's surface activity and self assembly of its novel end groups. In this way the antimicrobial groups are concentrated on the surface where they are needed. No secondary coating processes or treatments are required to provide the necessary antimicrobial properties, which reduces manufacturing times and the cost of goods. The polymers exhibit low water absorption, excellent strength and processability, high molecular weight, and effective contact-killing of Gram-positive bacteria relative to controls. Anti-Crobe antimicrobial POM polymers are a family of acetals targeted at high performance polymer applications such as medical devices exposed to environments where heat, moisture and nutrients can promote bacterial and fungal growth. Anti-Crobe antimicrobial polymers resist bacteria throughout the part. Parts made from Anti-crobe polymers help resist bacterial growth in all kinds of difficult applications and environments that can cause odor, contamination, discoloration and slime growth. These resins are NSF Standard 61 Drinking Water Systems components listed, giving the benefits of antimicrobial part protection in potable water application as there are no health concerns from contaminants leaching into water. Materials that restrict the growth of microorganisms on equipment and surfaces in the medical environment help control the potential for infection in hospitals, clinics and doctor's offices. These engineering plastics by Ticona give medical designers a tool to apply to demanding applications that can benefit from resistance to bacteria and fungi. The material works by inhibiting bacteria's ability to reproduce. The inorganic, antimicrobial technology built into this acetal series is present throughout the polymer matrix and not just on the surface as with coatings. This means its protection won't abrade or scratch off, so it can continue to limit microbial growth over the long term. This deterrent to bacteria and

fungi also keeps them from attacking the plastic and causing the odors, stains, biofilms and loss in mechanical properties that can compromise product performance. Many components and surfaces touched by medical staffs or patients are candidates for these new antimicrobial grades, as are hard-to-reach-and-clean areas that can foster microbial growth. The polymers' high lubricity also makes them ideal for sliding parts, such as those in hospital beds. The materials are dimensionally stable, abrasion resistant, and tolerant to low temperatures. In addition, they give good surface aesthetics in molding. As a naturally white polymer, they can be tinted or color coded. They also have a high resistance to chemicals and withstand continuous exposure to hot water at 82 C (180F) and intermittent exposure to water at 100° C (212° F) or more. They can be sterilized by all common chemical, thermal, and irradiative sterilization methods. The polymers were developed for use where polyolefins and other commodity plastics cannot meet performance specifications. The polymers do not protect users or others against disease-causing or food-borne bacteria as antimicrobial properties apply only to the molded part. Bayer Material Science has developed two grades of antimicrobial PC with different levels of efficacy for use in medical device applications to meet a growing demand for products that can help inhibit the growth of bacteria. These are based on attaching silver ions on the backbone of PC polymer. Bayer is using an inorganic silver nanoadditive to control growth of bacteria on the surface of medical devices. The nano particles' high surface area makes the silver additive highly efficient. The company says the additive can potentially control the generation of Gram-positive (bacillus, listeria, staphylococcus) and Gram-negative (e-coli, salmonella) bacteria. Stain testing shows that bacteria on untreated PC grow unabated, while bacteria growth on the antimicrobial PC is virtually nonexistent. Potential applications are IV and urological systems, and housings for diagnostic/hospital equipment. Patented polymer technology has yielded an altogether new type of antimicrobial that provides permanent protection at much less cost than conventional silver-based additives while eliminating common problems like discoloration, opacity and concerns about heavy metals, by BIOSAFE, Inc. Tradenamed BIOSAFE®, the new antimicrobial protects plastics from staining and degradation caused by bacteria, mold, mildew, and fungi and does not compromise end-product safety by migrating out of the plastic or being rubbed off the surface, according to the company. The additive does not compromise optical properties when used with high-clarity resins. It provides an environmentally sustainable means of prolonging the useful life of consumer and industrial products and addresses the growing demand among the healthcare community for hygienic cleanliness in medical products for hospitals and doctors' offices. As a nontoxic polymer that renders plastic surfaces permanently antimicrobial, it eliminates the safety issues of leaching antimicrobials and does so while actually reducing the cost of effective end-product protection. It takes 1-4 hours to achieve effective microbial reductions on plastic surfaces. BIOSAFE products can be incorporated by standard mixing and compounding techniques and they contain no volatile organic compounds, heavy metals, arsenic, or polychlorinated phenols. Toxicity tests have shown them to cause no irritation or sensitization in skin contact. BIOSAFE chemistry is FDA listed as a modifier to medical devices and has received its EPA label approval. The spread of infection in hospitals and the development of antibiotic-resistant strains of bacteria is nationally recognized as a critical healthcare problem, one that the antimicrobial can help solve through its use in catheters, wound dressings, and high-contact environmental surfaces such as door knobs and countertops.

Biaxially oriented PLA produced on existing BOPP equipment without much additional cost

A biaxially oriented laminate film including a first amorphous polylactic acid polymer heat sealable polymer layer, a second core layer including a blend of crystalline polylactic acid polymer, and 2-10 wt% of the core layer of an ethylene-acrylate copolymer, has been developed by researchers from Toray. The laminate film, exhibiting the property to be transverse oriented in excess of 6 times its original width (8-10 times its original width) with excellent operability and relatively low haze is obtained with this development. This invention has obtained patent and has a multi-layer biaxially oriented polylactic acid (BOPLA) film with a novel formulation that exhibits significantly improved ability to stretch in the transverse direction in a biaxial orientation process. PLA has specially designed a processing aid in small proportion which helps in better orientation on BOPP stenter processing equipment without additional capital investment in a big way. The methods could produce BOPLA film at transverse direction orientation rates near or the same as BOPP transverse orientation rates so as to improve the productivity of BOPLA film production and allow for the utilization of BOPP film making processing equipment without substantial changes to the equipment. This multi-layer laminate film includes a first layer of a heat sealable

polymer including an amorphous PLA and a second layer of a crystalline PLA containing blend on one side of sealable amorphous PLA layer. This second crystalline PLA containing blend layer may be considered a core or base layer to provide the bulk strength of the laminate film. The second PLA core layer includes a blend of crystalline PLA homopolymer combined with an amount of ethylene-acrylate copolymer that acts as a processing aid to enable high transverse orientation rates of 8-11 times. The second PLA core layer may also include an optional amount of amorphous PLA blended with the crystalline PLA and the ethylene-methacrylate copolymer. The first heat sealable layer includes an amorphous PLA which provides heat sealable properties to the laminate and also may include various additives such as antiblock particles to allow for easier film handling. Furthermore, the laminate may further include a third PLA polymer containing layer on the second PLA polymer containing core layer opposite the side with the amorphous PLA sealable layer for use as a printing layer or metal receiving layer or coating receiving layer. This third layer of this laminate can include an amorphous PLA, a crystalline PLA, or their blends. Biaxially oriented PLA sheet is commercial in applications like prepaid phone cards and gift cards and hotel key cards, where it replaces PVC. Sheet for such cards is made by Biax International Inc., Tiverton, Ont., and Treofan Group in Raunheim, Germany. PLA is a high-clarity bio-polyester derived from fermented corn starch. NatureWorks makes 19 grades. Pilot-plant quantities are also made by Mitsui Chemical and Shimadzu Chemical in Japan and Tate & Lyle Biopolymers bv in the Netherlands. Another small producer, Galactic SA in Belgium, works with a Chinese partner. Purac in the Netherlands is a lactic acid producer that blends different isomers of PLA to produce specialty grades such as Purasorb medical resins and high-heat grades for microwave or hot-fill packaging

Plastic tanks are better than concrete for rainwater storage

Water shortage is becoming an acute problem, particularly in under developed regions of the world due to added demands of an ever rising population. Poor water management, unclear laws, government corruption and industrial and human waste have caused this water supply crunch and rendered available water practically useless due to the huge quantity of pollution. Supply of water is rapidly dwindling primarily due to mismanagement of water resources, although over-pumping and pollution are also significant contributors. Climate change is expected to exacerbate the problem by causing erratic and unpredictable weather, which could drastically diminish the supply of water coming from rainfall and glaciers. Water shortage could lead to a slew of subsequent problems such as food shortages. Ground water resource gets naturally recharged through percolation. But due to indiscriminate development and rapid urbanization, exposed surface for soil has been reduced drastically with resultant reduction in percolation of rainwater, thereby depleting ground water resource. Rainwater harvesting is the process of augmenting the natural filtration of rainwater in to the underground formation by some artificial methods. Rain water harvesting is essential because surface water is inadequate to meet our demand and we have to depend on ground water and because recharging of ground water has diminished. There are two main techniques of rain water harvestings. • Storage of rainwater on surface for future use. • Recharge to ground water. Rain water is being harvested/ used instead of wasting it through soil percolation. Water so collected, is now used for WCs, washing machines or garden irrigation. This can save both valuable potable water and expensive wastewater charges. Compared with concrete tanks, tanks in plastic that are easier to instal and handle can be used. Because of the much lower weight, installation cost comes down. Tanks can either be rotational molded or produced in the form of clamshell halves and stapled on palettes. The later method has a lower transport cost along with easy logistics. Smooth tank inner surfaces prevent build-up of contamination, thereby enabling high water quality and simultaneously easy tank cleaning. The tanks have long life and can be recycled after use. Types of water storage tanks include: **Surface Storage:** Free-standing plastic tanks offer the least expensive means of rainwater storage and are available in a wide range of sizes. Since they simply sit on compacted fill or a concrete base, installation is relatively simple. But plumbing and pre-filtration can be problematic when surface tanks are used for large roofs with multiple downspouts. Without expensive insulation systems, surface tanks must be drained for the winter in cold climates. In hot humid climates where nighttime temperatures do not drop significantly, water stored in surface tanks can get quite warm, leading to accelerated biological activity. Since surface tanks are exposed to the weather, they have finite life spans that must be factored into the cost evaluation. Large surface tanks are very difficult to conceal, although sometimes they can be incorporated as a dramatic building design element. **Underground tanks:** They are invisible, are unaffected by freezing weather, and can last indefinitely. Since underground tanks provide a cool, dark

environment inhospitable to algae and microbial growth, they are always preferred when rainwater is to be reused inside buildings. On the other hand, underground storage is usually two to three times as expensive as surface storage and involves significant excavation which can be problematic for sites with large rocks or high groundwater. Typical underground plastic water storage tanks are simply septic tanks made with FDA grade plastics and re-labeled as cisterns. While these tanks may work well as holding tanks for low-yield wells, or as holding tanks for fire control, most are not sufficiently strong to remain empty for any period of time and are not suitable for rainwater storage systems. We offer a range of underground tanks suitable for rainwater storage, each of which has been engineered to remain empty indefinitely without risk of collapse. Most also include specialized features for rainwater collection such as access ways large enough to accommodate filters, pumps and controls and provision for large diameter ports both top and bottom.

Biodegradable polyesters blended with crab shells unveil effective nerve repair material

Researchers at the University of Washington (UW) recently announced a significant innovation in nerve repair material. They have developed a new hybrid fiber by weaving industrial polyester and chitosan which has shown huge promise for creating tiny tubes (called nerve guides) that support repair of a severed nerve. The first component of the new material—polycaprolactone, is a strong, flexible, biodegradable polyester commonly used in sutures. The second component, chitosan, is found in the shells of crustaceans like crabs and shrimps. The hybrid fiber combines the biologically favorable qualities of the natural material with the mechanical strength of the synthetic polymer. Miqin Zhang, a UW professor of materials science and engineering says, "A nerve guide requires very strict conditions. It needs to be biocompatible, stable in solution, resistant to collapse and also pliable, so that surgeons can suture it to the nerve." On its own, polycaprolactone is not suitable for use as a nerve guide because water-based cells don't like to grow on the polyester's water-repelling surface. On the other hand, chitosan is cheap, readily available, biodegradable and biocompatible. Chitosan has a rough surface similar to the surfaces found inside the body that cells can attach to. However, chitosan swells in water, making it weak in wet environments. As a result, the researchers developed a thread made of crab shell and polyester to repair broken nerves. After an injury that severs a peripheral nerve, such as one in a finger, nerve endings continue to grow. But to regain control of the nerve surgeons must join the two fragments. For large gaps surgeons used to attempt a more difficult nerve graft. Current surgical practice is to attach tiny tubes, called nerve guides, that channel the two fragments toward each other. Currently, commercial nerve guides are made from collagen, a structural protein derived from animal cells. But collagen is expensive, the protein tends to trigger an immune response and the material is weak in wet environments, such as those inside the body. The strength of the nerve guide is important for budding nerve cells. As an alternative to collagen nerve guides, the team combined the industrial polyester polycaprolactone with chitosan at the nanometer scale by first using a technique called electrospinning to draw the materials into nanometer-scale fibers, and then weaving the fibers together. The study notes resulting material to have a texture similar to that of the nanosized fibers of the connective tissue that surrounds human cells. The researchers maintain that the two materials are different and are difficult to blend, but proper mixing is crucial because imperfectly blended fibers have weak points. As a part of the study, the team tested a guide made from the chitosan-polyester blend against another biomaterial under study, polylactidoglycolic acid, and a commercially available collagen guide. The chitosan-polyester nerve guide showed the most consistent performance for strength, flexibility and resistance to compression under both dry and wet conditions. Under wet conditions, which the researchers say best mimics those in the body, the chitosan-polyester blend required twice as much force to push the tube halfway shut as the other biomaterial, and eight times as much force as the collagen tube. In addition to developing strong nerve guides for repairs, the new chitosan-polyester blend is also envisaged to work well for wound dressings, heart grafts, tendons, ligament, cartilage, muscle repair and other biomedical applications. Researchers at Purdue University have developed a technique using spun-sugar filaments to create a scaffold of tiny synthetic tubes that might serve as conduits to regenerate nerves severed in accidents or blood vessels damaged by disease. The sugar filaments are coated with a corn-based degradable polymer, and then the sugar is dissolved in water, leaving behind bundles of hollow polymer tubes that mimic those found in nerves. The scaffold could be used to promote nerve regeneration by acting as a bridge placed between the ends of severed nerves. The researchers are initially concentrating on the peripheral nerves found in the limbs and throughout the body because nerve regeneration is more complex in the spinal cord. About 800,000 peripheral nerve

injuries are reported annually in the United States, with about 50,000 requiring surgery. The approach also might have applications in repairing blood vessels damaged by trauma and disease such as atherosclerosis and diabetes. The new approach represents a potential alternative to the conventional surgical treatment, which uses a nerve "autograft" taken from the leg or other part of the body to repair the injured nerves. Researchers are trying to develop artificial scaffolds to replace the autografts because removing the donor nerve causes a lack of sensation in the portion of the body where it was removed. The autograft is the lesser of two evils because you have to sacrifice a healthy nerve to repair a damaged segment. Researchers from Cornell University published similar findings that focused on using the technique to create vascular networks for providing blood and nutrients to tissues and grafts. The synthetic scaffold resembles the structural assembly of natural nerves, which are made of thousands of small tubes bundled together. These tubes act as sheaths that house the conducting elements of the nerve cell. The first step in making the tubes is to spin sugar fibers from melted sucrose. The sugar filaments were coated with a polymer called poly L-lactic acid. After the filaments were dissolved, hollow tubes of the polymer remained. The researchers then grew nerve-insulating cells called Schwann cells on these polymer tubes. These cells automatically aligned lengthwise along the tubes, as did nerve cells grown on top of the Schwann cells. This alignment is critical for the fast growth of nerves. Nerve cells grew not only inside the hollow tubes but also around the outside of the tubes. This finding is important because the increased surface area may accelerate the regeneration process following an accident. The scaffolds are designed specifically to regenerate a portion of a nerve cell called the axon, a long fiber attached to the cell body that transmits signals. Fast regeneration is essential to prevent the atrophy of muscles and organs connected to severed nerves. The researchers also discovered that the polymer tubes contain pores that are ideal for supplying nutrients to growing nerve cells and removing waste products from the cells. Images of the polymer-coated sugar strands were taken using a scanning electron microscope. Another instrument, called an atomic force microscope, was used to obtain images of the hollow tubes and pores in the walls of the tubules. Other images using fluorescent dyes revealed the nerve cell alignment along the tubes. The work was done using cell cultures in petri dishes, but ongoing work focuses on implanting the scaffolds in animals. The method for creating the scaffolds is relatively simple and inexpensive and does not require elaborate laboratory equipment. A provisional patent application on the material has been filed. Cotton candy and networks of veins and capillaries inside living tissue, at first glance, may not have much in common. Dr. Leon Bellan, a former doctoral student at Cornell University's Nanobiotechnology Center and Dr. Jason Spector of New York-Presbyterian Hospital/Weill Cornell Medical Center, thought otherwise. Using cotton candy, the team developed a promising new method to create artificial vascular and capillary systems for laboratory-grown tissue, skin, muscle or fat. The three-dimensional vascular network was created by pouring a liquid polymer over a ball of cotton candy attached to two sugar rods. After the polymer solidified, the sugar is dissolved, leaving a complex network of tiny channels. To test how well blood could flow through the artificial vascular system, the researchers injected rat's blood containing fluorescent dye. By following its progress through the network using a video fluorescence microscope, they confirmed that the microchannels and the other larger channels were observed to fill with blood. This technique could someday solve a central problem of developing artificial organs, currently limited by the difficulty of reconstructing the human body's complex and essential circulatory system quickly and cheaply. Without fine-grained nets of capillaries that can be connected to the body's circulatory system, complex tissue can't dispose of waste effectively, nor receive the nutrients it needs from blood cells. While future medical applications are compelling, putting this technique into use in reconstructive surgery and wound healing treatments will likely require significantly more research and extensive testing.

Source : www.plastemart.com

INJECTION MOLDING

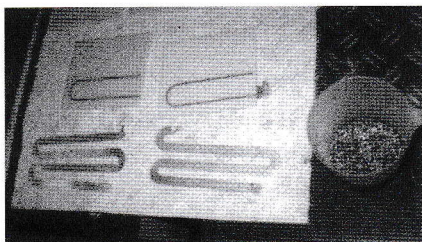
Metal/plastic parts take shape in a single mold and machine

By Matt Defosse

In late October the experts at the Institute of Plastics Processing (IKV) in Aachen, Germany provided a close look at some of the cutting-edge technology they will discuss and display there during the 25th annual International Plastics Technology Colloquium to be held March 3-4, 2010. Two injection molding processes were highlighted, one truly novel and the other an advanced version of an established technology.

Let's start with the truly novel project. The aim, as explained by Walter Michaeli, the director of the IKV, is to combine a process similar to metal injection molding with thermoplastic molding in a single mold, on a single machine. The potential advantages to standard insert molding is that there is no need for metal-forming steps in advance of molding; the design of the metal portion of a part can be much more complex; and there is no need for extra automation or personnel (depending on how the insertion is accomplished).

As MPW watched, Andreas Neuss, the engineer running the project, molded small PC/ABS panels that included a curved metal center. The metal processed was a zinc/tin alloy similar to that processed on laser sintering systems for rapid prototyping, or used for soldering; it is highly electrically conductive. Injection of the metal melt is accomplished with a small aggregating unit piggybacked on the



The metal powder (in cup) can be used to form channels (left) in the thermoplastic part.

injection mold. The aggregate serves both as dosing unit and metal injection system.

The bond between the disparate materials can be broken but you would need to be both strong and angry to do so; the metal does not separate from the plastic without serious effort. Neuss said his project group is working hard to test and improve upon the bond, likely either via some form of coating, or by injecting two types of metal, with the first offering some bond with thermoplastic.

The IKV reckons there might be enormous potential for the combo injection molding/metal diecasting process for a large number of future applications, such as in the automotive and electronics industries.

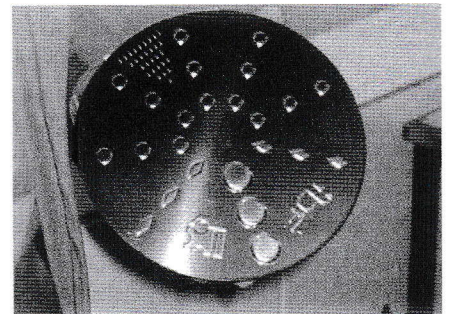
Physical foaming revisited

Across the hall from Neuss and his machine, two of his colleagues were using an injection molding machine from Arburg to demonstrate the Institute's ProFoam process. ProFoam, explained Michaeli, is a new means of physically foaming injection molded parts. The goal is to commercialize a foam injection molding process that is easier to use and less expensive than those currently available.

Of the other physical foaming processes available for injection molding, Trexel's MuCell process is the best known, though the IKV also helped develop an earlier

process, Optiform, which is in commercial use. The new ProFoam setup can use carbon dioxide or nitrogen, with the gas brought into the process at the feeder so that the blowing agent can diffuse into the polymer during the plastication process. Unlike the MuCell process, the gases need not be supercritical.

On the IKV's project, the plasticating unit of the molding machine is sealed off in the rear section of the screw, and a sluice in a pressurized chamber is installed between the material hopper and the



The surface is real metal sheet (stainless steel here), back injection molded using the IKV's ProFoam process.

plasticating unit. This sluice makes it possible to transport the granules into the pressurized screw cylinder under ambient conditions. The pressure of the blowing agent is the sole additional parameter that needs to be set.

Asked to note the advantages over current physical foaming processes, Michaeli said the ProFoam process, which is in advanced development stages, will require much lower investment as no elaborate valve technology is required. So far part weights could be reduced about 30% via the foaming.

As MPW watched the system in operation, the IKV was physically foaming PC/ABS onto an aluminum sheet, demonstrating one of the Institute's other processes, for back injection molding onto

real metal. For this the mold needs to be heated to about 100°C to activate a binder on the back of the metal sheet. This binder creates the bond between metal and plastic.

Asked about potential patent infringement issues with MuCell, the IKV engi-

neers say that because their process stays away from supercritical gases, that aspect is not a problem. Trexel also has patents on physical foaming of very thin-walled parts; here the engineers reckon that their process, as long as it is used to mold parts 1.4 mm or thicker, will not infringe on those.

plasticstoday.com/mpw
Find our related article, "Cool" plastic moldings decorated with real metal," at plasticstoday.com/mpw. For more info on the IKV's March 2010 conference, see www.ikv-colloquium.com.

RocTool, German institute work together on inductive heating

One of the more significant developments at the Fakuma trade show in October was the announcement by the developers of two technologies for inductive heating of injection molds to work together, a move that could encourage the technologies' already swift-growing acceptance.

There was reason for concern as both have interesting but similar technology, similar enough that a patent dispute could have ensued and halted processors' interest in either. Instead, the two—RocTool (Le Bourget du Lac, France) and Germany's plastics institute in Lüdenscheid (German acronym KIMW)—will work together, with RocTool acquiring the KIMW's patents and the institute agreeing to continue its development work while also promoting both outfits' products in Germany, Europe's largest injection molding market and one open to innovation. The KIMW is funded largely by processors and equipment/material suppliers.

Inductive heating is not new, but both RocTool and the KIMW have advanced it significantly. The gist of induction is that electricity, and not water or oil, is used to rapidly heat an injection mold's surface. Because only the surface of the mold is heated, cooling also can be done rapidly. The combination of rapid heating and cooling helps prevent warpage and makes for better surface appearance. (MPW reported on both of these before; search for "Surface appearance, Take Two: Foamed parts, great finish, no license needed" at plasticstoday.com/mpw, originally published in the January 2009 issue, for the most recent account.)

The German partner's Indumold technology involves use of an inductor inside an injection mold, while RocTool's Cage system forms a cage around a mold's exterior. Indumold is already in commercial

use, says Stefan Schmidt, managing director in Lüdenscheid. RocTool only changed focus to injection molding in 2008 but sold 16 licenses in 2008 and expects to sell about 20 this year. Prior to 2008 the company had worked almost exclusively with



Joining KIMW's Stefan Schmidt (center) and RocTool's Alex Guichard (right) is Korbinian Kiesel, owner of molding machine maker Billion, which hosted RocTool at its stand at Fakuma.

processors of thermoset composites.

On an injection mold, RocTool CEO Alex Guichard says a Cage-equipped mold's surface can be heated about 100 deg C in just 6-10 seconds; Indumold gets you that 100 deg C change in temperature in just 2 seconds, says Schmidt. Injection of the melt is onto this hot surface, with water then used to rapidly cool the mold. Because the inductive heating only affects the mold's surface, cooling can be focused there and not be wasted on the rest of the mold.

Guichard and Schmidt say the partnership took shape as they began to

compete on some projects. Generally, though, Indumold makes more sense for parts with deep cuts, and the Cage system is better for large panels. Patent concerns also played a part, as did Guichard's realization that it would take a German partner to be successful in that country.

RocTool acquired the IP, patents, brand name, and know-how surrounding Indumold and will now license the process as well as its own. The Lüdenscheid team will demonstrate RocTool's technology at their facility and help introduce it to Germany; the KIMW also received an ownership stake in RocTool. RocTool, though small, has a presence in Japan, the U.S., and soon Taiwan and India, offering opportunity for Indumold to see use far afield from its German roots, says Schmidt.

Inductive heating is not for every application as there is a cycle time penalty. The technology is of interest for system cost reduction in the processing of parts that, after molding, usually require coating, painting, or other surface enhancement. The rapidly heated mold surface causes parts to form with no weldline and often with a near-mirror surface that needs no embellishment.

Guichard adds, "So far most of the emphasis has been on parts with a top surface finish, but the future will be more use of the rapid heating for high-temp materials" such as polyetheretherketone (PEEK). Making that point at the Fakuma trade show in October was a large (60 cm by 50 cm; 900g) PEEK part, 2.2 mm thick, that RocTool displayed. The panel was molded with a single injection point, demonstrating how the heated (330°C in this case) mold surface positively affected melt flow. "If you can change the flow, you dramatically change the injection molding business," said Guichard. MD

Rapid Heat Cycle Molding now available globally; no license needed

By Stephen Moore

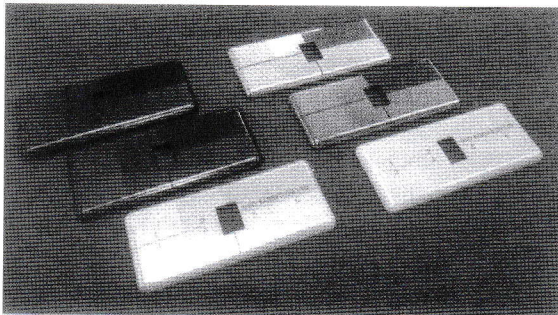
Japanese processor Ono Sangyo Co. (Soka) is stepping up efforts outside of its home country to spur demand for its surface-finish-enhancing and cycle-accelerating RHCM (Rapid Heat Cycle Molding) technology.

Ono Sangyo set up a manufacturing operation in Suzhou, China in 2008 to reduce manufacturing costs for its steam-driven mold temperature control systems and furthermore, it no longer charges a licensing fee for use of the technology. "All we ask is that processors purchase our equipment, and we will also provide them with certificates confirming their right to use our patents that cover the technology," managing director and chief strategy officer Hiro Miyauchi told

but with RHCM, we have solved the issue of cycle time," he says.

IML application

Ono Sangyo has also perfected the use of RHCM in inmold labeling processes to rid parts of the "orange peel" phenomenon, where small pits form on inmold labels. "RHCM is akin to ironing the inmold label," says Miyauchi. This is handy in decorated smart phone and handheld consumer electronics housings using, for example, Picasus metallic luster PET film from Toray Industries (Tokyo, Japan). "Tool cavity textures can also be transferred faithfully onto the film surface in a faster molding cycle," adds Miyauchi.



Inmold labeled cell phone housings are one area where RHCM can enhance surface finish.

MPW. According to Ono Sangyo, such certification is helpful for licensees to present to their OEM clients, especially in the electronics and automotive fields, who remain cautious when selecting contract manufacturers to ensure their products are fabricated in compliance with global intellectual property rights.

Ono Sangyo teamed with Trexel Inc. (Woburn, MA) in 2004 to dock the latter's MuCell process with RHCM. This represented the first step in developing a trio of processes under the Advanced RHCM umbrella. Miyauchi reports that the company has now perfected technology to accelerate cycle times for molding of parts from carbon-offset bioplastics such as polylactic acid (PLA) as well as to improve their surface finish. "PLA is traditionally a slow crystallizing resin

three locations in Japan. Going forward, though, the now-listed company sees itself as an engineering resource provider to other processors. "With our experience as an RHCM processor for over 10 years, serving the likes of Sony, Toshiba, Hitachi, Nissan, and Honda in Japan, we are in the perfect position to enable other molders worldwide to get the most out of standard RHCM and our Advanced RHCM trio," says Miyauchi. Today, he says, more than 300 RHCM controls are in commercial use.

plasticstoday.com/mpw

MPW first covered RHCM technology in 2003. Find that initial report by searching for "Mold-temperature control gathers steam in Japan" at plasticstoday.com/mpw.

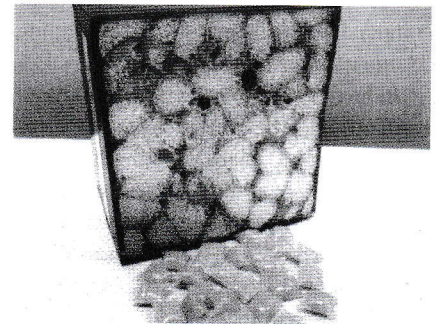
ROTOMOLDING

Tough skin harbors foamed interior

A Japanese company is seeking licensees for its patent-pending process for rotomolding structures having a crosslinked polyethylene foamed core and a polyethylene or polypropylene skin.

Rather than a blowing agent, foam here is realized via the unique design of the pellet. Potential applications are foreseen in any number of uses, including coolers, flotation devices and piers, hot water tanks or chemical tanks, sporting goods, and more.

The developing company, Shiina Kasei Co. (Okano, Japan), is working with rotomolding consultant Paul Nugent to help find potential licensees. In response to questions from MPW, Nugent says foam-filled parts made via the process differ from rotomolded parts with a foamed interior realized with foaming agents. The pellets developed by Shiina Kasei are cored with foam so that as they



Shown is a foamed part, and the pellets from Shiina for rotomolding it.

expand, they form foam balls with outer shells. This is a one-step process; the powder for the shell of a product and the foam pellets are loaded at the same time before the mold is closed.

The outer shells on the foam create a network within the part that reinforces the structure, while the ultralow-density foam inside the shells keeps the overall density of the part low. Typical overall

expansion rates are around 13x. The material can be used with any mold but the venting of escaping gases as the foam expands must be taken into consideration, notes Nugent. Pressure buildup inside the mold can reach 2 kg/cm². The process is said to be a good choice for shapes that require complete or near-complete foaming as the foam can expand to fill the entire part. Parts can be completely recycled with the recycle suitable for use as foaming pellets.

The base materials need to be spe-

cially formulated because standard rotomolding materials typically do not have the necessary rheology profile for the process, he explains. Shiina already has licensed an Icelandic company, IFoam, to work with processors and license the process, and Nugent says that company already is in talks with rotomolders regarding potential commercial applications. Perhaps not coincidentally, the world's largest rotomolder, Promens, has its headquarters in Reykjavik. Shiina says patents are pending in the U.S., Canada,

Europe, Australia, India, and China.

According to Shiina, additional flexural strength can be achieved by inserting a nonfoaming strengthening member in the foamed core. Shiina offers two types of foaming pellets. The specific gravity for the Type I single-layer, high-expansion pellets ranges between 0.05 and 0.1, with expansion rates of 6-40 times the pellet size; for the double-layer (structural) Type II pellets it is 0.1-0.2, with expansion rates of 5-13 times the pellet size. Processing is done at 300°C. **MD**

THERMOFORMING

German processor goes commercial with IML packaging

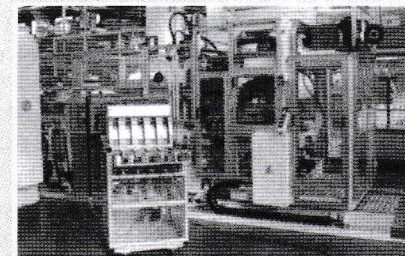
Using machinery supplied by Italy's OMV, German processor Bartling GmbH is thermoforming and inmold labeling polypropylene (PP) food containers in what is one of the first commercial IML thermoformed projects. Bartling is a family-owned processor of food packaging with more than 250 employees.

OMV marketing manager Alfredo Banfi told MPW that the processor uses two OMV F25 thermoforming machines, plus the company's own Label-Robot-Handling inmold labeling (IML) system, for processing and labeling the 500g rectangular PP packaging.

The F25/5 is the third generation of one of OMV's stalwart machine ranges, first introduced more than 30 years ago. The newest iteration is a fully automatic, electro-mechanically driven thermoformer with inmold trim. According to OMV, the flexibility of the machine made it appropriate to be the basis for the company's IML system, but the IML system also can be used with the company's other lines.

During processing, a robot grabs labels from a two-station buffer magazine, separates them, and centers and forms the labels in a forming station. When the first magazine is empty, the second buffer is used while the first is refilled.

After preforming, the labels are given a static charge in the forming station. The robot then inserts the labels into the cavities of the thermoforming tool; electro-



OMV's IML system is shown next to one of its thermoformers.

static helps hold labels in place in those cavities. After containers are formed, the robot then unloads the labeled packaging onto a conveyor belt, located between the forming station and the upper heating oven. The conveyor transports the labeled products to a stacking and counting unit positioned on the side of the thermoforming station. Only one operator is necessary for the machine and for packing the finished products, reports OMV, and the IML unit works with round and rectangular containers.

The IML robot comes with two servomotor-driven axes. The x-axis is also equipped with a cam gearbox with shock- and vibration-free movement.

The vertical inserting arms on the z-axis are made from carbon fiber in order to avoid expansion from heat. The movement is driven through a pneumatic piston with dynamic damping elements to avoid shocks.

OMV predicts that IML use in thermoforming will grow as its advantages over injection molded packaging are realized. These advantages can include the lower investment in molds and robots compared with injection, faster cycle times, the lower cost of labels due to the possibility of reel use, and the potential for lower-weight packaging and thus material savings.

Lids in this project are formed from preprinted sheet. To ensure that the decorated part of the sheet and the thermoforming mold cavities match up, OMV integrated in its thermoforming machines an optical QA camera to control the sheet index. The electronic eye detects a registration mark that is printed on the plastic sheet, and interacts with the sheet index drive to stop the decorated part in the proper position inside the mold. In this way the lid can be decorated across its entire surface and not only on its flat central area as with IML. **MD**

Source: Modern Plastics Worldwide

ENVIRONMENT

HP Bans Polythene Bags

Shimla : A ban on polythene bags went into force across Himachal Pradesh. Under the provisions of the Himachal Pradesh Non-biodegradable Garbage (Control) Act, 1995, violators of the ban will be punished with a fine of Rs.1000 to Rs. 5000, officials said. HP joins Jammu and Kashmir, Delhi and Chandigarh where all kinds of poly-thene bags are banned. Earlier, the HP government had decided to impose a complete ban on polythene bags from the Independence Day but deferred it till Gandhi Jayanti on the request of trading bodies which had sought time to dispose of the old stocks.

[SOURCE : Economic Times dated 03.10.2009]

Campaign Against Plastics Critised By Expert

The Anna University in Chennai has joined the bandwagon of environmental groups in India against the use of plastics. The Vice Chancellor of the University has banned the use of plastics. The Vice Chancellor of the University has banned the use of plastics in University campus and said that to start with, the canteen contractor would be asked to stop using plastic cups and replace them with paper cups.

Commenting on the development, Mr. N.S. Venkatraman, Director, Nandini Consultancy Centre P. Ltd., said, "Given the extent of use of plastics in various application sectors including domestic, industrial and offices, one wonders as to whether the replacement of plastics in its entirety would be possible at all." He criticized the campaigners for not having strategic action plan to do away with plastics.

"It is inconceivable in today's use pattern that plastics can be replaced to any significant extent, in view of the fact that plastic is used in almost all aspects of activities, whether packaging or cell phone or computers or automobiles etc. Under the circumstances, the environmentalists who campaign for ban on plastics appear to be doing so in vacuum.

Need For Organized Disposal

Mr. Venkataraman urged campaigners to be more realistic and work out schemes for the continued use of plastics without causing environmental hazard. Countering the argument that plastic is environmentally incompatible, he asked environmentalists to look at the positive side of the long life of plastics. "The used plastics can be effectively recycled and mixed with the

virgin plastic and reused which would even result in the reduction in cost for the consumer. What is needed is an effective system for collection of waste plastics and avoiding disposal of used plastics in an unorganized manner," he remarked. The other argument against plastics is the emission in the case of burning the plastics. "There is absolutely no need to burn plastics and the campaign by environmentalists must be directed to avoid burning plastics," noted Mr. Venkatraman.

He also urged the environmentalists to focus on propagating the use of biodegradable polymers in India.

Sack the plastic-bag levy

Green-oriented move often counterproductive

The Washington Times Monday, October 12, 20 By Patrick M. Gleason

More and more politicians want to tax the bag you use to carry purchases home, though the purchases often have already been taxed. More than 20 bag-tax bills were introduced across the country in just the past year. From New York to Hawaii, chances are lawmakers in your state or city have considered taxing plastic shopping bags or will do so in the future.

Bag taxes were approved most recently in Washington, D.C., where next year, shoppers will have to pay a 5-cent tax on all paper and plastic bags used at every grocery, convenience and drug store in the nation's capital. This in addition to a D.C. sales tax on non-grocery and nonmedical items.

However, not everyone is jumping on the bag-tax bandwagon, and results from where it has been imposed suggest that the District's bag tax is unlikely to meet proponents' goals.

In May, the Philadelphia City Council shot down a bill to tax plastic and paper grocery bags. An attempt to implement a citywide plastic-bag ban subsequently was introduced and rejected in June.

New York City Mayor Michael Bloomberg has been a vocal proponent of a 5-cent tax on plastic bags. That proposal died this year in the face of resistance from his own city council, which contended that the new levy was too costly in the midst of the deepest recession in a generation and in what already is one of the most expensive locales in the United States.

In what came as a shock to many, the crunchy, environmentally minded voters in ever-so-blue Seattle re-

jected a 20-cent plastic-bag tax at the polls in August by a nearly two-thirds majority. In California, legislation to impose a 25-cent bag tax died in committee.

While Americans pay taxes on almost all goods, the preponderance of budget shortfalls at the state and local level has prompted many legislators to target even that which is not purchased. Though they're nothing more than a money grab for revenue-desperate lawmakers, bag taxes are always sold to the public under the auspices of litter reduction and environmental protection.

The truth is there are no studies that show bag taxes or regulation benefit the environment. In fact, there is only evidence to the contrary.

Environmental groups and other bag-tax advocates point to Ireland and San Francisco as policy models. However, experience there highlights the ineffectiveness and adverse impact of bag taxes and regulations.

In 2007, San Francisco became the first city in the United States to pass an outright ban on plastic bags. San Francisco conducted litter audits before and after the ban. The results? The ban had no impact on the city's litter-mitigation goals. In fact, bag litter increased, making up 5.9 percent of total litter after the ban compared to 4.4 percent before the ban.

Then there is Ireland, which approved a bag tax in 2002 and is often lauded by those who wish to impose bag taxes on this side of the Atlantic.

Ireland's bag tax caused use of plastic shopping bags to decline by more than 90 percent. What bag-tax proponents conveniently fail to mention is that the amount of all plastic bags used on the Emerald Isle (including those bought to hold trash and for other uses) actually has increased 10 percent since the tax went into effect. This underscores the fact that consumers rarely discard plastic shopping bags after one use, and efforts to discourage the use of plastic shopping bags can increase the total number of plastic bags used. In fact, 92 percent of the population reuses plastic shopping bags to line trash cans, clean up after pets and for a host of other functions.

Reducing litter in our cities and states is a worthy and noble goal. However, efforts to do so by imposing a highly regressive tax on every bag used at the check-out have proved to be misguided and ineffective.

Voluntary efforts and incentives to encourage recycling and the use of reusable bags are working. In 2006 alone, recycling of plastic bags increased 24 percent.

Market forces and consumer education will cause this positive trend to continue.

It is this combination of information and incentives, not taxation and regulation, that will yield the best outcome for family budgets, employers, the economy and the environment. Bag taxes and plastic-bag bans will continue to be proposed in states and cities across the country in the coming months and years. Given the results from places where such policies have been tested, lawmakers and voters would be wise to sack the bag tax.

AMUT S.p.A. press release

1,500,000 PET post-consumer bottles recycled every hour from now on!

A world technological success with two new r-PET plant constructions of PETSTAR and FRP plants places AMUT at the top of the leading companies in recycling equipment sector.

Today, 1,500,000 is the quantity of dirty post-consumer PET bottles recycled every hour of every day throughout the year in the various AMUT PET recycling plants operating across the globe.

A remarkable contribution for reducing the carbon foot-print and improving the recycling efforts worldwide with the starting-up of the latest two big plants in Mexico and France; the first PETSTAR located in Toluca, Mexico and the second FPR near Paris, France.

The design of both plants is based on the best washing technology as they are producing flakes to be used to make new PET bottles or "Bottle-to-Bottle" process accordingly the most demanding specifications in recycling in order to obtain the highest and purest standards for r-PET material.

The Toluca plant, located near Mexico City, has an hourly out-put of 3,000 kg of finish r-PET product and it is part of the total ambitious project which amounted to 35 million dollars that PETSTAR started up in the beginning of the 2009. After the AMUT washing process, the r-PET flakes are converted into granules for "Bottle-to-Bottle" application through the Bühler SSP (Solid State Processing) plant.

These three most important multi-national companies in conjunction are producing r-PET material for many of the world-famous brands of waters and carbonated beverages have been tested, and obtained certification with such positive quality acceptance results these companies have to decide to buy the 90% of its pro-

duction for their Bottle-to-Bottle process. The R-PET material is being used presently to make new bottles in many parts of North America for these major beverage companies.

AMUT, proud of its technology, succeeded in obtaining a product purification that seemed to be impossible to achieve due to fact the particular post-consumer bottles in Mexico, are extremely dirty post-consumer bottles that come directly from the land-fills/dumps and are not collected from the usual door-to-door or deposit collection systems.

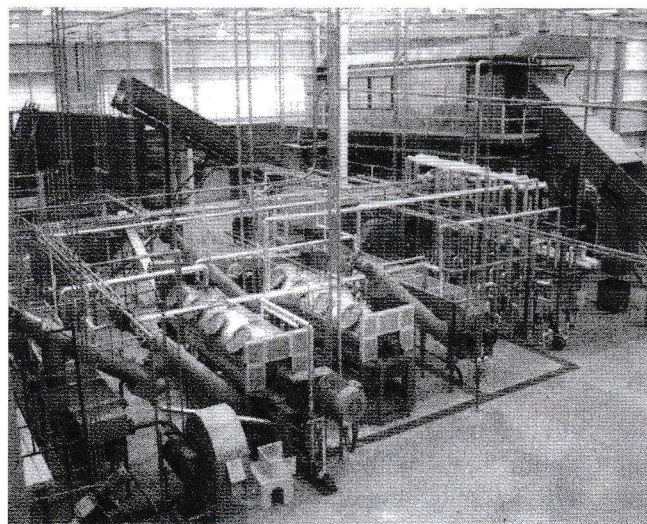
One of the major production points of the plant is: AMUT patented Whole Bottle pre-washing system with hot high friction washing. By utilizing minimum detergents and special water distribution technology the cleanliness is obtained. In fact, the plant requires only 1 liter of water for every kilogram of r-PET material produced: in this way, the consumption of water, energy and chemicals is greatly reduced, resulting in a considerable saving of the operating costs.

Another key production point is the use of Special filters which are fitted in the various stages of the washing process to ensure the washing water characteristics remain unchanged in each stage of the washing process, an essential requirement in order to guarantee the quality level remains unchanged for the washing water.

The operation of the plant is fully automatic and controlled by a main PC, giving information about the status of the various machines, processes and devices during the washing process. All values are saved on 'real-time' & trend graphics allow the historical data of production to be reviewed and saved. The AMUT's recycling plants have been designed to meet the strictest standards that are needed in complying with the production of material for food application.

The Toluca site is ready to be doubled in capacity at the end of 2010, as was officially announced by the governor of the Mexican State, Enrique Pana Nieto, during the opening ceremony on April 22nd.

PETSTAR will be doubling of the plant's throughput by adding a second AMUT washing line in the same facility therefore over 120,000,000 pounds of reclaimed dirty post-consumer PET bottles will be taken/removed from the dumps of Mexico every year! This gives a considerable contribution to reducing the environment impact for the making of new PET bottles with r-PET as well as reducing the amount of waste going to land-fills.



Flakes washing section at PETSTAR plant in Mexico

AMUT has also started up in Paris, France the world biggest recycling plant for PET bottles that was purchased by the company FRANCE PLASTIQUE RECYCLAGE. As of September 2009 this plant will be able to convert every year 40 thousand metric tons of PET bottles into high quality r-PET flakes for "Bottle-to-Bottle" process, with an hourly throughput of 4,000 kg of finish r-PET product.

Based on the same technology of PETSTAR plant, the Parisian site has some new innovations & technological advancements.

The 5.5 metric tons of hourly input of post-consumer material, corresponding to 20 - 25 bales per hour, requiring high speed automation of bale breaking system with the capabilities to remove the steel straps as well. The bale strapping wire is automatically cut and recovered in small pieces for recycling.

The new AMUT Patented "cold" high friction Whole Bottle Pre-Wash technology is replacing the traditional AMUT patented hot system. The new AMUT technology still can be used to treat highly polluted post-consumer PET bottles, while allowing for a considerable power savings in the Operational Costs as well as reducing the overall Capital costs of the AMUT PET recycling plant. The final r-PET results are the same.

Since the post-consumer PET bale quality is highly polluted with non-PET polymers as well as colored PET bottles the separation in the new plant is performed by 3 NIR/Color detectors, in sequence and a final NIR/Color detector to re-check & verify the discharge of material ensuring optimum quality. This is done after the whole bottle wash, which removes all the exterior dirt and almost all the labels on the bottles allowing the Detectors to operate at maximum efficiency.

Thanks to its research and development teams, which focused on compactness and esthetics for the new FPR plant, AMUT developed a new design for the FLAKE washing module: a station where the complete PET FLAKE Washing sections are placed in one structure to become a sole unit. In the middle of the module is the irreplaceable "Friction Washer", the AMUT patented hot washer for dirty post-consumer PET flakes which guarantees the elimination of the organic pollutants and glue.

At the end of the AMUT process the cleaned r-PET flakes are automatically scanned through another color-detector to guarantee the highest quality of the product.

To obtain "Bottle-to-Bottle" certification, the r-PET washing plant is combined with a purification system from STARLINGER for the SSP and EVIAN a well-known French mineral water company producer will be one of the many clients to use the re-generated PET to make new bottles from this r-PET plant.

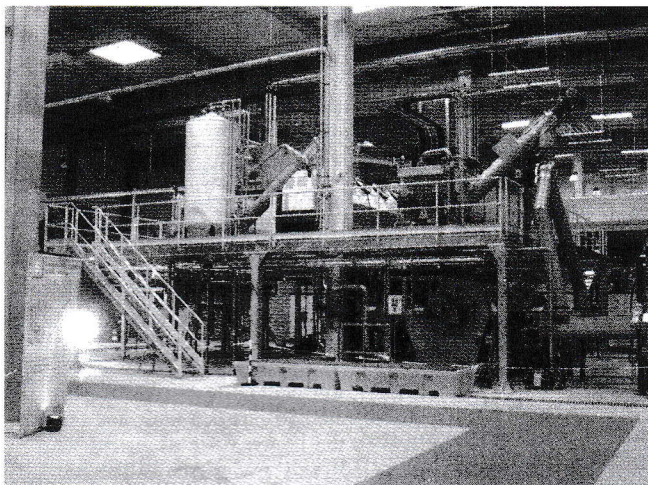
The opening ceremony took place on the 23rd June in the presence of many French government authorities.

For additional information or learn more about AMUT S.p.A.

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Flakes washing section at FRANCE PLASTIQUE RECYCLAGE plant in France

Biodegradable Mulching Film

PST (Park of Science and Technology) of Sicily, Italy,

will collaborate with the Chinese Research Institute IBFC of Changsha in a research project financed by the Beijing Government on the experimentation and production of biodegradable mulching film. The Italian partner will provide the technology to produce the PHA (polyhydroxyalkanoate) biodegradable film.

Testing of Stretch wrap cling Film

Lloyd Instruments offers versatile testing of stretch wrap film with introduction of two new test jigs for its LFPlus 1kN (225 ibf) single column materials testing machine. The TG1075 is used for testing puncture resistance to ASTM D 5748-95 (Re-approved 2007), while the TG1167 is used for testing peel cling to ASTM D 5458-95 (Re-approved 2001).

Stretch wrap film is an extremely important packaging material used in applications from heavy duty pallet strapping to sealing food items in containers to keep them fresh. Peel cling and puncture resistance are important parameters since cling is critical in maintaining a tight wrap after an item is stretch wrapped to prevent the film from unwrapping during handling and transportation, while puncture strength is important with regards to preventing accidental puncture damage thereby helping to maintain product freshness.

The TG1075 features a jig containing a 102mm aperture to support the stretch wrap film and a probe. The jig is locked onto the base of the LFPlus using the machine anchor pin. A removable upper plate allows the film to be mounted and clamped onto the jig. The probe is fitted to the bottom of the load cell. The Puncture resistance test method imparts a biaxial stress to determine the resistance of film to the penetration of a probe at a single constant test speed of 250 mm/min.

For peel cling measurements, the TG1167 Jig is fitted to the LFPlus. A film strip is adhered to a flat film attached to an inclined surface on the peel jig. The force required to remove the film strip from the flat film is measured.

The versatile LFPlus can also be used for tensile testing of stretch wrap film by equipping it with an EXSOOPlus non-contacting extensometer. The film samples have to be perfectly parallel or prepared dumbbells and are typically tested using TG33, TG74 or TG10 tensile grips. The EXSOOPlus provides travel of 800 mm and can readily accommodate the very long elongation that occurs during tensile testing. Suzanne.sharpe@ametech.co.uk

Source : OPPI, *Plastiscope Journal*

BIODEGRADABLE PLASTICS

Making green packaging Biodegradable plastics are 'environment-friendly'; they have an expanding range of potential applications, and are driven by the growing use of plastics in packaging.



Advanced technology in petrochemical polymers has brought many benefits to mankind. However, it becomes more evident that the ecosystem is considerably disturbed and damaged as a result of the non-degradable materials for disposable items. Our whole world seems to be wrapped in plastic. Almost every product we buy, most of the food we eat and many of the liquids we drink come encased in plastic. The environmental impact of persistent plastic wastes is evoking more global concern as alternative disposal methods are limited. Incineration may generate toxic air pollution, and satisfactory landfill sites are limited. Also, the petroleum resources are finite and are becoming limited. It becomes important to find durable plastic substitutes, especially in short-term packaging and disposable applications. Recently, the continuously growing concern of the public for the problem has stimulated research interests in biodegradable polymers as alternatives to conventional non-degradable polymers such as polyethylene and polystyrene etc.

Biodegradable plastics

Biodegradable plastics made with plant-based materials have been available for many years. Their high cost, however, has meant they have never replaced traditional non-degradable plastics in the mass market. The area of degradable polymers, products and definitions has evolved considerably over the last 20 years. In the most general sense and/or good judgment

"biodegradable" means that a substance is able to be broken down into other substances,

with a significant change of chemical structure, by the activities of living organisms and is therefore unlikely to persist in the environment. With this definition, neither a time limit nor environmental conditions are prescribed and

in this sagacity most materials could be classified as biodegradable. However, many materials will remain non-degraded in typical refuse conditions, such as a landfill, or will degrade to products with greater toxicity than the original material. Other terms that are of relevance here include photodegradable, where degradation results from the action of natural sunlight and disintegration, which is the falling apart into very small fragments of material caused by degradation processes. Now-a-days a biodegradable plastic would typically be defined as one in which degradation results from the action of naturally occurring microorganisms such as bacteria, fungi and algae. There are ranges of standards for biodegradable plastics. The requirements vary from 60 to 90% decomposition of the material within 60 to 180 days of being placed in a standard environment - this may be either a composting situation or a landfill. A material that simply breaks up into smaller and tiny portions is no longer regarded as being biodegradable. Naturally occurring polymers include: polysaccharides e.g., starch from potatoes and corn, their derivatives, cellulose from marine crustaceans; proteins such as gelatin (collagen), casein (from milk), keratin (from silk and wool) and zein (from corn); polyesters such as poly hydroxyl alkanates formed by bacteria as food storage; lignin; shellac and natural rubber poly(lactic acid, jute, flax, silk, cotton can fall into the category of natural polymers where the monomer is produced by fermentation. The rate of degradation of each of these depends very much on their structural complexity, as well as the environmental conditions.

While there are a number of biodegradable synthetic resins, including: polyalkylene

esters, polylactic acid polyamide esters, polyvinyl esters, polyvinyl acetate, polyvinyl

alcohol, polyanhydrides. The materials mentioned here are those that exhibit

degradation promoted by micro-organisms. This has often been coupled to a chemical or mechanical degradation step.

There are five different kinds of degradable plastic:

- Biodegradable,
- Compostable,
- Hydro-biodegradable,
- Photo-degradable and
- Bioerodable.

These can be either organically based from renewable resources or synthetic with a petroleum base.

Bioplastics

Compostable plastic: A plastic that undergoes biological degradation during the composting process (up to 2-3 months in a windrow) to yield carbon dioxide, water, inorganic compounds and biomass at a rate consistent with other known compostable materials and leaves no visually distinguishable or toxic residues.

Biodegradable plastic: A degradable plastic in which the degradation must result from the action of naturally occurring microorganisms over a period of time (up to 2-3 years in a landfill).

Degradable plastic: An oil-based plastic containing a chemical additive that undergoes significant change in its chemical structure causing it to break down into smaller particles. The degradation process is triggered only when material is exposed to specific environmental conditions (such as UV, heat and moisture). Residues are not food matter for microorganisms and are not biodegradable or compostable.

The range of degradable plastics now available includes:

- Starch-based products including thermoplastic starch, starch and synthetic aliphatic polyester blends, and starch.
- Naturally produced polyesters.
- Renewable resource polyesters such as PLA.
- Synthetic aliphatic polyesters.
- Aliphatic-aromatic (AAC) co polyesters.
- Hydro-biodegradable polyester such as modified PET.
- Water soluble polymer such as polyvinyl alcohol and ethylene vinyl alcohol.
- Photo-degradable plastics.
- Controlled degradation additive master batches

Applications and uses of Biodegradable plastics

Biodegradable plastics are a new generation of polymers emerging in the market. Biodegradable plastics have an expanding range of potential applications, and are driven by the growing use of plastics in packaging and the perception that biodegradable plastics are 'environmentally friendly', their use is predicted to increase. However, issues are also emerging regarding the use of biodegradable plastics and their potential impacts on the environment and effects on established recycling systems and technologies.

Source : TAPMA, Polymer Business

Technological Developments in PVC Pipes

Abhijit Patil & Dhaval Shah
Reliance Industries Ltd

Introduction:

Water is a critical input for social and economic growth development. Piping system, the most convenient and cost effective means of transporting water, needs to ensure quality and quantity of the potable water being delivered and also to ensure no leakage or cross contamination taking place through the sewerage piping systems.

To provide sustainable water and waste water systems, it is important to use pipes which are:

- Strong and durable
- Safe and clean
- Resistant to corrosion and scaling
- Easy to join, install and repair if required
- Practically maintenance free
- Having long service life
- Recyclable at the end of their service life

Rigid or Unplasticized polyvinyl chloride (UPVC) pressure pipes have been in use since the late 1940's. Correctly processed, the material with its high modulus, excellent retention of long-term strength and its outstanding price / performance ratio, has proven itself the most successful plastic pres-

sure pipe worldwide. Developments and innovations achieved till date, not only in polymer and compound formulation but also in extrusion machinery for producing pipes, have significantly fulfilled the basic need of assured availability of clear and hygienic water.

PVC piping systems score over the competing traditional materials on the following count:

- Corrosion resistance
- Chemical resistance
- Low thermal conductivity
- Low co-efficient of friction
- Flexibility
- Variety of jointing methods
- Leak proof joints
- Non toxic
- Biological resistance
- Maintenance free

PVC was one of the earliest plastic piping systems to handle fluids and today is one of the most commonly used piping materials in the world. PVC pipe industry has remained competitive against traditional materials on the life cycle cost concept. Significant developments have been taken up in the field of PVC pipe to improve the competitive position of PVC pipes via material sav-

ings with improved performance.

In pressure pipes, advances in technology have brought us (Modified PVC) PVC-M and Oriented PVC (PVC-O) pipes. The improved performance of these products has allowed pressure pipes to be manufactured with lower wall thicknesses. This has many benefits, including improved hydraulics and reduced environmental impact.

In non-pressure pipes, development of multilayer Foamcore pipe has allowed significant weight reduction with improved stiffness.

PVC-M Pipes

PVC-M pressure pipes are tough, high performance thermoplastic pipes which incorporate advanced technology and compared to conventional UPVC pipes, have lower wall thickness and superior physical characteristics including higher impact resistance, greater ductility, reduced weight and an increase in hydraulic capacity.

What is PVC-M?

PVC-M is formed by the addition of compatible modifying agents usually Chlorinated Polyethylene (CPE) or acrylics to the PVC matrix, forming an

alloy rather than a copolymer. The addition of modifying agents increases the ductility by altering fracture mechanism while retaining similar strength.

The modifying agents significantly improve toughness, impact and resistance to crack growth; a key performance requirement. The change in material matrix gives greater ductile behaviour and thus enables the factor of safety to be lower than UPVC. Short and long term tests on PVC-M pressure pipes have demonstrated consistently ductile behaviour, particularly in the presence of notches. The reduced factor of safety enables higher allowable stress levels, reduced wall thickness providing greater hydraulic efficiency.



Source: Iplex Pipeline

Characteristics of PVC- M Pipes

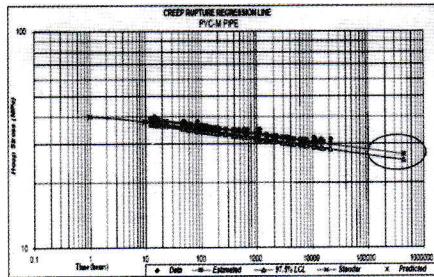
- The optimum combination of strength, stiffness and toughness
- Notch insensitivity with the corresponding reduction of "rapid crack growth" phenomenon
- Enhanced fracture toughness properties allowing for higher design stresses

Properties

The rubbery nature and plasticity of PVC-M are important characteristics. With the new polymeric alloy- PVC-M, the yield stress or strength is reduced a little compared to UPVC, but the toughness is enhanced, so we always have a ductile material.

Long-term pressure testing of PVC-M has been carried out as per ISO 9080. The minimum required strength (MRS) at 50 years is determined as 25 MPa for PVC-M.

Long Term Pressure Testing As per ISO 9080



The wall thickness and mass of PVC-M pressure pipes are approximately 30% less than the equivalent UPVC pipes, with obvious advantages in hydraulic capacity, transport, handling and installation.

Due to its flexibility, it is very easy to handle during installation; the pipes can be cold bent.

Applications

Modified PVC pressure pipes are suitable for applications including:

- Major potable water supply mains
- Industrial process pipelines
- Effluent pipelines for pumped sewage, industrial and rural wastes
- Slurry pipelines carrying abrasive and corrosive mine or quarry materials
- Irrigation and turf watering systems
- Gas supply network
- Compressed air, chilled water and aggressive slurries in harsh gold and coal mining environments.

International Status

PVC-M pressure pipes have been used for potable water supply and agriculture throughout South Africa; over 25,000 km of these pipes in the size range 50-500mm and pressure classes PN 6 to 25 have been successfully installed in last few years - proof of a durable and very competitive pressure pipe. PVC-M pipes have also been used in the gas supply network of the Netherlands for about 35 years. The total length of the network in the Netherlands is about 110,000 km and about 80% of this is the distribution network.

PVC-M pipes have been used in the mining industry in South Africa for over 25 years.

Major International Standards

- Australia/New Zealand Standard

AS/NZS 4765-2007 "Modified PVC (PVC-M) pipes for pressure applications".

- **SABS 966-: 2000** Modified poly(vinyl chloride) (PVC-M) pressure pipe systems.
- **ISO 6993-2006** Buried, high-impact poly(vinyl chloride) (PVC-HI) piping systems for the supply of gaseous fuels - Pipes for a maximum operating pressure of 1 bar (100 kPa).
- **British Standard PAS 27:1999** Unplasticized poly(vinyl chloride) alloy (PVC-A) pipes and bends for water under pressure.

PVC-O Pipes

PVC-O pipes are molecularly oriented polyvinyl chloride pipes which were developed in Europe in the 1970's.

PVC being an amorphous polymer, molecules are distributed randomly.

However, under controlled condition, by stretching the material, it is possible to orient the polymer molecules in the direction in which the material has been stretched.

The extent of orientation is greatly depended on the parameters of the process especially the stretch ratio. It results in a layered structure by greatly enhancing physical and mechanical properties without affecting its original chemical resistance.

PVC-O pipes are designed to operate at higher hoop stresses than traditional UPVC pipes and therefore have a thinner wall for the same pressure class. This is illustrated in the example in the table below which compares minimum wall thicknesses for DN150 Series of UPVC, PVC-M and PVC-O pipes as per AS/NZS.

Mat	PVC-U	PVC-M	PVC-O
Design Stress (Mpa)	11	17.5	32
DN 150	Min. Wall Thickness (mm)		
PN 12/12.5	9.2	5.9	3.5
PN 16	12.0	7.8	4.4

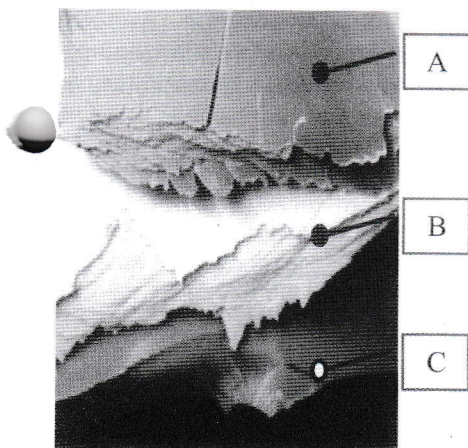
Design stresses of 32 Mpa are used for these PVC-O pipes resulting in

material savings around 50% against the equivalent UPVC pipes.

PVC-O Pipes -The Concept

PVC-O pipe starts as PVC compound that is first extruded into PVC pipe and then physically modified to become PVC-O pipe.

The physical modification causes realignment of the molecular structure from random orientation to radial orientation. This produces a true laminated wall structure by significantly increasing mechanical strength and toughness.



PVC-O Structure (Source: Molecor)

Layered structure after orientation of PVC is shown in the photograph. 'A' and 'B' are highly oriented and partially oriented structures respectively; and 'C' is normal UPVC structure.

Enhanced physical properties after orientation include:

- HDB (Hydrostatic design Basis) of 7,100 psi, approximately 80% greater than PVC
- Tensile strength approximately 80% higher than PVC
- Impact strength approximately four times that of PVC
- Increased resistance to cracking

PVC-O pipe is substantially tougher than standard PVC water distribution pipes and enables water agencies to significantly reduce pipe installation costs.

PVC-O Pipes - The Process

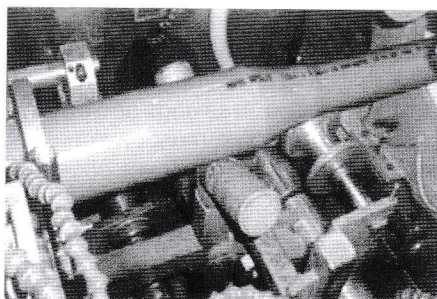
Initially, molecular orientation technologies were applied step wise "in batch", and the orientation was carried out on each pipe individually. Later, the

"in line" system was developed, which works continuously with the extrusion line.

The Process
Batch Process

In first stage thick-walled 'feedstock' pipe is extruded and then cooled. In the second stage of the process, this pipe is subjected to internal pressure at a carefully controlled elevated temperature in a specially designed steel mould. This blows the pipe up to its final dimensions, causing orientation of the polymer molecules in the hoop direction. Rapid cooling then 'freezes in' this orientation and with it mechanical properties are increased. As a result, the pipes can be used at higher service pressures or, alternatively, at the same pressure pipes with thinner walls can be used, giving material and cost savings.

However, this is a relatively slow process and more expensive in terms of energy and labor as it creates intermediate stocks.



PVC-O Pipe Structure (Source: Wavin)

In-line Process

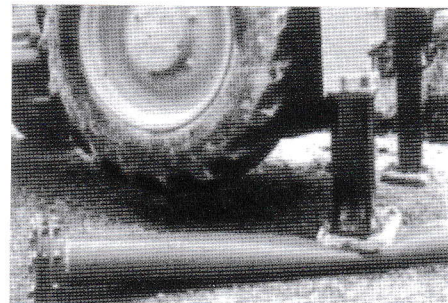
In recent developments, the extrusion and orientation processes have been combined into a single operation. Here, orientation is carried out continuously using a metallic mandrel. This avoids the need to re-heat the feedstock pipe and thus allows savings in energy and thus cost. The process is very fast as compared to 'In-batch' process. However developments have been taken up in 'batch process' as well and thus both the processes have their own individual advantages.

Properties

Crack propagation in the radial or longitudinal directions is almost non-existent in PVC-O, due to orientation of the molecules in hoop direction. As

soon as a crack is initiated and starts to run in either the radial or longitudinal directions, it is deflected into the hoop direction.

The crack front bifurcates repeatedly, absorbing the crack propagation energy in a very short distance, thus causing the crack to stop running. PVC-O thus confers inherent resistance to point loads and notches without modification of the fracture toughness of the basic PVC material.



Source: P W Eagle

This photograph shows the flexibility of PVC-O pipes. Because of its excellent elasticity, it can bear deformation of up to 100 percent of their internal diameter. When crushed, or in the event of a mechanical accident, pipe immediately goes back to its original shape, thus eliminating the risk of potential breakage by sharp edges on rocks or machinery.

PVC-O pipes have extremely good resistance to fatigue failure and can be specified in those installations where some pressure cycling is anticipated and providing design engineers with greater confidence. PVC-O pipes also have excellent resistance to surge pressures and water hammer and are quite capable of withstanding pressure transients over twice their rated working pressure.

Features and Benefits

- High burst strength - increased material strength allows reduced wall thickness and therefore a reduced pipe weight per meter
- High impact resistance - Provides better protection against damage during storage, handling and installation than conventional UPVC pipes
- Resistance to low temperatures- increased toughness allows pipe instal-

lation at temperatures down to -20°C

- Resistance to point loading - The layered wall structure reduces the premature failure under point loading conditions
- Light weight - lighter than UPVC pipes providing ease in handling and installations
- Improved hydraulic capacity- Reduced wall thickness results in larger bore compared to conventional UPVC pipe.
- Improved properties against surge and fatigue.

International Status

PVC-O pipes have been in use for some years in the UK, France, Netherlands, Portugal, USA, Australia, South Africa and Japan. The first installation, in America (Central Kansas) in 1986, has been in trouble-free service for over twenty years. PVC-O pressure pipes have given excellent performance in several European countries and Australia for over 25 years. There are currently approximately 20 million meters of PVC-O pipe installed in North America.

Applications

- Pumped water reticulation systems
- Rising sewer mains and installations
- Suitable in the mining environment
- Industrial applications for chemical slurry transport
- Agriculture water distribution

Major International Standards for PVC-O Pipes

- **SANS 1808-85-2004**, Oriented polyvinyl chloride (PVC-O) pressure pipes for underground use.
- **ISO/DIS 16422-2005**, Pipes and joints made of Oriented Unplasticised Poly (vinyl chloride) (PVC-O) for the conveyance of Water under Pressure- Specifications.
- **AS4441 (Int.) 2003**, Interim Australian Standard, Oriented PVC (PVC-O) pipes for Pressure Applications.
- **AWWA C-909-2002**, Molecularly Oriented Polyvinyl Chloride (PVC-O) Pressure Pipe, 4 In.-24 In. (100 mm 600 mm) for Water Distribution.
- **British Specification WIS 4-31-08** -

2001 Specification for Orientated polyvinyl chloride (PVC-O) pressure pipe for underground use.

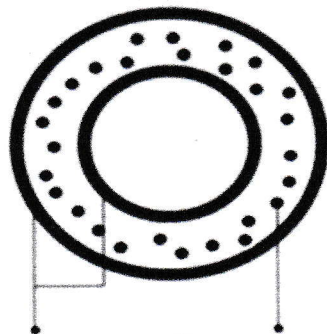
- **ASTM F 1483 - 2005** - "Specification for Oriented Polyvinyl Chloride (PVC-O) Pressure Pipe,"
- **French Standard - XP T 54-948:2003** Tubes en poly(chlorure de vinyle) orienté biaxila (PVC-BO) et leurs assemblages
- **Spanish Standard - UNE ISO 16422** Tubos y uniones de poli(cloruro de vinilo) orientado (PVC-O) para conducción de agua a presión

Foam core PVC Pipes

Foamcore PVC pipe is a multilayer (three layer) pipe with integral skin layers and the middle "Sandwich" layer with uniformly distributed foamed structure.

Concept

In a typical three layer pipe structure, the foam created by blowing agent replaces the virgin PVC compound in core layer. The cellular structure of the core PVC layer plays major role in producing quality PVC foamcore pipe. To develop maximum savings and physical properties, the core must have uniform cell structure.



Non-foamed skin Foamed core
Foamcore Pipe structure

Foam core pipe permits possible raw material savings of up to 30 %, combined with a cost reduction of up to 25 % compared to solid wall pipes maintaining the ring stiffness.

A feature of foam core pipe is the unique "I-Beam" structure it assumes. The skin is designed to take the initial load, while the foam gives rigidity and

maintains the shape of the pipe under load. The foam core pipe under equal load, distributes the load more evenly and does not show the same amount of distortion compared to solid wall UPVC pipe.

Due to their good insulation properties and their lower weight compared to solid walled pipes, foam core pipes find their application mainly in the non pressurised sectors.

Process

Presently three processes are commercially available for production of foam core pipe. Two processes involve two extruders, one for non-foamed skin layers and one for foamed core layer, and die with two flow channels. Out of these two processes one is developed by Alphacan and is known as the Bipea process, while the second is manufactured and marketed by American Maplan. The third system uses three extruders, one for each layer, the Genca die with three flow channels.

Depending upon the extrusion set up, the primary extruder(s) feeds PVC compound without foaming agent into a feed or Y block.

It separates the PVC melt into two streams, which will become the inner and outer (skin) layers. A second extruder feeds the PVC compound with blowing agent into the same block through a channel between skin layers. The three layer structure is then brought together in the die. The foaming takes place in middle layer after exiting die.

The minimum thickness of the inner and outer layer depends on the pipe size. Typical layer thickness distribution is tabulated below.

Layer	% of total wall thickness
Outer	10-15
Middle	60-80
Inner	10-25

Features & Benefits of Foamcore pipes

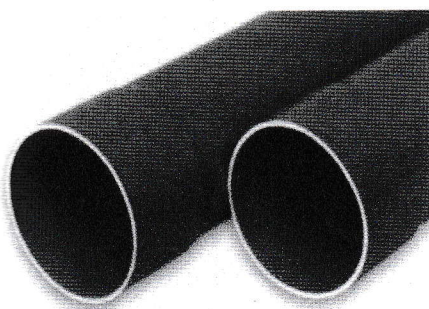
- Lower density with similar volumes i.e. much lower weight
- Easier to handle and install with

lower transportation & installation costs as compared to solid wall PVC pipes

- Better insulating effect due to low thermal conductivity
- High temperature resistant
- Good chemical and abrasive resistant
- Completely recyclable, low input of resources makes it very eco-friendly
- 'Silent' pipe - reduction in noise level normally created by the fluid flowing through pipe
- Cost effective
- Regrind / recycled material can be used for middle layer

Applications of Foamcore pipes

- Drainage and Sewerage pipes
- SWR pipes
- Ventilation pipes
- Cable conduit pipes



(Source: astral)

Major International Standards

ASTM F891-2007 Standard Specification for Coextruded Poly(Vinyl Chloride) (PVC) Plastic Pipe with a Cellular Core

Contribution of these developments in resource and environment conservation

The pipe industry faces a number of important issues including energy consumption, the depletion of natural resources such as water and oil, financial & environmental concerns.

The major sources of energy and electrical power in most countries are oil, natural gas and coal. The sources for plastics pipe materials are hydrocarbons produced from these fossil fuels. It may be considered that plastic pipes use more natural resources in the form of fossil fuels than traditional pipe materials

In fact, the reverse is true. It takes less energy to produce plastics materials for pipes than it does to make conventional metallic pipes. Similarly, the energy required to manufacture pipes is substantially low in case of PVC-M, PVC-O and foamcore pipes compared to metal pipes.

In addition, use of technologically advanced plastic pipes produce very less green house gases such as carbon dioxide as compared to conventional metal pipes. This is mainly because of

lower energy requirement during manufacturing of raw material, processing of pipe, transportation, installation, pumping of fluid and maintenance if required.

PVC comprises raw materials sourced from approximately 43% fossil hydrocarbons (oil, natural gas) and 57% salt. At the end of their life; PVC pipes can be collected, recycled and used into other products. Also due to superior hydraulic efficiencies these pipe needs very less pumping energy.

These technically superior products not only save energy but also reduce the wastage of water (which occurs due to leaks and damages in traditional pipes) resulting in saving of natural resources.

Thanks to low energy requirement and recyclability PVC-O, PVC-M and foamcore pipes contribute very less in global warming.

Conclusion

The new generation PVC pipes- PVC-O, PVC-M and foamcore pipes have proven themselves in service and continue to demonstrate the advantages of cost effective material & energy efficient pipes. The many advantages associated with their use, include confidence in long-term performance, ease of handling and installation, improved flow and reduced pumping power as well as significant energy conservation and benefits to the environment during production. This makes them modern generation pipe materials.

Source : IPI Journal

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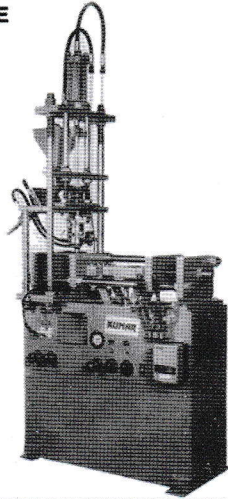
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PLASTEC MIDWEST - September 28 - 30, 2010 at Donald E Stephens Convention Centre. For details contact : Canon Communications, Los Angeles, USA. Tel: 310-996-9454, 310-4-454200; Fax: 310-4-454299; E-mail: plminfo@cancom.com

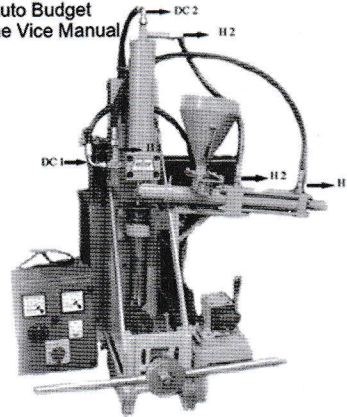
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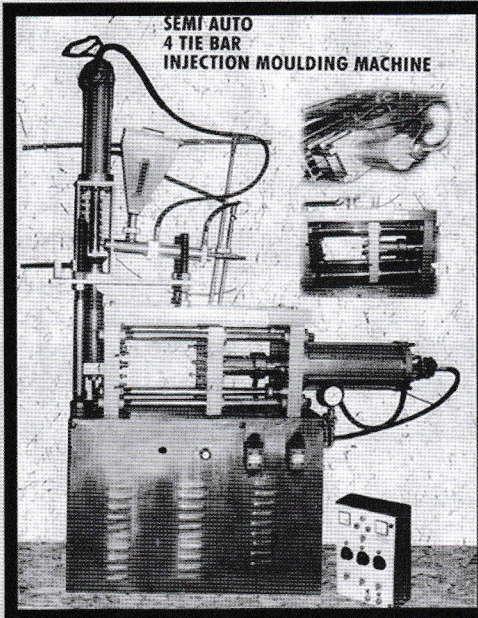
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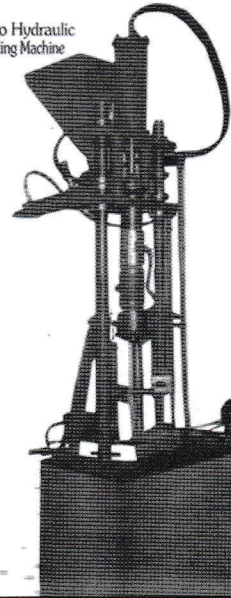
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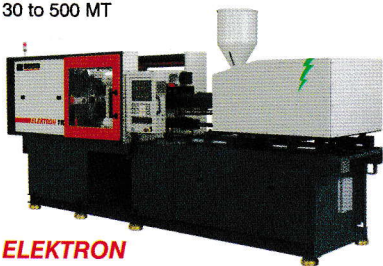
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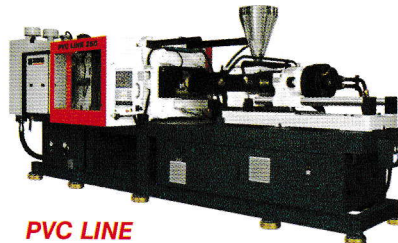
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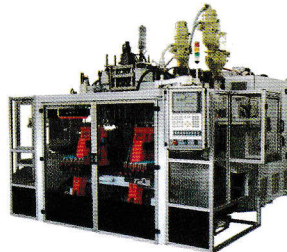
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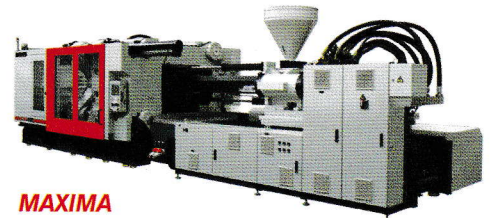
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