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Polyurethanes today

AN INDIA MAGAZINE

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COMMITTEE MEMBER'S MESSAGE

It is with much trepidation that I write this note to you, the esteemed readers of PU Today, as I consider the most commonly occurring words in news media: "farmers' woes". Recently Prime Minster emphasized in Parliament that a collective resolve and solution needs to be worked out and farmers cannot be allowed to die. It is ironical that a nation which has more than 55% of its workforce engaged in agriculture and which still lives predominantly in its villages, is struggling to meet the fundamental infrastructure for the farmers' prosperity. The reasons are complex, as you be able to appreciate more when you read DNA's Consulting Editor Mr. Bhaskar's article on this topic in this issue.

The tragedy does not stop at the food (grain, fruit, vegetable) production level. Food is lost or wasted throughout the supply chain, from initial agricultural production down to final household consumption. In low-income countries food is lost mostly during the early and middle stages of the food supply chain; the per capita food wasted in Sub-Saharan Africa and South/Southeast Asia is about 6-11 kg/year. The story does not end here: It is reported that the carbon footprint of wasted food is equivalent to 3.3 billion tons of carbon dioxide per year. Every year about a third of all food for human consumption, around 1.3 billion tons, is wasted, along with all the energy, water and chemicals needed to produce it and dispose it off.

The causes of food losses and waste in low-income countries are mainly connected to financial, managerial and technical limitations in harvesting techniques, storage and cooling facilities in difficult climatic conditions, infrastructure, packaging and marketing systems. Given that many smallholder farmers in India live on the margins of food insecurity, a reduction in food losses could have an immediate and significant impact on their livelihoods.

The food supply chains in developing countries need to be strengthened by, inter alia, encouraging small farmers to organize and to diversify and upscale their production and marketing. Investments in infrastructure, transportation, food industries and packaging industries are also required. Both the public and private sectors have a role to play in achieving this.

The need for increasing cold storage capacity and developing a cold chain infrastructure in India is well established. In the absence of a cold storage and related cold chain facilities, Indian farmers are being forced to sell their produce immediately after harvest which results in overstock of the produce in the market (based on seasonal harvest cycles) and low price realization. Lloyd's insulations, a pioneer in India in cold warehousing, has contributed precious insights in this issue through, experience-rich, Mr. Mitra's article. As is well established, the solutions based on Polyurethanes have been able to solve the technical demands of superior insulation as well as increase the ease of construction of cold storages.

I want to suggest to our Prime Minister that the existing gaps in the horticulture cold chain and its impact on the progress of small and marginal farmers offers a unique opportunity to address economic, social and environmental issues through enabling cold storage solutions at the farm level. Smaller-sized low-cost farm-level cold storage solutions could address the following key challenges:

- Lack of availability/access of suitable cold storage for diversified fruits and vegetables at the production center (farm level) where maximum wastage occurs.
- High rental costs for use of cold storages which are typically owned by private players (not by farmers)
- Lack of cold chain transportation from farm to cold storage facilities leads to further deterioration in quality of the produce.
- Limited or no access to post harvest management tools for small and marginal farmers who account for a significant portion of total horticulture production in India.
- Reduce the possibility of distressed sales by poor farmers who do not have the infrastructure to optimize their sales.

An Innovation Fund should be allotted to the sole task of assessing the available prototypes (also discussed in this issue) and take this up on a war footing. We must change from 'TALK' mode to 'JUST DO IT' mode.

– Isaac Emmanuel

EDITORIAL

Just read a succinct cartoon: *"I think that a man wearing a helmet and saving our Country should be better paid than a man wearing a helmet and saving a ball!"*

Not that I do not idolize the man saving the ball like any other fan of a sport! But we MUST see the importance of the job executed and weigh the serious consequences of both the jobs, if neglected or well done, and advocate commensurate rewards.

On a similar argument, it is so shameful that in times of food surplus and forecasts of accelerating growth of the economy, the backbone of our Country – the Agriculture Sector is resonating with abject and sombre news stories of farmers' escalating debts & consequent suicides! In times of enhanced use of technology to improve logistics of our economic pursuits, especially in the Industry segment, the farmer has been short-changed in the progress wheel. His lot is still left dependant on the vagaries of 'Nature'- unpredictable, unstable, uncertain, unstructured and inconceivable.

How can we explain: a food surplus with a large amount of grains getting wasted in our granaries, vis-à-vis unmitigated hunger in the very families that produced the grains in our store-houses? How can we accept the fact that there are bountiful rains and floods in various regions of our country on one hand and years of drought and hence failed crops in other regions?

How can we reason with the stone solid fact of: there being irrigation projects galore in these drought ridden regions BUT where is the water?

How *can* we comprehend why a bumper harvest, still does not earn enough for a farmer, to mitigate his woes?

Lack of control over the Market forces is the crux of the matter from the farmer's perspective. After harvests with bountiful crops, the supply surpasses demand, and the price begotten, falls low. Everyone is trying to sell off the surplus crops after storing personal consumption requirements. The Middleman rules the roost. The one, who produces, gets short-changed by the one who provides a service – of transporting that produce to the Market/consumer. This Middleman prospers but the actual producer bleeds. The solution to this, is to enable the farmer to control the when, where and how much of his crops he sells, i.e. *the price at which he sells!*

In this issue, we have tried to highlight *these areas* of human misfortunes - of how Polyurethanes can be of use to alleviate the destitution of our economy's backbone – the FARMER.

Sincerely,

Medha Bhuta

Polyurethanes today
AN INDIA MAGAZINE

Editor
Mrs. Medha Bhuta

Editorial Team
Mr. Pravin Mahajan - BASF
Mr. Govind Gupta - Dow
Mr. Pranav Mehta - Honeywell
Ms. Priya Fonseca - Special Correspondent

Compilation & Selection
Dr. Mahesh Gopalasamudram - Manali Petrochemicals
Mr. Arun Kumar - Innogrow
Mr. Isaac Emmanuel - Bayer Material Science

Design Concept
Mr. Mukesh Bhuta

Graphic Design & Layout
Red Sky Designs

Production & Execution
Mr. Ramamurthy

IPUA OFFICE BEARERS

Chairman Emeritus
Mr. Rahul Gautam rahul@sheelafoam.com

Chairman
Mr Mukesh Bhuta mbhuta@expanded.co.in

Vice Chairmen
Dr. G. Mahesh maheshgn@manalipetro.com
Mr. Rohit Relan rohit@rrelan.com

Treasurer
Mr. Gian Jain gcjain@karefoam.com

IPUA EXECUTIVE COMMITTEE MEMBERS

Mr. Ashwini K. Sehgal	aksehgal@saanglobal.com
Mr. Deepak T. Mehta	deepakmehta@tirupatifoam.com
Mr. H. S. Kochar	kochar@pfeda.com
Mr. Abraham Varghese	abraham.varghese@basf.com
Mr. Rabindra Jhajharia	multiwynfoams@multiwynfoams.com
Mr. Romesh Madan	romesh.madan@goodie.in
Mr. Sanjay Sanghi	sanjay.sanghi@momentive.com
Mr. Sudhanshu Vachane	sudhanshu@gnfc.in
Mr. Samir Arora	samir2109@icloud.com / samira@industrialfoams.com
Mr. Paramjeet Singh	paramjeet@springwel.com.
Mr. Praduman Patel	pradumanpatel@primecomforts.com
Mr. Arun Jaluka	flexipol@rediffmail.com
Mr. Tushaar Gautam	tushaar@sheelafoam.com
Mr. Vasant Gori	vasantgori@gmail.com
Mr. Narendra Kudva	narendra.kudva@kurlon.org
Mr. Isaac Emmanuel	Isaac.emmanuel@bayer.com
Mr. Ananth Muthupandian	ananth@dow.com

Special Invitees

Mr. Ashok Puri	puriasok@rediffmail.com
Mr. Somesh Pare	somesh.pare@evonik.com
Mr. Kalpesh Shah	info@easysleepindia.com

Governing Council Members

Mr. Vinod Vora	vnvora@aromaticagencies.com
Mr. Rahul Gautam	rahul@sheelafoam.com
Mr. Deepak Doshi	info@durafoamindia.com
Mr. G Ramachandran	indramu123@gmail.com

Secretary General

Mr. K. Ramamurthy	admin@pu-india.org ramamurthy_k2@dataone.in ramapu42@gmail.com

Secretary

Mr. P. V. Murali Mohan	muralimohandel@gmail.com

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INDUSTRY UPDATES

Honeywell

Honeywell Receives Low-Carbon Achievement Award for Solstice Low-Global-Warming Refrigerants

New Delhi, India, Mar. 05, 2015 – Honeywell (NYSE: HON) announced today that its Solstice low-global-warming refrigerants have been recognized for carbon reduction during the 10th RAC Cooling Industry Awards. The awards are issued by the leading UK trade publication for the refrigeration industry, RAC Magazine, in multiple categories.

The judges commented: "These refrigerants will play a significant part in future refrigeration and will therefore have a major impact on carbon reduction."

"We are proud to accept this award for our low-global-warming Solstice refrigerants. We are committed to developing environmentally-preferable refrigerants that are also highly effective and can help customers lower their carbon footprint," said Julien Soulet, senior business director for Honeywell Fluorine Products in Europe, Middle East, Africa and India.

Honeywell's family of Solstice-branded products includes mobile, cold-chain, retail food and residential air conditioning refrigerants; gaseous and liquid blowing agents; propellants; and solvents based on Honeywell's new hydrofluoro-olefin (HFO) technology that helps customers lower their carbon footprint without sacrificing end-product performance.

The Solstice products have been developed and are being commercialized by Honeywell's Fluorine Products business, a leader in the manufacture and supply of non-ozone depleting refrigerants used by top air-conditioning and refrigeration makers worldwide, and blowing agents for energy-efficient foam insulation, as well as hydrofluoric acid and precursors for nuclear fuel.

Honeywell Performance Materials and Technologies (PMT) is a global leader in developing advanced materials, process technologies and automation solutions. PMT's Advanced Materials businesses manufacture a wide variety of high-performance products, including environmentally friendlier refrigerants and materials used to manufacture end products such as bullet-resistant armor, nylon, computer chips and pharmaceutical packaging. Process technologies developed by PMT's UOP business *(www.uop.com)* form the foundation for most of the world's refiners, efficiently producing gasoline, diesel, jet fuel, petrochemicals and renewable fuels. PMT's Process Solutions business (www.honeywellprocess.com) is a pioneer in automation control,instrumentation and services for the oil and gas, refining, pulp and paper, industrial power generation, chemicals and petrochemicals, biofuels, life sciences, and metals, minerals and mining industries.

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Honeywell *(www.honeywell.com)* is a Fortune 100 diversified technology and manufacturing leader, serving customers worldwide with aerospace products and services; control technologies for buildings, homes, and industry; turbochargers; and performance materials. For more news and information on Honeywell, please *visit www.honeywellnow.com.*

BASF unveils its largest Construction Chemicals plant in India

- Commercial production commences at Nellore plant in Andhra Pradesh
- New plant provides timely solutions to customers and meets growing demands for durable and energy efficient construction materials in India

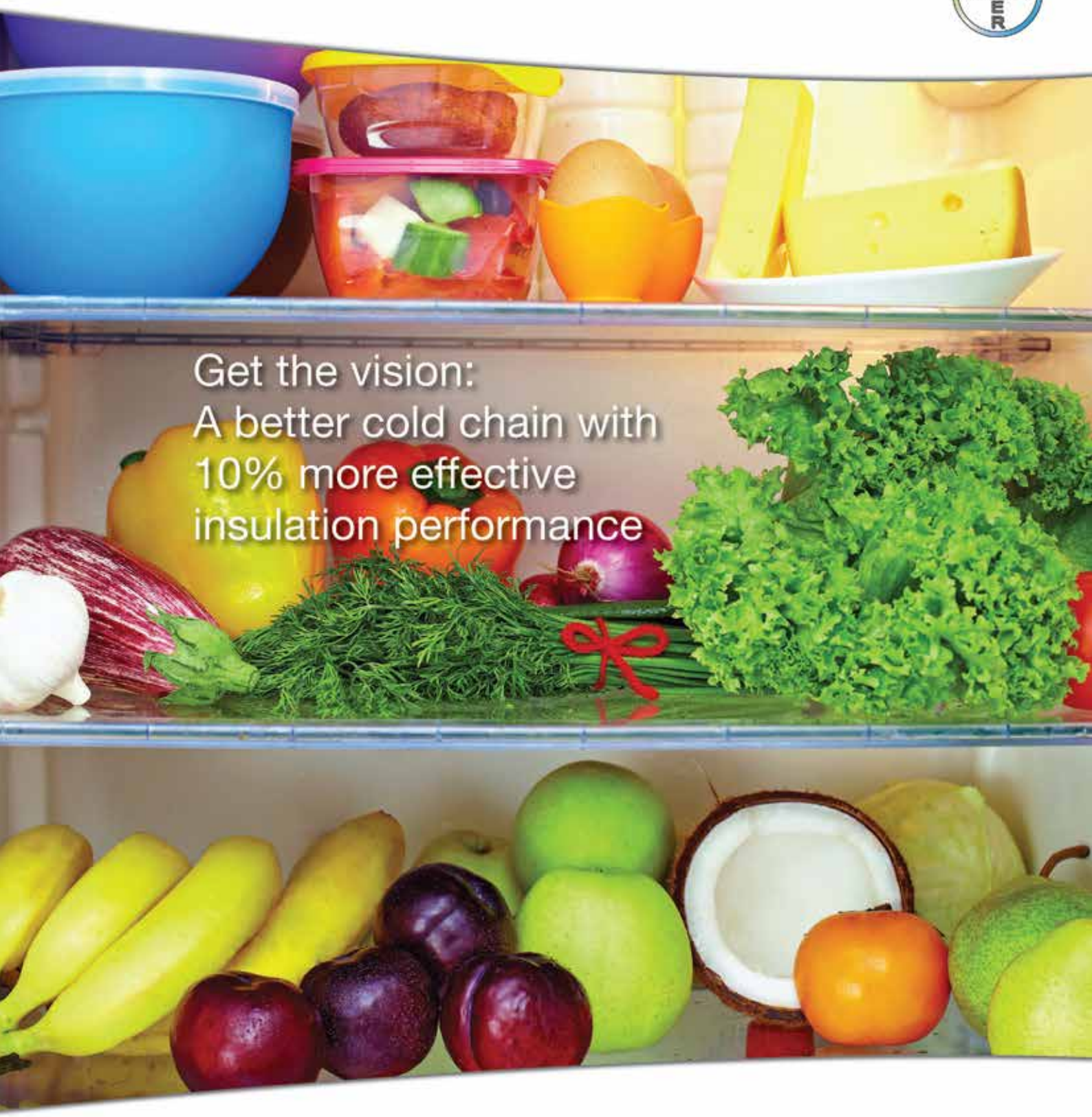
Nellore, India – April 15, 2015 – BASF India Limited (BSE code: 500042) today unveiled its largest construction chemicals plant in India at Nellore in Andhra Pradesh. This is also BASF's fifth construction chemicals plant in India. With its state-of-the-art technology, the plant will enable BASF to respond in a timely way to customers' needs in the Southern part of India and to support them with high performance solutions in the highly competitive market.

At the new plant, BASF is now producing standard and custom-made performance based concrete admixtures – MasterGlenium, MasterPolyheed and MasterRheobuild range. In addition, construction systems, such as MasterTile, MasterSeal, MasterTop, and MasterEmaco series are being manufactured, with the potential to expand to higher versions of MasterTile and MasterProtect series of products. The site also houses a multiple tank storage facility and a well-equipped concrete lab that will deliver tailor made recipes through formulation excellence.

"BASF India Limited today inaugurated its largest Construction Chemicals plant in India at Nellore Andhra Pradesh"

Mr. Ralf Spettmann, President, Construction Chemicals, BASF said, "With the new plant at Nellore, BASF offers a comprehensive range of solutions to help construct buildings that can be more energy efficient, durable and require fewer resources for maintenance."

Raman Ramachandran, Chairman and Managing Director, BASF India Limited and Head, BASF South Asia said, "India is a strategic market for BASF and it's important to be able to respond to the local market in a timely manner." He further elaborated, "The Nellore site, an addition to our existing four construction chemicals plants in India, enables us to stay close to the customers and offer them customized solutions to



BAYTHERM® Microcell is an innovative product from the latest generation of polyurethanes based on Bayer's advanced technology. As a result of up to 40% smaller cells, BAYTHERM® Microcell can improve insulation performance by 10%.

Get the vision: www.materialscience.bayer.com

For more information, please contact Isaac Emmanuel at
Isaac.emmanuel@bayer.com or +91 9819854360

Bayer MaterialScience

meet the growing demands for multi-story buildings, long-lasting infrastructure constructions and more energy efficient construction techniques."

The production plant is strategically located in the Naidupet area of Nellore, Andhra Pradesh with access to the road network and the Krishnapatnam Port. Other construction chemicals production sites in India are located in Turbhe in Navi Mumbai, Nalagarh and Kolkata.

About BASF's Construction Chemicals division

BASF's Construction Chemicals division offers advanced chemicals solutions for new construction, maintenance, repair and renovation of structures: Our comprehensive portfolio encompasses concrete admixtures, cement additives, chemical solutions for underground construction, waterproofing systems, sealants, concrete repair & protection systems, performance grouts, performance flooring systems, tile fixing systems, expansion control systems and wood protection solutions. The Construction Chemicals division's about 5,400 employees form a global community of construction experts. To solve our customers' specific construction challenges from conception through to completion of a project, we combine our know-how across areas of expertise and regions and draw on the experience gained in countless construction projects worldwide. We leverage

BASF's Construction Chemicals division offers advanced chemicals solutions for new construction, maintenance, repair and renovation of structures

global BASF technologies, as well as our in-depth knowledge of local building needs, to develop innovations that help make our customers more successful and drive sustainable construction. The division operates production sites and sales centers in more than 50 countries and achieved sales of about €2.1 billion in 2014.

About BASF India

BASF has successfully partnered India's progress for over a century, with 13 of BASF's 14 global businesses maintaining a local presence in India today. BASF in India has 2,186 employees at about 20 production sites & sales offices and R&D centers in Mumbai and Mangalore. In 2014, BASF registered sales of €1.1 billion to customers in India.

About BASF

At BASF, we create chemistry – and have been doing so for 150 years. Our portfolio ranges from chemicals, plastics, performance products and crop protection products to oil and gas. As the world's leading chemical company, we combine economic success with environmental protection and social responsibility. Through science and innovation, we enable our customers in nearly every industry to meet the current and future needs of society. Our products and solutions contribute to conserving resources, ensuring nutrition and improving quality of life. We have summed up this contribution in our corporate purpose: We create chemistry for a sustainable future. BASF had sales of over €74 billion in 2014 and around 113,000 employees as of the end of the year. BASF shares are traded on the stock exchanges in Frankfurt (BAS), London (BFA) and Zurich (AN). Further information on BASF is available on the Internet at *www.basf.com*.

"The Nellore site, an addition to our existing four construction chemicals plants in India, enables us to stay close to the customers and offer them customized solutions to meet the growing demands for multi-story buildings, long-lasting infrastructure constructions and more energy efficient construction techniques."

– Raman Ramachandran, CMD, BASF India Limited and Head, BASF South Asia

INTERNATIONAL NEWS

Huntsman Innovation to Boost Greenhouse Crops

Everberg, BELGIUM – Huntsman today announces that it has developed a hydrophilic material with a special affinity for water that can be used for food cultivation and in commercial greenhouses to support the production of crops such as tomatoes, peppers, cucumbers, eggplants and salad leaves.

The material, which is being produced in conjunction with Dutch greenhouse horticulture specialist BVB Substrates, has a high pore volume that creates excellent water retention.

Marketed as BVB SUBLIME®, the innovative material locks in exactly the right balance of air and water to optimize successful plant development – releasing moisture slowly, over time.

Hydroponics Vegetables-1

Clean, inert and easy to use, BVB SUBLIME® substrate delivers a comparable performance to existing plant growing materials but with a number of advantages.

Hydroponics Vegetables-2

With the need for soil eliminated, BVB SUBLIME® substrate can help keep greenhouse drains clear. In addition, the roots of salad plants such as lettuce are kept clean and require less preparation before distribution to retail outlets.

The BVB SUBLIME® substrate is ideal for use in greenhouses that employ traditional hydroponics growing systems and the nutrient film technique (NFT) – a method of growing plants in a watertight gully.

The Netherlands has a mature, high-tech, hydroponics industry where food crops are grown continuously, all year-round to meet national and international demand.

Dave Burge, Strategic Marketing at Huntsman, said: "Demand from the food industry for fresh

crops, all year round, is increasing. Consumers now expect ready access to fruit and vegetables, regardless of season. With the global population booming – and estimated to surpass nine billion by 2050 – pressure on food supplies is only going to intensify. Spotting a gap in the commercial greenhouse sector we developed a new type of material with the potential to benefit everyone on the planet – and worked closely with the team at BVB Substrates to bring it to market. The BVB SUBLIME® substrate has been rigorously tested to ensure that it is safe for use in the production of greenhouse crops. Following extensive trials by numerous growers and research stations, the material is now being used in commercial greenhouses worldwide and interest in this next generation substrate is growing."

As well as commercial hydroponic growing mats, the BVB SUBLIME® substrate can be shaped into grow plugs and propagation blocks to support different stages of the plant growth cycle."

Samples of BVB SUBLIME® substrate will be on display at UTECH Europe at Huntsman's exhibition stand: 1210. UTECH Europe opens on Tuesday 14 April 2015 at MECC Maastricht, The Netherlands. For more information about the event go to: *http://www.utecheurope.eu/*

Evonik expands silicone platform in Germany & China

- Enlarged production facility in Essen goes on stream
- Expansion and construction of production capacities in Germany and China
- Demand for additives for the construction, textile, coating, furniture, and appliance industries is driving the global market growth for specialty silicones

Essen. Evonik strengthens its technology platform for specialty silicones with a global investment initiative. Overall, Evonik plans to invest a triple-digit-million-euro amount in the coming years and gradually increase the production volume of specialty silicones. "Evonik is one of the world's leading manufacturers of specialty silicones. With our investment initiative we want to strengthen our position as a technology leader and reach new market opportunities" says Evonik Executive Board member and Chief Operating Officer Patrik Wohlhauser.

In Essen, the company is currently putting the expansion of a plant for the production of these special products into operation. The investment for this expansion is in the double-digit-million-euro range. Increasing the production in Germany Evonik accompanied the growth of its customers in the important European market. Within the global investment initiative for specialty silicones additional production expansions in Essen are planned.

The market for specialty silicones continued to grow in recent years. This development is mainly driven by the construction, textile, coating, furniture and appliance industries. Particularly strong was the demand in Asia. Evonik responds to this positive development by expanding its site in Shanghai (China) with a new production complex for specialty silicones.

"Optimization and expansion of the global silicone platform will strengthen effectively the position of Evonik as the world leader in specialty silicones. We want to meet the demands of the different markets even better and to accompany the growth of our customers locally. We position ourselves as a long term reliable supplier and partner" says Hans-Josef Ritzert, Member of the segment management Nutrition & Care.

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35 years of excellence

High Resilience Foam

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- High resilience Foam
- Foam in rolls for Quilting
- Convoluted Foam
- Supersoft Foam
- Hard Foam
- Conventional Foam

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E-1162, Bhiwadi Industrial Area, Phase-IV,
Bhiwadi-301 019 (Rajasthan) India
Ph.: 01493-512815, 09983250166

96, Muktaram Babu Street
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flexipol® Foam Sheet

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Specialty silicones offer an enormous wide range of applications for numerous industries. For example, as additives for plastics, specialty silicones are responsible for comfortable furniture, car seats and ergonomic mattresses. They also play an important role within the formulation of ideal insulation material for building insulation and guarantee of the highest energy efficiency of refrigerators. Other areas of application are defoaming agents, used in industries like construction, textile or plastics. Furthermore, specialty silicones are used in coatings and inks. The integrated silicon technology platform forms the backbone of significant businesses of the Evonik segments Nutrition & Care (Business Lines Comfort & Insulation, Interface & Performance, and Personal Care) and Resource Efficiency (Business Line Coating Additives).

Company information

Evonik, the creative industrial group from Germany, is one of the world leaders

in specialty chemicals. Profitable growth and a sustained increase in the value of the company, form the heart of Evonik's corporate strategy. Its activities focus on the key megatrends health, nutrition, resource efficiency and globalization. Evonik benefits specifically from its innovative prowess and integrated technology platforms.

Evonik is active in over 100 countries around the world. In fiscal 2014 more than 33,000 employees generated sales of around €12.9 billion and an operating profit (adjusted EBITDA) of about €1.9 billion.

Disclaimer

In so far as forecasts or expectations are expressed in this press release or where our statements concern the future, these forecasts, expectations or statements may involve known or unknown risks and uncertainties. Actual results or developments may vary, depending on changes in the operating environment. Neither Evonik Industries AG nor its group companies assume an obligation to update the forecasts, expectations or statements contained in this release.

Platts: Global Petrochemical Prices Up10% in April from Month Ago

First double-digit increase since February 2012

Mumbai, May 12, 2015 – Prices in the $3-trillion-plus global petrochemicals market climbed 10% month over month in April, posting the first double digit increase since February 2012. This marked the first time since 2013 that global petrochemical prices have climbed for three consecutive months. Petrochemical prices, expressed as a monthly average, increased $97 per metric ton (/mt) from March to $1,052/mt in April, according to the just-released monthly Platts Global Petrochemical Index (PGPI).

The **PGPI** is a benchmark basket of seven widely used petrochemicals and is published by Platts, a leading global provider of energy, petrochemicals, metals and agriculture information and a top source of benchmark price references.

"Petrochemical prices were reacting to increasing crude and naphtha prices," said Jim Foster, director of petrochemical analysis at Platts. "Naphtha, which is the most commonly used feedstock to produce olefins, climbed 13% in April as crude was up about 16%. As those feedstock prices climb, petrochemicals tend to trend higher.The tightness in supply due to maintenance turnarounds in the global ethylene markets also contributed to the strong gains."

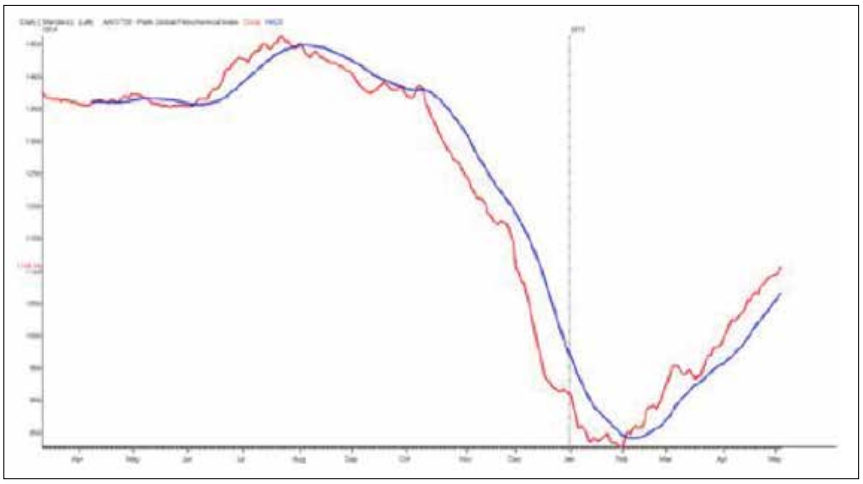
Petrochemicals are used to make plastic, rubber, nylon and other consumer products and are utilized in manufacturing, construction, pharmaceuticals,

INTERNATIONAL NEWS

Platts Global Petrochemical Index In Dollars Per Metric Ton

The daily price reflected as a monthly average

April 2015	Monthly % Change	Annual % Change	April 2014	March 2015	Feb 2015	Jan 2015	Dec 2014
$1052	10%	-23%	$1,363	$954	$872	$850	$984



The chart above shows the daily end-of-day Platts Global Petrochemical Index (PGPI) price in red and also displays the 20-day PGPI moving average (MA) in blue. If you have trouble viewing the graphic, visit this link:PGPI Averages.

aviation, electronics and nearly every commercial industry.

Olefins

Prices of olefins – a group of hydrocarbon compounds which are the building blocks of many petrochemical products used to produce everyday goods – were mixed in April. Ethylene prices jumped 19% to $1,096/mt. Maintenance turnarounds caused tight supply in the global ethylene markets, pushing the price higher. Propylene, though, saw prices fall 2% in Aprilas strong refinery production rates pushed more propylene into the market.

Polyethylene and polypropylene, plastics manufactured from ethylene and propylene respectively, were both stronger in April. Global polyethylene prices climbed 12% to $1,422/mt, while global polypropylene prices increased 7% to $1,368/mt.

Aromatics

Prices of aromatics – a group of scented hydrocarbons with benzene rings used to make a variety of petrochemicals – also was also on an uptrend in April. Benzene saw the largest increase of any aromatic component in the PGPI, with prices climbing 14% from March to $831/mt in April. Toluene prices rose 6% to $730/mt, while paraxylene prices were up 9% at $859/mt.

Global equity markets were higher in April. The London Stock Exchange Index (FTSE) posted a 3% gain, while the NIKKEI 225 was up 2% last month. The Dow Jones Industrial Average climbed 1% in April.

A summary of the April performance of each of the seven key petrochemicals included in the PGPI is available upon request.

The **PGPI** reflects a compilation of the daily price assessments of physical spot market ethylene, propylene, benzene, toluene, paraxylene, low-density polyethylene (LDPE) and polypropylene as published by Platts and is weighted by the three regions of Asia, Europe and the United States. Used as a price reference, a gauge of sector activity, and a measure of comparison for determining the profitability of selling a barrel of crude oil intact or refining it into products, the PGPI was first published by Platts in August 2007.

Published daily in a real-time news service *Platts Petrochemical Alert* and other Platts publications, the PGPI is anchored by Platts' robust and long-established price assessment methodology and the firm's 100-year history of energy price reporting.

Platts petrochemicals experts are available for media interviews. A sample list of experts may be found at the *Platts Media Center*. For more information on *petrochemicals*, visit the Platts website at *www.platts.com*.

Fire in Japan on 26 April 2015

A Fire incident occurred in an air-conditoned factory processing mushrooms in the Prefecture of Hokkaido, in northern part of Japan on 26 April 2015. The fire is believed to have started at approximately 11 am in the morning and could be fully extinguished at only about 7 pm.

It is classified as an indoor agricultural factory. Since it is an air-conditoned factory, for insulation purpose the material used is Polyurethane Spray Foam. The Prefectural Police have stated that the fire was caused by the spark from the welding equipments.

Unfortunately, the fire has resulted in the death of four people. According to media reports following this incident, Hydrogen Cyanide gas is claimed to be responsible for death of these victims and not Carbon monoxide. How they have come to this conclusion is not known. A full-fledged enquiry is on.

JURA (Japanese Urethane Research Association) and JUFA (Japanese Urethane Foam Association) have also begun their own enquiries and investigations.

JUFA (Japanese Urethane Foam Association) is handling the media related matters on this incident.

Additional inputs from JUFA:

- The factory is about 20 years old.
- The fire started when the CFC / HCFC replacement in the air-conditioning happened, when the piping was being cut.
- The Spray Foam was not covered - either with gypsum or with metal.
- Japanese Urethane Foam Association (JUFA) held a press conference after getting preliminary inputs.

(Source: JUFA)

COOPERATIVE PARTNERSHIP WITH 3CON

Interior trim systems from a single source

KraussMaffei is reinforcing its system expertise for reaction process machinery in the area of interior trim and has worked together as a partner with 3CON Anlagenbau GmbH since the beginning of the year. The ambitious automotive supplier with headquarters in Ebbs, Austria, is among the leading global providers of laminating, edge folding and thermoforming technologies.

In the area of interior trim, KraussMaffei's reaction process machinery implements production systems for foamed or back-foamed parts for vehicle manufacturing with surfaces with especially high aesthetic quality. This includes parts such as instrument panels, door coverings, door panels and window trims. Krauss Maffeiprovides customized system solutions from a single source, starting with the molds, including the mixing and metering systems, and spanning all the way to equipment for cutting and punching finished components. Through the partnership with 3CON, KraussMaffei is now expanding its system expertise.

Global Cooperation
Shared system expertise in the area of interior trim: Nicolas Beyl, President of the Reaction Process Machinery segment of the KraussMaffei Group, and Hannes Aue CEO and founder of 3CON (from left to right).

Nicolas Beyl, President of the Reaction Process Machinery segment of the KraussMaffei Group, explains, "3CON is a valuable partner to have at our side. Together with them, we can also offer our customers technologies for laminating, folding and thermoforming." Hannes Auer, founder and CEO of 3CON, adds, "We are very glad to have KraussMaffei, a company with global standing, at our side." The two companies have cooperated closely in both domestic and international matters regarding sales and project engineering since the beginning of the year.

Text: Petra Rehmet
Photo: KraussMaffei

PRODUCT NEWS

SAIP Patents New Mixing Head Model and Presents The New Technology at Utech Europe 2015

Romanò di Inverigo (Como), Italy – SAIP EQUIPMENT presents its brand new technology for "third stream direct injection" in high pressure mixing heads. The aim of this project is to retrofit existing equipment or supply new ones to the use of HC's, HFO's, methyl formate and other blowing agents with a cost saving investment and proper results and performances.

The new mixing head permits the use of a third blowing agent on any kind of foaming units (SAIP or other ones) either new or in revamping.

Technical characteristics and benefits:

- Recycle in head of the third component;
- Third component pressure adjustment (from 0 to 180 bar maximum);
- Possibility of exclusion of the third component and manual or automatic enabling;
- High quality mixing due to the simultaneity of the components' input in the mixing chamber;
- Mixing homogeneity: no advance and postponement of each component.

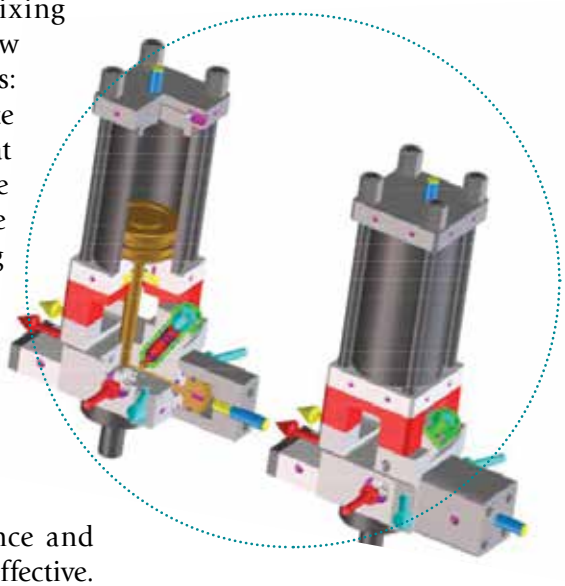
Compared to other products on the market the novelty of **SAIP HP THIRD STREAM MIXING HEAD** is the recycle of the third component directly in the head with components radial mixing.

Thanks to the flows imprinted direction and to the high kinetic energy of each component, a perfect nebulization is determined as well as an optimal foam mixture. The HP third stream mixing head represents the new generation of SAIP heads: it is the result of experience and targeted research that have demonstrated the mixing in the radial type head gives better mixing results than the axial one.

The third component is installed on SAIP mixing heads with diameter from 10 mm to 24 mm; it is easy to install and use. It requires low maintainance and service and it is really cost effective.

Due to the great results achieved in our laboratories and by our customers, SAIP has decided to patent the technology.

SAIP will showcase **HP THIRD STREAM MIXING HEAD** during **UTECH EUROPE 2015.**



Chinaplas 2015, 20 to 23 May 2015

Discover What's New in The World of Polymer Modification at Huntsman at Chinaplas 2015

China Import & Export Fair Complex, Guangzhou, PR China
Visit Huntsman at Stand: 13.2M21

Guangzhou, China – Huntsman today announced that three of its business divisions will exhibit at Chinaplas, the largest plastics and rubber fair in Asia, when it opens in May in Guangzhou. Experts from Huntsman's specialist Performance Products, Pigments & Additives, and Polyurethanes (TPU) teams will attend the event, demonstrating the scope of materials and chemistries the company can offer polymer manufacturers and compounders looking to differentiate their products. Visit the Huntsman Stand (13.2M21) to discover what's new in the world of polymer modification.

Huntsman has a world-class portfolio of performance chemistries for plastic and fiber formulations including ELASTAMINE® and JEFFAMINE® polyetheramines. These can be used to improve mechanical properties and low temperature characteristics like the elasticity and flexibility of thermoplastics including polyamides, polyesters, polyolefins and polyimides. They can also be used to enhance the hydrophilicity, surface energy and polarity of plastics and fibers for improved static dissipation, dyeability / paintability and interpolymer adhesion.

From a pigments and additives perspective, Huntsman produces a broad range of specialty pigments, additives, fillers and extenders with diverse functions to meet the needs of the plastics industry. Available under the established global SACHTLEBEN® and TIOXIDE® brands, these pigments can deliver significant color improvements in plastics. They have good powder flowability, giving off minimal dust, and are easily dispersed during the plastics production process. End use benefits include better brightness and outstanding durability, as well as improved thermal stability and UV protection. Huntsman also has a comprehensive portfolio of synthetic, natural and high purity, colored, inorganic pigments available for plastic applications. The choices on offer to formulators include high performance iron, mixed metal and chromium oxides, including FERROXIDE® and COLOURPLEX® pigments as well as ultramarines and cadmium pigments.

For plastic product manufacturers, Huntsman offers a vast selection of fully formulated thermoplastic polyurethane (TPU) materials under its AVALON® and IROGRAN® TPU brands. Manufactured locally in Jinshan, China, these materials can be easily extruded, injection molded or converted into technical films and sheets for use in the manufacture of shoes, wires and cables, wearable devices, luggage, furniture and technical clothing. At Chinaplas 2015, there will be specific emphasis on:

- UV resistant TPUs for the footwear industry
- High performance TPUs for cables used in transport and automation applications
- Hard wearing, soft touch, water resistant TPUs for the manufacture of suitcases
- Hot melt TPUs to create outdoor clothing and other technical textiles
- TPUs for sports goods, specifically wearable electronic devices, a growth area.

Discover what's new in the world of polymer modification at Huntsman. Visit the Huntsman stand at Chinaplas to find out how our experts can help you.

PRODUCT NEWS

LFI TECHNOLOGY EXCELS IN MANUFACTU RING LARGE-FORMAT COMPONENTS

Film Instead of Paint

Visible components in commercial vehicles and caravans have to be stable and visually appealing at the same time. The use of thermoforming films that are made rigid using fiber-reinforced polyurethane enable cost-effective production of thin, high-strength components with high design freedom.

Text: Dr. Harald Sambale, Petra Rehmet
Photos: KraussMaffei

Parat GmbH + Co. KG specializes in manufacturing large-format components with high-gloss surfaces. At the Neureichenau location in the Bavarian Forest, the company operates several KraussMaffei LFI (Long Fiber Injection) systems. A short time ago, Parat invested in a fourth KraussMaffei LFI system that is suitable for the production of particularly large-format components. "These types of components with a weight of up to 30 kg are used primarily for commercial vehicles and motor homes," explains Christian Kornexl, Head of Development at Parat. In the area of commercial vehicles, for example, this involves engine hoods, fenders and canopies for tractors and other agricultural machines. For motor homes, Parat manufactures complete front end and rear panels with an area of several square meters. "In these applications, the numbers of pieces are often in the range between 500 and approximately 10,000 components," Kornexl says. "Therefore, it has proven useful to manufacture the components as a combination of thermoforming thermoplastic film with fiber-reinforced polyurethane."

Complex Geometry
To be able to implement large-format components as well, the LFI unit of the new system is guided by a 7-axis robot.

The new LFI system is operated in the double-shuttle process. Two moving tables, on which the molds are located, move in alternation from both sides, first into the polyurethane feed station and then into the press. At the beginning of the processing cycle, the machine personnel place the thermoforming film into the mold. The side of the film facing the mold later makes up the visible, high-gloss surface of the component. In the feed station, the mixture of polyol, isocyanate and glass fiber is applied to the rear side of the film. For the LFI process, the polyurethane wets the glass fibers that reinforce the component while they are still in the mixing head. This has the advantage that more cost-effective rovings can be used as reinforcement material instead of preformed fiberglass mats.

Discharge capacity of 1,000 grams per second

The LFI process unit consists of a cutter and an LFI mixing head. The cutter draws the roving in,

chops it into fibers of the preset length (of 12.5 to 100 millimeters) and shoots the chopped fibers into the mixing head. There, the polyurethane components are mixed with each other and wet the reinforcing fibers. For the new LFI system at Parat, a mixing head with a discharge capacity of 1,000 g/s is used. The rovings are drawn into the mixing head in four closed lines. This prevents the rovings from interlocking or getting entangled.

73.8 million euros in sales were earned by the Parat Group in 2013 with 667 employees.

To implement complex geometries in largeformat components, the LFI unit of the new system is mounted on a seven axis robot. An additional special feature from a process technology standpoint is the use of two different types of polyol. "We use fast-reacting and slow-reacting polyol variants, as the feeding of the polyurethane mixture can take up to 30 seconds," explains Christian Kornexl. "At the beginning, we feed the slowreacting components; over the course of the shot, the percentage of fast-reacting polyol is increased successively. This ensures that the material cures uniformly and the material density in the component is not subject to any fluctuations."

High production flexibility

An important aspect in designing the new LFI system was the production flexibility. The track system of the moving tables is countersunk in the hall floor to ensure an ergonomic operating height. "No platforms are required for inserting the film or removing parts. This lack of barriers the mold to be changed quickly. Among other benefits, we are able to approach the system directly with a forklift," Kornexl says. "We also shorten the set-up times with magnetic mold-clamping systems. Thus we are capable of responding to the requests of our customers in a particularly flexible manner."

The company has over 5 locations in Germany, Austria, Hungary and Romania.

Cleanliness is also a critical factor in manufacturing components with visually sophisticated surfaces. This is because, at a foaming pressure of approximately ten bars, each glass fiber that gets lost between the mold and film leads to an unacceptable visual flaw in the surface. The polyurethane feed station is encased to keep the hall environment as lint-free as possible. The doors do not open until the material pouring is complete. The press is also shielded from the environment using lock-gates.

Scratch-resistant films with uniform thickness

Manufacturing the component begins with a process step that is upstream of the LFI process: thermoforming the film. "We turn the traditional manufacturing process on its head, because, to a certain degree, we paint the components first and then reinforce them," says Kornexl. Instead of a layer of paint, films are used to give the components a high-gloss surface. This film can be made of ABS or PC, for example. A PMMA coating increases the scratch resistance of the surface. Before stiffening with polyurethane in the LFI system, the film has to be reshaped accordingly. "Thermoforming primarily depends on generating a uniform thickness in all areas," explains Kornexl. To do so, the film must first be uniformly heated. When the corresponding temperature is reached, the film is pressed onto a mold with underpressure and then shaped. Three thermoforming machines are available at Parat for the LFI films.

IN GOOD SHAPE

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Post-mold processing with maximum precision

After the LFI process, the outlines of the part are reworked to remove the residue that develops during pressing. For this work step, Parat has 15 portal milling machines, six robot cells and a waterjet system. "The component size is one aspect that determines which process is used. The smaller the component, the more simple the milling operation," explains Kornexl. For large-format components, the portal milling machines provide the highest precision. The processing program is already created in advance via CAM interfaces. In this way, the finished components correspond exactly to the design data.

Large size
The new LFI system produces visible parts, several square meters in size.

MORE DESIGN FREEDOM THANKS TO LFI

More design freedom thanks to LFI Examples of components for commercial vehicle applications that Parat produces in the LFI process include engine hoods, fenders and roof elements for agricultural vehicles and construction machinery. The objective of these applications is to reach the largest component stiffness possible with low wall thicknesses. This also includes the high requirements for the visual quality of the component surface. The LFI components have numerous advantages compared to the painted sheet metal parts used previously. First, the production costs are considerably lower since subsequent painting is not required. Furthermore, the LFI procedure provides greater freedom in component design. Minor damages in the surface of an LFI component also do not lead to visual flaws as quickly. The reason is that the coloring film has a thickness of 1.5 mm and is, therefore, significantly thicker than a layer of paint. And even if the film is damaged enough to leave the polyurethane layer exposed, unlike paint damage to sheet metal parts, no corrosion occurs.

On the other hand, slightly different requirements are placed on components that are used as rear and front end panels for motor homes. The polyurethane layer here has a thickness of up to 20 mm, because, along with the mechanical properties, the insulating effect of the polyurethane also plays an important role. Previously, these types of panel elements consisted of a wood fiber board, a relatively thick EPS layer and an outer shell made of aluminum. The excellent insulating properties of the polyurethane make the LFI components considerably thinner. Because of this and the three-dimensional contour of the components, they ensure additional space in the interior of the motor home. This space can be used as storage space or for storage compartments, for example.

PRODUCT NEWS

Elanpro Redefines Frost with Its New Vertical Freezer

- Launches ultra-low temperature (-40°C) vertical freezer
- Uniquely designed with six sections along with individual door for temperature management

New Delhi, May 21, 2015: Dedicated to the design and production of innovative solutions, **Elanpro** has added **-40°C Vertical Freezer** to its extensive range of commercial refrigeration products. **Elanpro -40°C Vertical Freezer** is designed to meet the demanding requirements of hospitality industry apart from the prerequisites of scientific and laboratory researches. A large-capacity (300lts capacity), vertical, ultra-low temperature (–40°C) freezer is capable of storing different type of samples in 6 different chambers. The freezer is uniquely designed with six compartments each with individual doors. An efficient choice for cooling, the freezer has inbuilt safety alarms which captures high and low temperature, probe failure alarm and door alarm. The freezer also has a provision for connecting it through remote server for data monitoring.

Bringing some modern technology to the table, **Elanpro -40°C Vertical Freezer** comes with built-in battery back up system for temperature display and alarms which helps user in knowing the actual temperature status even in the case of power failure. **Elanpro -40°C Vertical freezer** is equipped with a password protected lockable control panel which allows only the authorized person to make any changes in parameter.

The new product by Elanpro provides energy efficient, convenient, safe and reliable performance for optimal storage temperature environments necessary for a wide range of life science, pharmacy, biological, medical, clinical, and industrial applications. Priced at Rs. 1,90,000, **Elanpro -40°C Vertical Freezer is now available at Elanpro dealer stores.**

Elanpro is an organization focusing on commercial refrigeration & food-service products in India. An organization trusted by the largest names in Hospitality, Retail and Pharma Industry, the company has a network of almost 100 channel partners in Key districts of India.

About Elanpro

Elanpro is an organization focusing on commercial refrigeration & food-service products in India. An organization trusted by the largest names in Hospitality, Retail and Pharma Industry, the company has a network of almost 100 channel partners in Key districts of India. Elanpro offers international range of refrigeration and food-service solutions for hotels, restaurants, bars, coffee shops, ice cream & beverage, food retail and the healthcare segments.

The company represents the world's leading brands for Beverage Dispensing: Vin Service's for BEVERAGE RETAIL segment – includes Beer and Soda Dispensing System from Vin Service Italy.

With the aim of creating a difference with its service in the industry, the company has created trusted relationship with major Retailers like Pepsi, Coke, Amul, Sabmiller, Inbev to have trusted Elanpro.

Elanpro is providing its key clients with large-scale solutions as well as service. The Elanpro organization is poised to grow faster than the market whilst taking care of all stake holders.

Huntsman Unveils Food Contact Materials for Potable Water Applications

Three new products unveiled at NPE 2015 in Florida

Orlando, Florida – At NPE 2015, Huntsman has announced the availability of a family of polyether-based thermoplastic polyurethane (TPU) food contact materials (FCM) that are approved for use in potable water applications.

Fully compliant with Food and Drug Administration (FDA) standards and NSF 61 certified by NSF International – the US public health and safety organization – the range comprises three TPU grades that can be extruded to create hoses, tubes, belts and films for food and drink related applications.

Part of Huntsman's well known IROGRAN® TPU portfolio, the materials are more resistant to water than standard polyester TPUs, are easy to clean and have a high tolerance to microbial attack. Available in hardness levels ranging from 80 to 92 Shore A, the TPUs are highly transparent and offer good crystallinity. They also deliver good low temperature flexibility and are easily processable with a high extrusion quality. The three products are:

- IROGRAN® A 80 P 5039 FCM TPU
- IROGRAN® A 85 P 4394 FCM TPU
- IROGRAN® A 92 P 4637 FCM TPU

Huntsman has been developing materials for the FCM market since the 1990s and has an in-depth understanding of industry regulations. With an unwavering commitment to product quality, the business has developed one of the broadest portfolios of polyester- and polyether-based TPUs available to the FCM market. Different grades, with distinctive characteristics, are available for technical extrusion, injection molding and calendaring projects – delivering benefits to manufacturers operating throughout the food and drink supply chain from field to fork.

Michael Griffin, Account Manager at Huntsman, said: "The population of planet earth is booming with estimates suggesting there will be 11 billion people worldwide by 2100. More people will mean greater demand for food and water, which in turn will require more efficient farming, food processing, transportation and

TECHNICAL UPDATES

storage techniques. The need for high quality FCM materials that can be easily processed and offer long-lasting performance is only going to increase. The availability of three FDA and NSF approved polyether-based IROGRAN® TPU grades opens up new options for food and drink manufacturers worldwide."

Samples of Huntsman's IROGRAN® FCM grades are available on request. Two new FCM grades are also in the pipeline, which are ideal for calendaring applications but also suitable for technical extrusion projects. For more information please contact: *paola_palma_faoro@huntsman.com*

Cold-chain solutions

The Agony and the Ecstasy

R. N. Bhaskar

It could be the best of times, as Charles Dickens once wrote, and it could also be the worst of times.

On the one hand there is a great deal of expectation that the new cold-storage units coming up across India could translate into higher margins for farmers, less wastage for the food industry, and reasonable prices for consumers (http://dnai.in/cGKD). But on the other, the more one looks at the way the cold-storage industry itself has been shaping up; there is a painful awareness that a lot more has to be done.

India already enjoys an operational capacity for 26 million tonnes of cold-storage. And this does not include other storage capacity created exclusively for captive use by large organisations – like milk coolers, abattoirs, hotels, food processing factories.

Take the numbers first.

Chilling can be quite heart-warming

Cold chain development in India

Created capacity in cold storages	31.2 million tonnes
Average capacity per cold store unit	5,021 tonnes
Total number of units *	6,227
Total units shut down (ageing obsolescence etc)	1,100
Operational capacity	26 million tonnes
Operational units	5,200
Required capacity#	61.13 million tonnes
Current gap#	35 million tonnes
Modern 'pack houses' required	30,000
Reefer unit requirement (@ 2 per pack house)	60,000
Modern 'pack houses' in existence	200
Reefer units in existence	10,000

Source: NCCD (www.nccd.gov.in/), FICCI, Assocham, McKinsey, DNA

Note: (*) Does not include other storage capacity created exclusively for captive use by users - e.g. milk coolers, abattoirs, hotels, food processing factories. A survey conducted in 2013 is still pending ratification. Hence actual numbers could be higher.

 # An earlier study conducted by National Spot Exchange (NSEL) in 2010. But current gap does not account for the gap in other allied infrastructure, such as reefer vehicles, pack-houses and ripening chambers, which are necessary for holistic development, and overall benefit, of cold-chains.

Then look at the other side. The minimum capacity addition that is required to make this industry truly vibrant is 35 million tonnes (see table). Clearly, the industry has not met even half the required demand that is estimated to be in existence today.

Also take a close look at some of the large merchant cold-storage units that are coming up. At least half their required business comes from large players like Mother Dairy (ice-creams and other milk products), ITC (food products) and Pepsi (fruit and assorted drinks). Farmers have not been able to use these cold storage units as effectively as one would have liked. The reasons are not too hard to discover. Most farmers have very small holdings. They need cash upfront for the little that they produce. Large aggregators have yet to emerge on the scene – leaving small farmers with few players who can pick up the small quantities of fruit and vegetables produced by countless small farms, aggregate them, sort them, and then send them to cold-storage units for preservation and storage till the time favours higher prices.

Moreover the small farmer is quite vulnerable to rains, creditors, inept farming practices. He has little, if any, crop insurance against inclement weather. He does not even have access to good roads which would allow him to reach the aggregator, even if one exists in the vicinity.

Compounding all this is the fact that many farmers are not even permitted to reach the markets that want their produce. Many state governments have imposed barriers to free transport of fruit and vegetables, which must be sold only through government licenced brokers to Agricultural Produce Marketing Committees (APMCs). Consequently, even for a city like Mumbai, the markups for vegetables can be as high as 400-500%. Thus for every Rs.5 the consumer in Mumbai pays, the farmer gets barely Re.1.

Some progressive state governments like Delhi and Gujarat have already disbanded APMCs. But many other, including Maharashtra, are reluctant to do so, because of the huge amounts of political funding these APMCs permit. Had they been banned, the farmers could hope to get better prices for their produce even while consumers pay less. The result, farmers lose out again, despite having the best of cold storages around. And the consumer eventually pays the price.

TECHNICAL UPDATES

At present the best solutions can be found in places where the farmers have come together to create their own cold storage facilities and have used appropriate technologies that would allow climb the value chain. One such example is the 'Fit-for-Purpose' cold storages that Bayer Material Science (BMS) has designed for small and marginal fruit and vegetable farmers in India for the past three years. This involves an innovative combination of good insulation with the small-sized cold store powered by a modified AC. While this does require grid power to operate, the powerful polyurethane insulation used ensures that the temperatures are maintained even during prolonged periods of absence of power; sometimes just a degree rise in 3 hours!

However, the question of availability of electricity posed a challenge. BMS has been working with technology partners to use farm level solar based cold storage. Recently, a partnership has been forged with Ecozen who has raised 1 Mio USD from Omnivore, a VC focused on agri-tech technologies. These funds will be utilized to scale up market of farm level solar based cold storage and also, some part of them will go for setting up manufacturing base in Pune.

That could allow for decentralized clusters generating their own power and enabling cold-storage solutions to flourish.

Lloyd's Insulation too has made some advances in this arena. Partnering with an inventor from the US, they have launched the Solercool, where solar energy is converted into DC electricity which drives the cooling system (the compressor and the air supply)

directly. Surplus generation of DC power is used to charge a bank of batteries forming part of the system, channeled by a controller.

Another good example is the way farmers got together in a village named Thottiyam (Tiruchi District, Tamil Nadu) to ensure that they got better prices for the bananas they produced in this region.

The BMS project team selected the Thottiyam Banana Society as one of the beneficiaries of the project after a thorough evaluation process, involving a comprehensive field study and scoring. It installed farm-level solar dryers and cold storages, formed a society of 300 farmers. A Memorandum of Understanding was signed and the Green House Dryer was installed in November 2013.

The Green House Solar Dryer was invented by Prof. J Serm from Silpakorn University, Bangkok, Thailand. But this technology was adapted to suit Indian conditions and produce. The Thottiyam Banana Society took the charge of the dryer once it was installed and quickly tried out various varieties of banana, carrying out many trials to establish standardization.

Over a few weeks, they came out with a honey-laced solar dried Banana and christened it 'Madhur' (sweet). A new brand was born

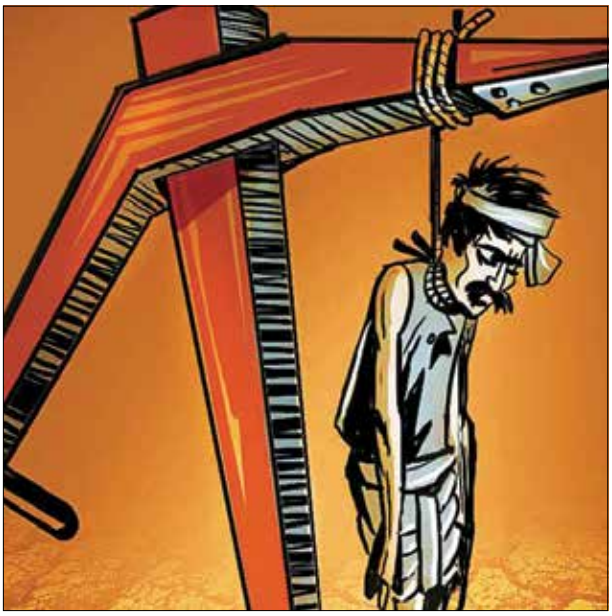
Clearly, simple interventions can go a long way in mitigating problems. Adapting suitable technologies, product identification, and brand building are some of the aspects farmers need to be educated about in order to bring about a better produce, higher value addition, in conjunction with cold-storage.

Obviously, the role of the government, or an industry-led association, is crucially important in helping achieve all these objectives.

As Ravichandran Purshothaman, president, Danfoss, puts it, "GST (which allows for uniform pricing of taxes across the country and breaks down artificial state or city barrier to the free movement of goods), growth in food processing and organised retail are the three critical game changers for cold-chain growth and for building scale. Technology and innovation will be strong enablers."

A quick look at some more numbers reiterates the need for integrated cold-chain solutions in India.

• 11% of world's total vegetables production is accounted by India alone but India's share in global vegetable trade is only 1.7%. This means that India has to value-add



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Engineering Passion

KraussMaffei

its produce and give it a longer shelf life in order to increase its share in the global vegetable market.

• 140 million metric tonnes of milk was produced in 2013- 14, but cold-storage capacity is only available for about 80,000 MT of milk. That in turn means higher prices for consumers who must eventually pay for the milk that is lose through spoilage and degradation.

• Approximately 25% of fish production is annually wasted in India compelling fishermen to charge more for the fish that is left.

• There are approximately 30,000 unregistered slaughter houses in India, which generally lack chilling facilities. Result: shorter shelf-life for meat, sale of stale meat as a final desperate measure to stanch losses, and a substandard product reaching customers.

Although, there have been talks about promoting integrated cold-chain solutions, the collaboration required to translate the dream into reality is lacking. The cold chain industry is primarily dominated by equipment manufacturers and there has been little active contribution from insulation material manufacturers until recently when Bayer went into active advocacy. The need to have good insulation is now being appreciated and acknowledged by the other industry stakeholders.

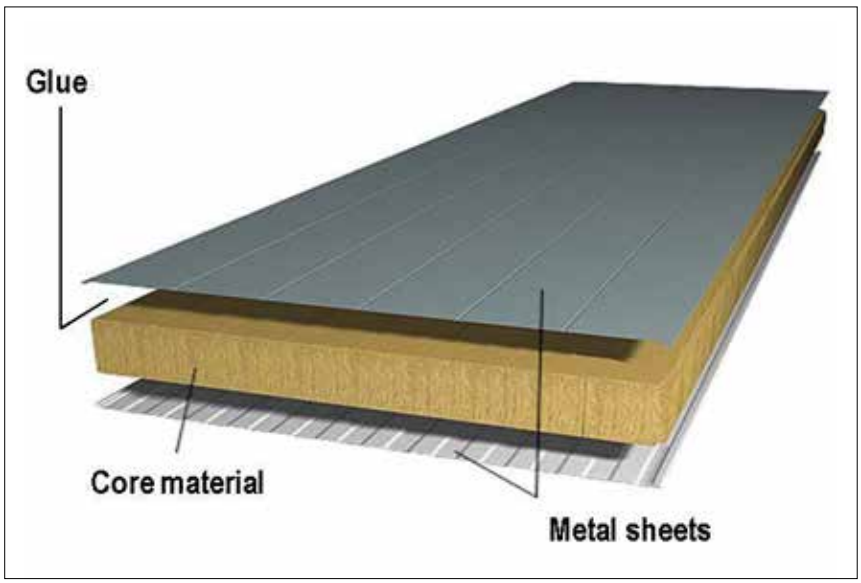
Eventually, success in introducing cold-chain solutions across India will depend on three things:

▪ Infrastructure development,

▪ Farmer education on ways to achieve greater value addition through cooperation at the village level and reaching consumer markets at the district, state or national level, and

▪ The ability of government and industry to find solutions that could benefit all the stakeholders – the farmer-producer, the consumer, industry players and the entire economy.

Till all the three are addressed in a holistic manner, both the farmer and the consumer will continue to feel short-changed.



TECHNICAL ARTICLE

Modern Energy Efficient Cold Storage Construction & Insulation System

K. K. Mitra – Vice President (Mktg. & Tech.),
Lloyd Insulations (India) Limited

Preface

India has a wide variety of Horticulture Crops harvested throughout the year and spread all over the country. There are altogether seven varieties out of which vegetables have 58.93 percent share followed by fruits of 31.74 percent, plantation crops of 6.09 percent, spices of 2.76 percent and 0.48 percent others.

In vegetables sector, Potato has the maximum share of 28 percent and in fruits sector Banana has 31.86 percent, Mango 21.34 percent and citrus 10.82 percent. But out of huge production done a major chunk gets wasted in the field or transportation or due to improper storage. India is a tropical country and major parts experience higher day temperatures which has an impact on the farm produces deterioration. An ambient of 40 deg.C can cause 25 percent loss of agriculture produce per day. So there is an urgent necessity for protection at different levels for the fresh produce:

Harvest

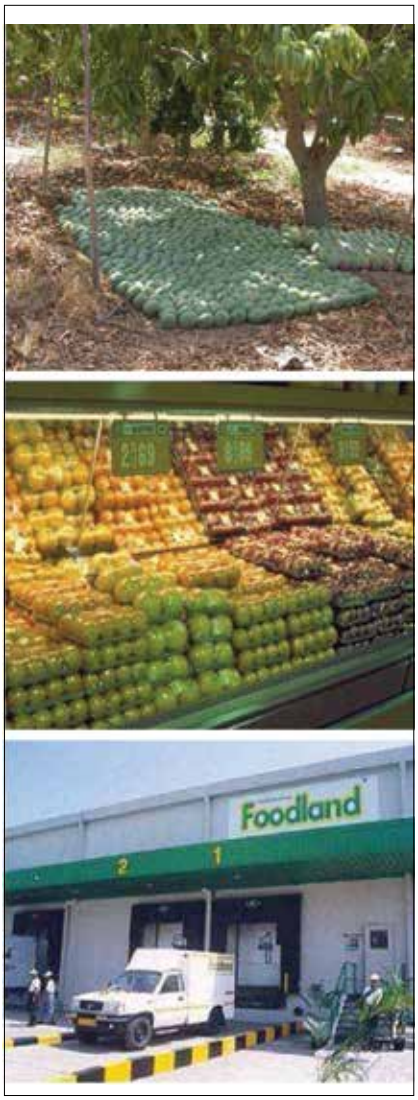
- Protection of the product from direct sun.
- Quick transportation to the packinghouse.

Cooling

- Minimize delays before cooling.
- Thorough cooling of the product as soon as possible.

Temporary Storage

- Keeping the product at optimum temperature.
- Ship to the market as soon as possible.



Transport To Market

- Use refrigerated truck.
- Cool truck before loading.
- Load pallets towards the centre of the truck.
- Avoid delays during transport.
- Monitor product temperature during transport.

Handling At Destination

- Use of refrigerated unloading area.
- Measurement of product temperature.
- Quick movement of product to proper storage area.

Handling At Home or Food Service Outlet

- Transport to retail market in refrigerated trucks.
- Display of temperature range.
- Use product as soon as possible.

But unfortunately existing system does not take care of the above factors, not even 40 percent. What we have, is inefficient Cold Chain practices at every level. The produce is voluminous but what the ultimate customer gets is awful and limited. The fresh produce should be treated as a living human being which breathes, releases heat, looses moisture and can get sick and even die. So there is an urgent need for protection at different levels for fresh produce like :

Post Harvest Management

- Collection centers
- Pack houses.
- High humidity cold stores associated with pack houses.

COLD CHAIN MANAGEMENT

- Single/dual commodity cold stores.
- Multi commodity cold stores with modified atmosphere control system.
  CA Cold stores

The Cold Chain Industry is estimated

to be as large as Rs.10,000-15,000 crore, growing at 20-25% and is expected to touch Rs.40,000 crore by 2015

Thermal Insulation System In Cold Chain Management

DEFINITION OF A COLD STORE

A cold storage is a building or a group of buildings with Thermal Insulation and a Refrigeration System in which perishable food stuffs can be stored for various lengths of times in set conditions of temperature, humidity and appropriate environment to slow down deterioration and spoilage, which would occur in a natural environment. In some countries cold stores are known as refrigerated warehouses. A cold store may also be defined as a sealed structure, the internal volume of which is maintained at a temperature generally below ambient and other conditions and used for the storage of goods of all types, mainly foods.

Thermal Insulation System is a combination of material, ancillaries for application and application methodology which resists the flow of environment heat to inside of a building or enclosure which is supposed to maintain a much lower temperature than outside (a typical Indian situation mostly where ambient temperatures are higher during most period of a year). Thermal Insulation will resist the flow of heat by acting as a barrier. The most effective insulation will provide maximum resistance and will be defined by a particular 'R' value which will depend upon its thermal conductivity value and thickness. Lower the thermal conductivity of an insulation material the more effective it will be. Further mass of the insulation material is also important defined as adequate density of the material to be selected. A slighter higher density will increase the heat capacity of the material and result into a lower thermal diffusivity value. A material having lower diffusivity value will be able to maintain a constant temperature or slow rise in temperature inside a building in a situation when internal cooling is not working.

In a cold store operation Refrigeration system brings down the temperature initially during start-up but Thermal Insulation maintains the temperature later-on continuously.

Thermal Insulation is not material alone, it is the complete system which includes how it is applied and finally finished or the cladding / covering arrangement which provides protection. Proper application technique is equally crucial to its success.

In case of cold stores where a lower temperature is maintained insulation has a major role to play. Insulation will resist flow of heat from outside. If insulation does not perform effectively cold loss from inside will take place and load on refrigeration will increase.

Now let us look into the functioning of cold storage and how insulation failure can be identified and what are the causes. Cold Store is a situation under cold insulation chapter. Cold Insulation is also defined as anti condensation insulation. Wherever there is a situation of a cold body and there is humidity present all around heavy condensation deposition on the cold body will take place which will make the entire area moist. An even severe situation can be icing formation. Now even if insulation is done over the cold body, condensation will still take place as water vapour will make passage through the insulation joints. So a term called vapour barrier is used, which is a solid impervious membrane applied over the insulation on the warm side which avoids the water vapour or humidity to go through the insulation. Vapour barrier is very important in cold insulation. Together with vapour barrier is proper adhesive and fixing of insulation within a holding framework so that it remains in place for a longer period and perform effectively.

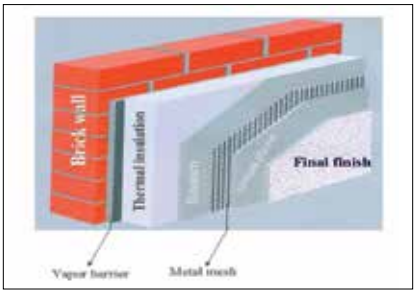
Existing Conventional Cold Storage Situation

INTRODUCTION

Cold Storage primarily meant for Potato Storage is an industry in existence since independence. These cold storages usually running from capacities 2000 tons to 6000 tons are in the co- operative sectors and Private Sector. The usual height on an average is 40-50 ft. and base is like a square of various dimensions, depending upon the capacity. The main construction methodology involves erection of RCC columns on the periphery, thick brick walls, asbestos sheet roofing fixed over a steel structure or RCC roofing and a false ceiling.

The inside construction activities involves:

1. Erection of steel or RCC columns / beams structural network for creating storage spaces of rectangular boxes. The vertical beams are erected



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first and then the cross horizontal beams which are carried up to the walls forming 4 to 6 tiers. Wooden planks are placed over the horizontal beams forming racks for holding the storage bags.In between the wooden planks gaps are maintained for air circulation. Each rectangular box holds approx. 42 bags. of 50 kg. capacity.

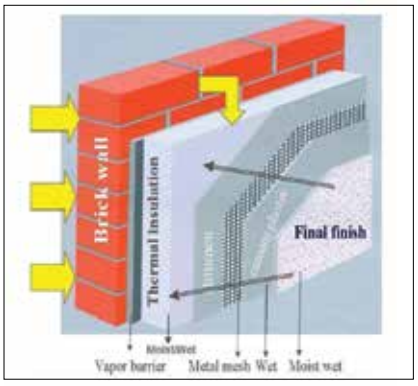
2. Thermal Insulation of usually Expanded Polystyrene or Mineralwool / Glasswool Slabs in 100mm is fixed over the walls with wooden battens, vapour barriers (over the plastered brick surface) and finally plastered. Floor is insulated with Expanded Polystyrene Slabs having concrete or stone slab finish. There is a false ceiling of rigid board and insulation is placed over false ceiling, is usually Rice husk spread uniformly. Mineralwool / Glasswool slabs placed inside polythene bags are also used.

3. Refrigeration system is usually hung on the top or sides. The temperature desired for potato storage is 2-5 deg.C.

4. Usually a single chamber with no partition walls in between.

5. Staircase is running inside usually at the centre and placed in front of the door.

Offlate these conventional cold storages have become ineffective and inefficient because of failure of Insulation and Refrigeration system mainly. The insulation has



given away because of continuous moisture ingress through the plastered surface, leading to the surface becoming wet, loose and chipping off. This exposes the insulation and the wooden battens, which then is attacked by the moisture and gradually destabilizing the system making it ineffective and inefficient. In cold storage's mouse is very common which eats up the Expanded Polystyrene. In case of Mineralwool moisture gets trapped between the fibres making them heavier & ineffective. The vapour barrier which is on the warmer side of insulation and fixed over the plastered brick wall, slowly & gradually gets exposed to the moisture ingress and gets dislodged from its place.

This results into the inside cold environment coming in direct contact with the outside brick wall. This situation leads to moisture deposition from outside environment to the wall due to cold spots formation. So finally the insulation is under attack both from inside and outside. This slowly & gradually makes the insulation wet rendering it ineffective with passage of time. One percent moisture ingress reduces insulation value by five percent. So at a point of time insulation looses its resistance property and outside heat ingress increases. This leads to more running of refrigeration compressor and load on the refrigeration machinery, which in turn increases electricity consumption. With prolonged power cuts situation cold storage inside situation becomes warmer and that leads to product deterioration. So it is a cyclic effect starting from construction methodology or system to improper running and finally attack on product storage life and losses.

Usually most of the conventional cold stores have single large chambers. So even when storage is half-filled entire refrigeration machinery has to be in function making the cold storage operating cost higher and making it a loosing venture.

Insulation is supposed to maintain a desired temperature for sometime even when the Refrigeration compressor is not functioning. That is it should not allow heat from outside to penetrate through the walls & ceiling in to the cold storage, playing a role for energy conservation. So slower the heat passage through the walls & ceiling slower would be the gain in temp. inside the cold storage when compressor is not running. Consequently in case of power failure the inside temp. will remain congenial for a longer period of time. Otherwise the moment power goes off temp. rises fast and the products inside start decaying.

Insulation also helps in the running cycles of compressor. The compressor can be switched off after reaching a lower or stable temperature and depending upon the temperature rise switched on. The time gap between this "Off & ON" function will depend upon the efficiency of insulation system.

In present situation almost all the old cold storages in India have faced or are facing inefficient insulation function leading to Refrigeration system failure. The insulation system had been found to have sagged or have fallen down partially with the plaster or water soaked making it ineffective. This leads to formation of cold spots on the walls. A continuous moisture presence leads to Algae formation making inside atmosphere filthy leading to faster deterioration of products. So product decays, higher energy costs, failure of refrigeration system has lead to many cold storages being closed down.

NEW INSULATION SYSTEM

A thorough analysis was done of the existing cold storage problem in India and it was found that the insulation system needs a complete change over. The present insulation

TECHNICAL ARTICLE

materials like Expanded Polystyrene & Glasswool / Mineralwool which are of open cell structure, which allows moisture ingress & deposition. The most appropriate modern insulation for cold services is a closed cell material like Polyurethane Foam. In Indian condition both in terms of techno-commercial factors and availability Polyurethane Foam has much better insulation properties and higher thermal efficiency in comparison to those being used presently mostly (Expanded Polystyrene /Mineralwool / Glasswool). Further it has a density almost double that of Expanded Polystyrene. Because of its lower thermal conductivity value the thickness required for Polyurethane Foam will be less thus allowing more storing space inside. Moreover PUF is not eaten by rats & insects. Another alternative is Polyisocyanurate Foam, which is an advanced fire safe insulation material. These two are also closed cell insulation material with lower conductivity values and higher densities.

While selecting insulation for cold storage one should differentiate it from an air conditioned building. A building is a situation where the various occupants like human beings and electronic gadgets generate continuous heat. Further there are windows and doors through which heat or cold comes in. So the design has to take care all these effect and has an effect on insulation material & thickness whereas in a cold storage no. of openings are limited and mostly closed and the products once stored will release humidity (whereas human beings & electronic gadgets in an office building release only heat). Further the product once cooled will act as a cold body emitting cold.

The problem faced with conventional insulation system was not only the material but also the application procedure. Cold storage insulation is different from building insulation concept. In normal insulation system vapour barrier is applied on warmer side of insulation. But in case of cold stores vapour pressure is from both sides, that is outside environment as well as from inside the storage whereas vapour barrier on warmer side prevents vapour from outside environment, there is no system in place to stop the moisture ingress from inside. Since inside cover or finish over insulation is plaster which is again a porous material will allow moisture deposition and absorption. So we need an insulation application where the insulation should be covered with an impervious cover or membrane from both sides. This cover should be non- porous and mechanically stronger.

Another problem was the insulation form. Insulation is applied in slab form allowing numerous joints which has to be properly covered with adhesive. Multiple layers with adhered joints all to be sealed properly. Even the vapour barrier to be properly sealed. Now all these are highly labour oriented and any lapse at any step will result into leakage and cold spots formation. Finally while applying plaster, above a reinforcement of wire netting is required, which has every chance of puncturing the insulation. Plaster is porous and moisture from inside slowly gradually is absorbed by the plaster. So from inside the moisture slowly gradually kills the insulation system.

Insulation thickness is an important tool to its effective performance. If thickness is inadequate, there will be heat ingress continuously. In thickness calculation humidity is an input. One should take care of considering the maximum RH happening in that area or remaining in sometime during rainy season. Say if average taken is 70% then during peak monsoon period when RH remains 85-90% there will be cold spots formation. So it is advisable to follow at least 85% during design.

Existing insulation system is highly labour oriented, cumbersome and a basic draw back in terms of application methodology. Continuous supervision during construction is required.

Next comes the basic insulation material which has a defined property with respect to the water/ moisture ingress. An open cell structure material like a fibrous material or steamed compressed beads filled insulation like Expanded Polystyrene will have the tendency to absorb moisture and retain it through out. So once moisture will go into the material it will remain there, reducing its efficiency. Ultimately ice formation also takes place.

Now let us analyze which are the possible controllable factors. These are material, design and procedure. Now material can be changed to closed cell materials like Polyurethane Foam, Polyisocyanurate Foam, Extruded

Polystyrene Foam. By opting for RH 85% adequate thickness can be followed.

In terms of vapour barrier the same can be applied on both sides. Insulation can be laminated on the facing side, similarly vapour barrier application on the wall. First layer will be applied on top of brick wall and then insulation laminated with aluminium foil on one side to act as vapour barrier on product storage side. Finally apply colour coated galvanized steel sheet (1m wide and any length) fixed vertically or horizontally on to the supporting structure and sealing the joints with sealants and 75mm wide tape.

Recommended Overall Heat Transmission Coefficient For Cold Storage Structure (Is : 661-2000 – Revised / Proposed)

Storage T emp. range (^{0}C)	Max. U value, W /m^{2}K			
	Exposed Walls	Intermediate Walls /Ceilings	Roofs	Floors
-30 to -20	0.17	0.47	0.14	0.20
-20 to -15	0.21	0.47	0.17	0.23
-15 to -4	0.23	0.47	0.21	0.27
-4 to 2	0.27	0.58	0.24	0.29
2 to 10	0.35	0.93	0.29	0.47
10 to 16	0.47	0.93	0.29	0.64
16 & above	1.28	1.47	1.05	1.63

Note : Surface coefficient values can be taken as per IS : 3792 (Guide for Heat Insulation of non-industrial buildings)

Repair of Existing Cold Stores Walls & Roof Insulation The most efficient and latest technology application will be externally fixing of closed cell Polyurethane Foam insulation slabs with special water based adhesive on to the walls and then applying polymerized plaster 4-6mm thick in 2 layers with synthetic reinforcement superimposed between the 2 layers. The plaster after drying will have a natural finish (white colour). Alternatively applying 2 coats of proper grade painting over the dried plaster. For roof, polyurethane foam insulation shall be sprayed to form an uniform homogenous cover over the RCC roof followed by plaster and suitable water proofing treatment.

In this way the wall & roof can be revamped.

RECOMMENDED OVERALL HEAT TRANSMISSION COEFFICIENT FOR COLD STORAGE STRUCTURE (IS : 661-2000 – Revised / Proposed)

Proper application procedure can be formulated, but how much control is there practically during construction. The application procedure remains labour intensive requiring lots of supervision and control. But it has to be seen how properly the application is done. So by changing or shifting to an efficient system is not the final solution – it is a partial solution. The total construction time for a typical 5000 tons cold storage will remain to be around 9-10 months. So if harvesting time is February construction has to start around May-June the previous year with monsoon in between.

So basic system needs a correction.

Latest State Of The Art Modern Cold Store Construction Technology

Then comes the decision to opt for a new Modern Technology Concept where a complete study of existing construction system is done starting from basic civil infrastructure to insulation system, which can take care of existing problems. The massive civil construction involving RCC & brick works also needs to be given a thought. Suppose the brick wall & insulation system is replaced by a system which will serve the purpose of a permanent wall & insulation as a composite system then it becomes very convenient. This is exactly where modern technology comes. Now we have prefabricated panels which can serve as permanent walls & insulation and also can be used for roofs. These panels have closed cell insulation (PUF) and faced on both sides with colour coated steel. These panels since faced on both sides with metal sheet act as vapour barrier and resist flow of moisture from both sides. Being steel faced provides mechanical strength and sturdiness to environment attacks. The panel does not have any thermal bridge in between to allow heat conduction.

PANEL CONSTRUCTION

The panel system consists of basic pre-fabricated panels made to very tight specification and the full range of accessories required, including insulated doors, pressure relief valves, sealants, mastics, PVC and aluminium profiles, ceiling suspensions and plastic components.

The inner and outer surface of each pre-fabricated panel is made of a 0.5 / 0.6mm thick hot dipped galvanized steel sheet and sandwiched between them is a 40+2 kg/m3 layer of rigid CFC free close cell & also HCFC free and zero ODP polyurethane foam. Each

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- Modular design
- Cyclo-Pentane capable

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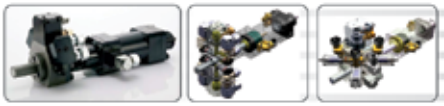

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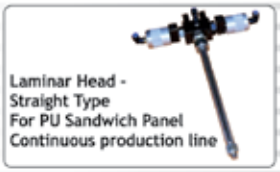

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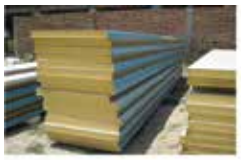
Panels



Wall Panels

PEB Structure

PEB & Panels

Wall Panels

panel is complete with a tongue and groove joint and optionally is provided with camlocks jointing arrangements to ensure rigid interlocking between panels.

Each panel is supplied pre-painted with a colour coating of 20-25 microns of architectural polyester on a minimum 175 gms/m2 base of zinc coating. PVC and plastisol coatings of 200 micron thickness are also available as an option. The standard colour is off-white and the surface of the steel sheets have light- cutting grooves both to enhance their strength as well as to provide an aesthetic appearance. Plain panels are also available. Panels are usually approx. 1M wide and transportable length upto max.12-13 mtr.

Built into the pre-fabricated panel is a large choice of doors, hatches and viewing glasses.Doors can be hinged or sliding, manually operated or mechanized. Standard mechanized doors are 1300 x 2300mm and come complete with electrical heat tracers to prevent freezing of gaskets. Manual sliding doors are 2200mm x 3000mm in size and normal hinged door of 1220mm x 2010mm.

These panels are manufactured in a semi automated or fully automated continuous machines with total quality control. The panels are indigenously manufactured and easily available in the country (approx. mfg. capacity 20 million sqm. per annum).

PANEL FIXING

These panels can be directly bolted to the RCC columns with suitable fastening arrangements. There can be two type of fixing arrangement. In one method after fixing the panels horizontally the joints on the column is covered by a flashing. In other type the panels are fixed with a hidden fastening arrangement, which makes an absolute flushed finish. In both case, panels are fixed horizontally and the columns are inside visible only. Outside an absolute smooth wall will be noticed.

The RCC columns can further be replaced by steel columns, rafters & purlins. This technology of steel is also termed as Pre- engineered Building concept. The entire RCC framework is replaced by structural steel components (vertical- columns, horizontal – rafters). The columns are usually placed at 4-5 meters. These steel structures are lighter than conventional steel structure. The steel columns and rafters are tapered reducing steel consumption. Wall panels are fixed vertically to these purlins. Wall panels can be upto 12-13m length maximum. Here horizontal purlins will be on top and bottom, fixed to the columns. In case of above 12m, 2 panels will be used. The entire steel fabrication is done at the factory and brought to site in knock- down condition, thereby reducing any welding function at site. This makes construction faster. Since no site welding is involved, site is clean of debris.

The roofing arrangement here is a 2-tier system. A false ceiling with prefab PUF panels is hung from the roof structure. An insulated 'T' arrangement is done, on to which panels are placed. Over the steel structure, profile colour coated steel sheet is provided, which stops direct heat or rain to come in contact with the panels below. Exhaust fans are provided to blow out the heat accumulated in between the roof & panels. Chilled water pipes can be carried in this space.

For a typical 5000 tons cold storage with steel PEB structure and panels construction time will be around 90 days. Since time period is short, construction can be taken up 2-3 months before the harvesting time and save interest period.

Main features of the Panel system are:

- A high strength to weight ratio, with significant savings in steel work and load bearing foundations, allowing large spans to be constructed with no intermediate columns.
- Dimensional stability.
- Maintenance-free surface.
- High thermal efficiency ensures low heat transmission, resulting in lower refrigeration load.
- No deterioration of thermal efficiency over time.
- Panels can be furnished in single jointless height /

TECHNICAL ARTICLE

Length upto 12 mtrs. Partition wall can be easily erected as the panels are self supporting.

• Panel system incorporates special "L" shaped single piece panels for CORNERS. This avoids wall to wall direct jointing - provides additional stability, strength, aesthetical appearance, easy house keeping etc.

• To arrest thermal leakage, joints are finished in tongue and groove configuration which in combination with CAMLOCKS (optional) ensures a foam to foam joint rather than a metal to metal joint.

• For additional reinforcement "U/L" shaped flashing are provided at wall to ceiling joints.

THERMAL AND LOAD CHARACTERISTICS							
THICKNES S	MM 6	0	80	100	120	150	200
'U' VALUES W	/M^{2}C	0.36 0	.26	0.21 0	.19	0.14	0.11
PANEL WEIGHT K	G/M2 1	1.25 1	2.05 1	2.85 1	3.65 1	4.85 1	6.85

POLYURETHANE FOAM INSULATION CHARACTERISTICS

INSULATION PROPERTIES C	FC Free Rigid Polyurethane Foam (PUF) as per IS:12436
Foam Overall Density	40±2 kg/m3
Foam Thermal Conductivity (K-value) at 10°C mean temp.	0.023 W/mK
Compressive Strength @10% 2	.5 kg/sq.cm.
Deformation	3.0 kg/sq.cm.
Tensile Strength 2	.5 kg/sq.cm.
Flextural / Bending Strength 9	0-95%
Shear Strength	125mm (Extent of Burn) – Max.
Closed Cell Contents F	ire Retardent, SelfE xtinguishing
Horizontal Burning Characteristics Q	uality Foam
Water Absorption 0	.2% volume at 100% RH – Max.
Water Vapour Permeability Dimensional Stabilityat -25°C Cold Temp. 70°C Hot Temp.	0.12 ng/pasm at 88% RH & 38°C-Max. ±2% ±2%
Green Rating Points 5	

CFC, HCFC Free & Zero ODP continuous technology panels are also available

Energy Savings Aspect

CASE STUDY (FOR POTATO STORAGE)

Conventional Cold Storage Design Vs. Modern Cold Storage Design

POTATO COLD STORE - CONVENTIONAL

CASE STUDY

Storage Capacity : 6000 MT

Size : 105' (32M) x 105'(32M) x 60'(18M) (H)

Wall Design :

Brick Wall : 225mm (9")

Cement Plaster : 12 mm (both sides), Bituminous primer.

Al-Foil (vapor barrier) : 0.05mm.

(U-nails and Wooden Runners and Battens for fixing Insulation)

Expanded Polystyrene : 100mm or 4" (in two layers).

The final finish is a rendering of plaster ½" or 12mm.

Total Wall Thickness : 360 mm.

Ceiling Design

Ceiling is made up in a similar manner, with EPS being 100 mm or 4" in thickness (in case of RCC Slab as roof).

Floor Design

Floor is insulated with 60mm EPS, after tar felting and finished with Lean Concrete (PCC) 3" (75mm).

THEORETICAL HEAT GAIN FOR CONVENTIONAL CONSTRUCTION

Considering the Thermal Conductivity value for Polystyrene Foam (EPS) as 0.036 W/mK in order to allow for aging and imperfections during application for an ambient of 40-45 deg.C and operation at 4 to 6 deg.C.

Thermal Transmission Values

Q Wall = 12.26 W/m2

Q Ceiling = 8.98 W/m2

Considering a 6000MT Potato Cold Store

Dimension 105' (32M) x 105'(32M) x 60'(18M) (H)

Total Area

Wall – 1152 m2, Ceiling -1024m2, Floor – 1024 m2.

Thermal Transmission Value

Q Total (Theoretical) = 24 KW

BASIC ADVANTAGES OF MODULAR CONSTRUCTION OF COLD STORAGE

1. *The foremost advantages is that this type of construction provides the best possible Thermal Insulation value achieveable.*
2. *Overall construction period is reduced to a great extent.*
3. *With Modern Cold Storage Construction with PU Panels, the inside atmosphere becomes complete hygienic and resistant to attack by fungus and rats. According to available data, this accounts to 30 percent savings of stored products.*
4. *The deposition of any kind of impurities over the panels or holes being created by rats is completely ruled out.*
5. *Cleaning and washing of the panels is also very easy. The panels are completely maintenance free.*
6. *Such systems are in use in the country for more than ten years now.*

PRE-FAB PANELS

Wall insulation is an 80mm thick Rigid Polyurethane Foam Panel, with 0.5mm thick Colour Coated and Galvanized Sheet on both sides, with Tongue & Groove jointing detail and cam-lock arrangement.

Ceiling Panels are 100mm thick. Floor is 60mm EPS or 50mm Polyurethane Slabs

For this system, the thermal characteristics, based on design Thermal Conductivity Value of 0.023 W/mk (For PUF), a similar calculation as in the case of

Conventional will result in

Thermal Transmission
Q wall = 11.00 W/m2
Q ceiling = 8.57 W/m2.
Considering total area as above, Q total = 21 KW
A reduction of 12-15% in heat gain over conventional method at the initial stage.

Energy savings approx. Rs.13000/ month or Rs.1.60 Lacs per annum@ Rs.6/KW at the initial stage.

But gradually with insulation system failing in conventional system, it is found the efficiency reduces by at least 30% from 2nd season and then the difference in electricity saving will be Rs.43000 per month or Rs. 5-6 Lacs per annum.

The cost of the modern technology cold storage construction will be approximately 20-25% more than conventional construction methodology which is compensated by the electricity bills savings and pay back period ranges between 2 to 4 seasons depending upon the capacity. The life of compressor will increase as running time will get reduced because PU Panels shall maintain a stable temperature and slow rise in temperature inside the cold storage. The environment inside will be totally hygienic. The problems of rats can also be over come with this system. Storage space also increases. Because of better cooling and no loss of cooling to outside through walls and ceiling the products stored themselves absorbs cooling and increases its shelf life. This also leads to energy conservation further. In case of electricity failure temperature rise inside will be slow due to higher insulation value of PUF. Compressor running time also decreases.

CONCEPT OF MULTI PRODUCT MULTI CHAMBERED COLD STORAGE CONSTRUCTION

• This modern technology Modular Cold Storage is further modified to form multi chambers with partition walls & ceilings.

• A center door opens to a corridor

• On the corridor small independent chambers are constructed with Polyurethane Foam panels.

Central Corridor and Cold Store Chambers

• Ceilings are also with Polyurethane Panels.

The concept involves making an insulated corridor in the middle, on the ground floor in front of the main entrance door and on both sides of the corridor insulated cabins are made maintaining different temperatures. The upper floors' stair cases are through these individual chambers. Normally 6-8 chambers are constructed on the ground floor (for a large cold storage) with provision of stair case inside 3-4 chambers only. The upper floors may have small number of chambers. Temperature indicators are installed outside each chamber on the corridor. Such cold stores in limited numbers are in operation for the past 10 years.

BENEFITS OF MULTI PRODUCT MULTI CHAMBERED COLD STORAGE

• Year round availability of local fruits & vegetables

• Preservation of quality of fruits & vegetables

• Significant higher margins / value added

• Stimulates local economy and production

• Application of International Standards (incl. sorting & grading)

• Reducing costs (through benefits of scale)

• Reducing product losses

• Ability to compete with imported fruits

• Ability to store a variety of products

• Achieve economy through partial or complete store operation

CA STORES & POST HARVEST MANAGEMENT

CA Cold Stores can also be similarly constructed with pre-fab panels. But in case of CA stores

TECHNICAL ARTICLE

the panels are fixed from inside the structure and the structure is visible outside. In fact for Post Harvest Management which also consists of Sorting Grading, De-sapping, Washing, Drying, Packing / Crating, Pre-cooling, Ripening, Final Packing & Cold Storage – a complete infrastructure building can be made of Pre- engineered building technology.Inside this super structure individual above activities can be arranged conveniently and systematically one after another. The Cold Stores and CA Stores individual chambers depending upon the capacity can be erected.

Now for such independent cold stores if the dimensions are upto 6M wide then the panels can be individually joined to each other by camlocking (wall to wall, Wall to ceiling). The walls will be fixed to the floor with 'U' clips. There will be separate corner panels for convenience. This makes an unique combination of a complete system within a short span of time.

Ripening chambers can be conveniently constructed (usually of smaller size) with pre-fab panels anywhere inside a building. The panels can be camlocked and a chamber constructed. Together with the panels will be an insulated door with glass peep window to see the product.

FIELD COLLECT CENTRE STORES

Such panel constructed small stores at collection centres near the field can be useful to store products during the day time or it will protect it from day sun heat.

These panels do not get affected from sunrays or rain fall. Further there will be a temperature gradient difference of 5-7 degrees from outside to inside even without any cooling arrangement. Only an exhaust fan can be installed.

These stores are to be erected over a raised civil foundation. For protection against windage corner panels and may be some wall panels will be provided with tie-rods fixed to floor and roof panels. An additional rain guard roofing can be provided or the ceiling panels can be provided in a slanting fashion.

SOLAR PANEL COLD STORES

These collection centre Cold Stores can be provided with Solar Panel on roof. These Solar Panels will be capable to provide the energy to run a small refrigeration unit inside the cold room. These Solar Powered Cold Rooms will be highly suitable for installation in remote fields where electricity availability is a problem. Typical capacity will be 2.5 tons and will have back up power at max. 10 hours.

REVAMPING OF COLD STORES WITH PANELS

Existing cold stores with sound civil construction and damaged insulation can be revamped using prefab polyurethane panels. First the existing insulation will be removed including all supporting structure, surface cleaned and plastered. Thereafter fixing prefab panels on to the walls with fasteners. These panels will be slightly different comprising of metal sheet finish on cold storage side and thick paper or aluminium foil on wall side. This will make panels economic. The panels can be fixed horizontally or vertically. These panels can be upto 12m length & 1m wide and usually 50-80mm thickness.

INTERNATIONAL INSULATION SCENARIO FOR COLD STORE

Thermal Insulation is given lot of importance in developed countries. In developed countries 60% of the food stuff consumed needs refrigerated stores.Developed nations follow the Uvalue of 0.40 W/m2K and typical insulation thickness is in the range of 200mm and for minus temperature it is 300mm. The idea of providing higher insulation thickness is to properly maintain the temperature of the food produce stored and also achieve energy conservation. Even the partition walls are of 200mm thickness. In Europe there is a regulation to check the effectivity of insulation regularly.Hence there is large scope to improve the cold store insulation specification presently existing in India.

REFRIGERATED TRANSPORTATION

There are 4 Million refrigerated transportation trucks in the world. Out of this Europe has 1 million truck containers, France has 1,30,000 containers, China has 1,000,00 units and India has only 6000 Units. In Europe most of the food products are transported through refrigerated & insulated trucks.For refrigerated truck construction, prefabricated panels are used and here also the U value 0.40 W/m2K is followed. The prefabricated panels used for reefer truck construction has Polyurethane Foam insulation. The panels are held in position with a metallic frame work. Prefabricated panels are mostly with GRP (Glass Reinforced Plastic) sheet finish instead of metallic sheet to reduce

the weight of panel and improve the vehicle efficiency.

In India now a days most of the reefer trucks are being constructed with prefabricated panels. However the thickness of insulation needs to be revisited and upgraded. This is because of the simple reason that in case of non proper functioning of refrigeration equipment during the journey, the food produce will be able to maintain the temperature for a longer time due to thicker insulation.Internationally the thickness variation is from 100 -200mm. In India we follow 60-80mm panels. GRP sheet is being promoted in India and slowly picking up.

BUSINESS SECTION

By Arun Kumar Managing Director: InnoGrow Ventures

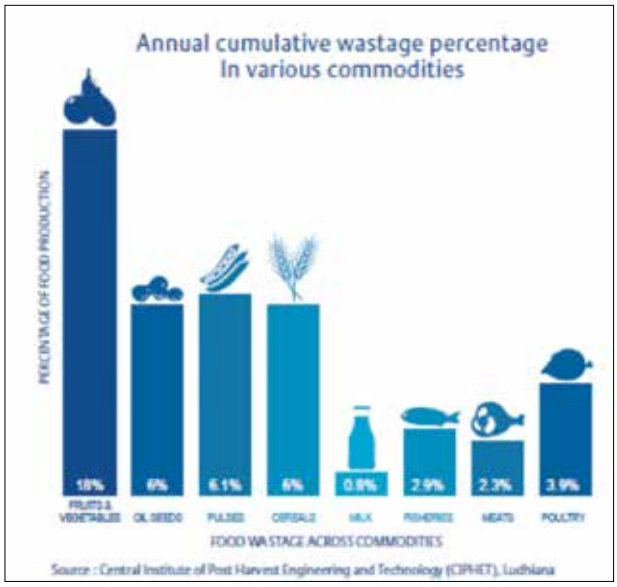
Developing Cold Chain Infrastructure in India–Need, Challenges and Opportunities

It is widely reported that despite serious issues like hunger and malnutrition in India , the country is letting food worth a whopping INR 44,000 crore go waste each year due to lack of adequate storage and handling infrastructure.

Various incumbent governments have made efforts in estimating the damage and made promises of improving the situation through investment in cold storages and better logistics facilities to transport perishables from farm to consumer.

The Saumitra Chaudhuri Committee, constituted by the Planning Commission in 2012, has estimated the country's cold food storage requirement as 61.3 million tonne as against the present capacity of around 29 million tonne. The past governments have taken some measures like providing grant-in-aid for states to build cold chain infrastructure, which is 50 per cent of the total cost of plant and machinery in general and 75 per cent in difficult areas including the Northeast with a sealing of INR 10 crores.

It is reported that India produces around 250 million tonne of food products in a year whilst the demand is 225 million tonne. This means theoretically there is ample food for every Indian but the reality is more than 250 million people go to bed hungry each day as due to poor cold chain infrastructure India ends up wasting food.



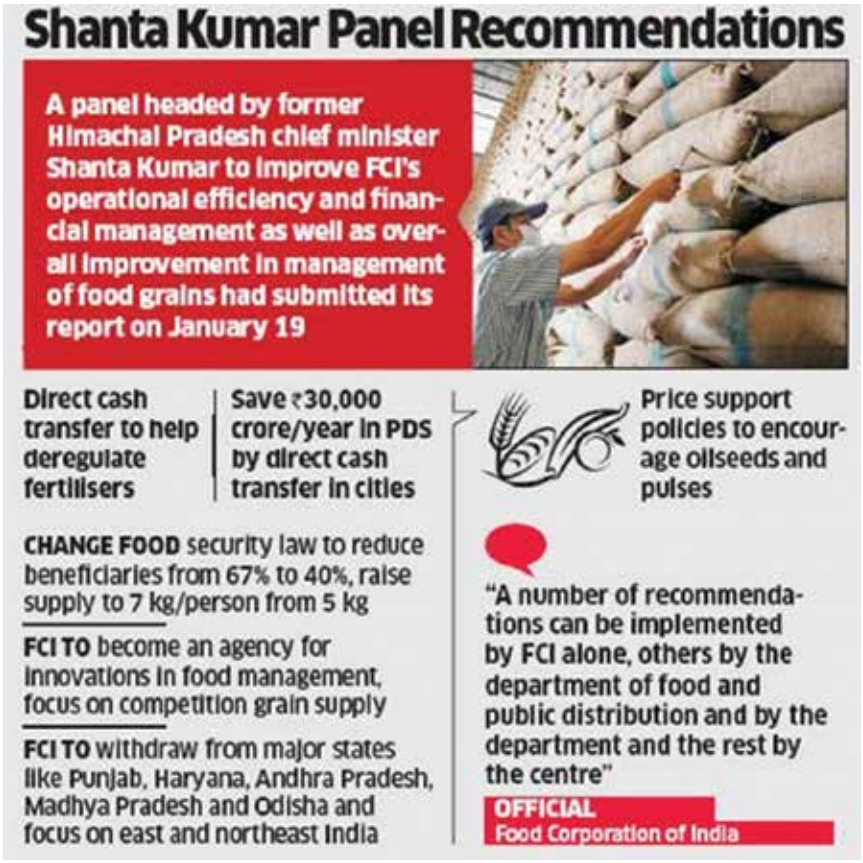
The below chart gives details of the percentages of the food wastage.

The present government had set up a high level committee in August 2014 with Mr Shanta Kumar as Chairman to suggest restructuring of Food Corporation of India (FCI) to improve efficiencies and to suggest models to improve storage and movement of food products across the country. The committee submitted the report to the Government of India on Jan 19th 2015. The major recommendations are captured as below –

Now that the problem is reasonably well understood lets discuss the current cold chain infrastructure that India has.

In 2012,India had about 6500 cold storages capable of storing about 30 million Tons whereas the demand was for 60 million tonnes of storage capacity. This storage also was concentrated in select few states and did not have India wide spacing. We are in 2015 now and it seems nothing much has changed even now. National Horticultural Board states that about 550 billion INR worth investment is needed to cope up with the demand of storage of fruits and vegetables. The cold chain industry as per ASSOCHAM is expected to grow at CAGR 25% in 2009 – 2017 to reach a value of INR 64 billion. In addition the cold storages currently in operation do not embrace modern technology and therefore are considerably less efficient. The typical issues faced by the cold chain industry is as below –

1) High costs of warehousing due to escalations in the real estate prices in India An investment of INR 5 crores is required to set up a warehouse with 6000 tonnes of storage.



2) The spread of warehouses is not uniform and around 75% of the current warehouses are dedicated for storing potatoes only. Therefore the current warehouses do not have the flexibility of offering different storages conditions for different food products. Nor are they accessible to storage demands across India.

3) Lack of awareness in the industry for improving the infrastructure coupled with large scale lack of investment by leading technology providers is not helping the cause either.

Government of India is well aware of the challenges and therefore over time has rolled out many schemes that will bring in the required focus and investments into the cold chain system.

Government has also formed a separate department named National Centre for Cold Chain Development (NCCD) – with the prime objective of developing and assisting the cold chain infrastructure development. In addition, Government has allowed 100% FDI in cold chain and 51% in multi brand retail to support the overall posture and creating the right environment for investments to come through.

Polyurethanes industry in India has a lot to offer as an integral part of the cold chain solution to develop the much needed infrastructure in India. Excellent thermal insulation offered by rigid polyurethanes foam, can be purposefully utilised for cold storages development with a modern intent of storing multiple commodities, long term storage needs, ripening chambers etc. Furthermore development of temperature conditioned logistics through refrigerated trucks and reefers for both short and long distances movement of food products is an area which is the heartland of polyurethanes capabilities.

The growth to say the least in the insulation industry in India over last 10 years has not been very exciting as there have been periods of rapid growth succeeded by negative growth. Serious investments were made in India during 2006 – 2012 by the polyurethanes industry stakeholders in continuous laminators which helped in scaling up the production and maintaining consistent quality. Most laminators in India are currently having significant amount of spare capacity and therefore it is in their own interest if more demand for PU insulated sandwich panels could be generated through cold chain opportunity.

Indian companies can offer holistic solutions in refrigeration and air- conditioning, there are stakeholders in the PU industry as raw material suppliers, equipment suppliers, panel manufacturers and others who will need to come together in engaging with appropriate government agencies like the NCCD and NHB to take the vision of cold chain development in India forward. I do sincerely believe that Indian

Polyurethanes Association has all the essential qualifiers to take leadership position in this area and contribute in potentially creating a very sizeable polyurethanes insulation market, fruits of which can be enjoyed the stakeholders in the industry whilst doing yeoman service to the country.

Acknowledgements :
• FCI website
• Newpaper articles
• GOI Annual budget submissions
• Emerson Climate Technologies Report on cold chain
• PU industry friends

Why export insulated panels? Should you invest in the future?

By Michael Young
Director Isowall Consulting, UK

With the development of insulated panels and their use in a wide range of end applications, the export of quality insulated panels that meet either North American or European test standard requirements has increased.

Markets throughout the world that are rapidly developing and where building owners are required to meet international building regulations for insurance purposes, there has been a significant increase in the volume of panels imported over vast distances.

Is it worth investing in an export activity?

Looking at the growth rates in various markets, it is evident that there are 3 factors that would encourage a company with a significant production base and a developed salesforce to seek out new markets especially where growth in their home market is declining.

For instance, in Europe, the growth of insulated panel sales will be 13.5% over the next 5 years which is a significantly lesser figure than that which has been achieved in the last 5 years. The use of panels in markets such as the Middle East (growth of 30.3%), South East Asia and India (growth of 77%) and in PRC (growth of 70%) offer new opportunities for panel systems which are:-

- Approved for a wide variety of building applications,
- Have a construction or installation system that is documented, and
- Have Approvals both in manufacture and insulation which meet the current building codes and, in particular, the insurance codes which are now, more than ever, imposing themselves upon the insulated panel market.

Generally, it is accepted that imported insulated panels are more costly than those manufactured locally. This higher value is protected by the Certification and Approvals which these panels carry and often by the demand of local builders and constructors for products of higher quality.

The perception of North American or European quality is such that in emerging markets clients are often willing to pay an 'added value' for the product to guarantee this performance and to ensure that their facilities (production or manufacture) are approved, say, for international clients to whom they are selling.

Growth rates in various markets throughout the world will vary and a company seeking to export should undertake the following:-

(1) An examination of their own product base and support facilities.
(2) Target those markets where they seek to obtain a market share.
(3) Establish links with both contractors and end clients in the specific markets.

(4) Obtain market data on local prices, competitors and building regulations.

The export of panels has been of advantage to many companies in Europe and North America especially in times of economic uncertainty and downturn. The assurance of payment under a Letter of Credit or similar guarantee conditions is also of benefit in funding and financing specific supply projects.

With growth opportunities increasing outside Europe, it is evident that the opportunity opening in developing markets continues to grow and that a company seeking to expand their global market should look at an export activity.

Michael Young is a Director of Isowall Consulting UK, a specialist and focused Consultant to the insulation, panel, refrigeration and rollforming industries.

Corruption topmost risk to Indian business environment: FICCI

IANS

IANS – 27 March, 2015

New Delhi, March 27 (IANS) A leading industry body on Friday ranked 'corruption, bribery and corporate frauds' as the topmost risk that impact Indian business environment.

The Federation of Indian Chambers of Commerce and Industry (FICCI) revealed the topmost risk to the Indian business environment in the latest edition of 'India Risk Survey 2015' (IRS 2015) survey.

On the 'corruption, bribery and corporate frauds' as the topmost risk, the survey said the recent news coverage and public uproar related to various cases involving major corporate houses justifies this trend as having the highest mind recall value and has also been assigned the greatest concern in recent times.

"Continuing with the trend evident from last year, the focus of the respondents for risk analysis continues to be on how the entire gamut of corruption, scams and corporate frauds are affecting the economy," the survey said.

The survey was conducted jointly by FICCI and Pinkerton Corporate Risk Management.

According to the industry body, the objective of the survey is to inform and sensitise all stakeholders about the emerging risks to the developing economies like India.

The Federation of Indian Chambers of Commerce and Industry (FICCI) revealed the topmost risk to the Indian business environment in the latest edition of 'India Risk Survey 2015' (IRS 2015) survey.

Apart from 'corruption, bribery and corporate frauds', the survey revealed that 'information and cyber insecurity', 'terrorism and insurgency', 'business espionage' and 'crime' as other major risks to business environment in India. The survey said that risks of 'strikes, closures and unrest' and 'political and governance instability', which were earlier in the top five risk brackets have dropped in the rankings to 6 and 11th positions respectively.

"This is a major shift in the yearly trends primarily due to the positive impact caused by a perceived stable government coming to power at the centre post the 2014 general elections," the survey said.

The industry body pointed out that the survey encompasses 12 key risks that pose a threat to the entire economic system of the country; and though each risk is rated on a mutually exclusive basis

BUSINESS SECTION

Central Government's Notification of Service Tax

Effective from 01 June, 2015

Today Central Government has issued most awaited notification for change in effective rate of Service Tax from 12.36% to 14%. New rates will be applicable from 1st June, 2015 (Notification No. 14/2015-ST dated 19th May, 2015). Corresponding changes in Rules 6 of Service Tax Rules, 1994 for increase in rate of Service Tax for:

A. Air Travel Agent,

B. Life Insurance Business,
C. Foreign Exchange Brokers and
D. Distributor & Selling Agent of Lottery

will also be applicable w.e.f. 1st June, 2015 (Notification No. 15/2015-ST).

In addition following changes will be applicable w.e.f. 1st June, 2015:
A. Service Tax on amusement facilities and Entertainment Events however exemption is available in respect of following services by way of right to admission to,-
a. Exhibition of cinematographic film, circus, dance, or theatrical performance including drama or ballet;
b. Recognised sporting event;
c. Award function, concert, pageant, musical performance or any sporting event other than a recognised sporting event, where the consideration for admission is not more than Rs. 500 per person."

B. Service Tax on Liquor Job Work;

Date of applicability of following provisions is yet to be notified:

A. Expansion of scope of services provided by Government and Local Authority; and

B. Applicability of 'Swachh Bharat Cess'.

An idea to drive change

The PU industry can work together to bring relief to India's farmers.

By Priya Fonseca

Natural disasters have been shaking up the Indian subcontinent over the last few months leaving most with thoughts about fate. Human nature and the will to live are intricately interwoven. There is a psychological force to fight for survival within each one of us that comes to the fore when our lives are threatened. This survival instinct is connected to hope. Recurring news from various parts of the country about farmers committing suicide brings out the dire hopelessness that apparently plagues a growing number of our agriculturists.

Across the country in states like Maharashtra, Telangana, Karnataka, Andhra Pradesh, Kerala, Madhya Pradesh, Haryana, Uttar Pradesh and West Bengal farmers are committing suicide on a regular basis. In parts of Maharashtra, drought along with the subsequent unseasonal rain and hailstorms has extensively damaged crops. This has led to 40% increase in suicides by farmers in the affected belts over the last seven months as compared to the same time frame last year.

Exact numbers and statistics are being debated and discussed by researchers, the media and the general public on an ongoing basis. Topics include; how serious is the problem of farmers' suicides? Is data reporting by the government, media or even the National Crime Records Bureau (NCRB) accurate? Do farmers in fact comprise the largest group of people committing suicide in the country? How are farmers classified when dealing with the numbers? Are farmer suicides actually a universal issue characterised by high stress across the globe? etc.

In India, the medium level and small farmers seem to be in the most vulnerable position. They are in a position to take risks in relation to commercial farming but do not have additional resources to manage in the event of crop failure or financial drawbacks. Factors like shame, lack of motivation, and depression associated with debt, crumbling economic status, addictions, suicides by peers, and concerns about how to manage familial life events like marriages, all take their toll on the psyche of the middle level farmer.

It is cash crop farmers that seem to be hit the hardest with maximum numbers of suicides being amongst the farmers invested in cotton, sugar cane, vanilla, coffee, pepper, groundnut and others. A generic report by the Intelligence Bureau titled 'Spate of Suicides by Farmers' identified the causes of suicides as being outstanding loans, rising debt, low crop yield, poor procurement rate of crops and successive crop failure. The note also emphasised the need to address factors such as crop yield, availability of farm inputs, loans from banking institutions, assured irrigation, marketing facilities, fair pricing policies and cold storage.

Mr. Mukesh Bhuta, Managing Director, Expanded Polymer Systems Pvt. Ltd. and IPUA Chairman about the key factors affecting Indian farmers said, "There are many factors that may be mentioned. These include drought conditions, untimely rains, poor warehousing facilities, temperature conditioned storage, etc."

A study in 2014 for London School of Economics brings up the point of state-specific and crop-specific causes for stress and suicides. Andhra Pradesh and Maharashtra farmer suicides show largest numbers coming in from the cotton belt. Fluctuating prices for cotton in the international market, weather, credit and also depletion of ground water were seen as the main issues in these regions. Kerala in addition to weather and international price swings also experienced the problem of pests. In Punjab, land degradation and poisoning of ground water were some of the factors mentioned.

Cold storage capacity in India is 29.3 million tonnes with 75% used solely for potato. The inter city reefer trucks account for only 4% of the country's transport facilities for perishable goods with 80% of the reefers being used currently for transportation of milk. India's cold chain capacity is said to be

SPECIAL FEATURE

30 million metric tonne while it produces approximately 200 million metric tonne of products. Currently the wastage stands to the tune of Rs. 44,000 Crore. With consumption levels over the next 15 years expected to treble, the issue of waste is one that requires urgent attention.

Tweet by Mrs. Harsimrat Kaur Badal, Hon'ble Minister, Ministry of Food Processing Industries, Government of India, from the 5th National Cold Chain Summit 2014.

It is an area where insulation plays a very key role. PU with its superior insulating, versatile space and energy saving properties finds applications in myriad steps across the food cold chain. Where its usage could directly impact the life of the farmer includes insulation for animal stalls, warehouses for seeds, saplings and harvested produce, refrigerated containers or lightweight coolers to transport perishable goods, portable coolers and reefer trucks.

Governmental and non governmental agencies are working on best approaches and options to manage the agricultural crisis. These range from the call for urgent expansion of formal financing routes for farmers by the RBI Governor to debt waivers, relaxation of norms for compensation for crop damage, more accessible relief schemes, appointment of IAS secretary-level officers in charge of suicide prone talukas, creation of Mega Food Parks (MFP), implementation and performance auditing of schemes like Jalayukta Shivar that ensures allotment of water, strengthening of water bodies and maintenance and allotment of other water sources and Rashtriya Krishi Vikas Yojana to name a few. In lieu of all the efforts being made and the fact that a multi-approach, holistic, concerted effort will yield best results, PU industry stalwarts in India are also brainstorming ideas that have the potential to aid farmers.

Specifically Mr. Bhuta suggests that Polyurethanes can help Indian farmers through sandwich panel warehousing in relation to food storage. He elaborated on the idea when he said, "One of the largest applications for sandwich panels is for insulated warehousing and cold storage. Food grains and vegetables can be stored in such warehouses or cold rooms as required so that it can be protected from adverse weather conditions such as rain, heat etc which is the largest destroyer of already harvested or ready to harvest crops. Using PU sandwich panels, it is possible to do quick construction of warehouses which could be seamless and give good weather protection. The PU industry will always try and work with the government, to look at the possibility of subsidizing such products."

India's food grain production in 2014 marked a record 264 million tonnes backed by technological innovations. However, the profit margins and revenues of the farmers have not improved. Indian farmers get approximately 25% to 30% of the price that is paid by consumers for their produce in sharp contrast to the 75% received by farmers in developed economies. The difference is generally attributed to losses, inefficiencies and middlemen. In addition to weather, dependency on rainfall and other factors that affect a good yield, post harvest logistics also remain an area that has tremendous scope for improvement.

Currently in spite of the fact that India is the second largest producer of fruits and vegetables globally, only 1% is exported and India ranks 10th among countries exporting fruit and vegetables. Mrs. Harsimrat Kaur Badal, Hon'ble Minister, Ministry of Food Processing Industries, Government of India, at the inauguration of the 5th National Cold Chain Summit 2014 said, "Cold chain plays an integral part in the development of our nation. In spite of all the challenges that

we have faced, we are the second largest producer of fruit and cereal, third in marine production and have the largest livestock in the world. But in spite of growth in these sectors, the disparity in the growth in the food processing sector is amazing." Talking about the challenges the industry faces, the Hon'ble Minister said, "The biggest challenge the industry faces is power, without which the cold chain cannot be successful. States need to invest in renewable energy and provide solar energy at subsidized rates."

Mr. Ajay Durrani, Managing Director, Bayer MaterialScience Pvt. Ltd. about the idea of empowering farmers with accessible PU cold chain solutions said, "The superior insulation of polyurethane has contributed to the vital need of efficient food preservation ever since it was invented more than 75 years ago. With urbanization constantly increasing the distance foodstuffs need to travel before they reach the consumer an unbroken food cold chain is essential to safeguarding the supply of food to the people and increasing disposable income for farmers. I strongly support the idea of 'Fit-for-Purpose' solutions from the PU industry."

A large portion of perishable items like potatoes, onions and fruit get ruined on account of a logistics system that is deficient in adequate storage facilities, far from appropriate transportation options, infrastructure issues in terms of roads, electricity, storage, access to markets etc, and the existence of middlemen. Where PU comes in is in developing and strengthening the cold storage chain that will aid farmers by empowering them with control over ownership from seed to trader. PU can work along with the government to develop storage capacity solutions for perishable commodities that can then effectively put a check on seasonal price rises.

Elaborating on his vision towards realising the goal of PU being more involved, Mr. Durrani said, "Today the wastage in value of fruits and vegetables is more than 25%. Added to this, high energy costs contribute to the punishing operating costs for the cold storage business in India which are approximately Rs 80-90 per cu ft per year as compared to Rs 40 per cu ft per year in the West. Energy expenses alone make up about 30 per cent of the total expenses for the cold storage industry in India compared to 10 per cent in the West. In addition to the high peak power deficit in India, industry players have to find an energy efficient cold chain solution with excellent insulation properties. Secondly, there is the lack of logistical support. The cold chain industry in India currently is very fragmented and most players do not have enough capital to invest in technology needed to build high quality cold storage infrastructure or even able to cover the entire value chain. Education and empowerment of farmers are essential on the importance of cold storage from seed to table. My vision therefore is linked to an integrated food and cold chain where the technology interventions are given at the right time and right place in order to realize a 'Towards a Net Zero Chain', beginning with insulation to the cooling equipment to the people who are adequately trained to provide the desired output."

Other sectors that have started working on increasing the shelf life of agri-commodities include the nuclear power sector with ventures like Rosatom, the Russian firm, with Maharashtra's Hindustan Agro Co-operative that will see the set up of 25 integrated irradiation plants with advanced cold storage facilities in India and other countries.

While the 2015 budget offers the agriculture sector much in terms of areas like soil health, farm credit, irrigation, Rural Infrastructure Development Fund (RIDF), National Agricultural Market and service tax exemption on pre-cold storage infrastructure; there is a lot more to be addressed. The issues that need further attention and impetus are related to food processing sector, agro exports, crop insurance and cold chain and warehousing.

PU insulation solutions cover a wide ambit from food production right to refrigeration in homes. It has been designated the main insulation material and construction element for various parts in the food chain. Sandwich panels offer a cost efficient prefabricated insulating option for warehousing. Mr. Bhuta elaborated on why PU insulating core is preferable over other materials when he said, "PU sandwich panels are easy to manufacture and are easily available as there are many manufacturers of PU sandwich panels in continuous as well as discontinuous form. PU sandwich panel has high strength to weight ratio and provides very good insulation properties which makes it a no 1 selection for warehousing. Our association, along with other insulation

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materials' associations have been trying along with the Bureau of Energy of The Government of India, to enlighten the general public, the Government and institutions, on the benefits of using insulated panels including PU panels for warehousing and cold storage for which IPUA initiated India Insulation Forum which has been periodically conducting seminars. We believe any concerns from the Government will help in availability of such an insulting material at a lower cost."

Earlier this year the government sanctioned 17 new Mega Food Parks that are poised to attract fresh investment of approximately Rs. 2330 Crores. Food Processing Minister Mrs. Harsimrat Kaur Badal announced that the parks will be spread across 11 states, will generate employment for around 2.5 lakh people and are expected to benefit more than 12 lakh farmers once the MFPs are operational. The MFPs with 40 to 50 food processing units in each will be designed to offer facilities to food processors, farmers, retailers and exporters. The MFP Scheme which is based on cluster approach will work towards creating a strong food processing industry. This will be backed by efficient supply chain to include collection centres, central processing centre and cold chain infrastructure.

Regarding the opportunity presented to the PU industry by the Mega Food Parks Mr. Durrani said, "Smt. Harsimrat Kaur Badal, the Honourable Minister of Food Processing, informed that this time a change was made in the eligibility criteria and Govt. Organizations / State Governments were also allowed to apply. Out of the 17 MPFs, 6 have been sanctioned for the State Govt. authorities and 11 to private sector. Out of the ongoing 25 Mega Food Parks, 2 have already been inaugurated and 3 more are expected to be operationalized by middle of this year. While their total now will reach 42 in a few years, if things go to plan, it would be a very great achievement of not just the Ministry but for the entire country as it is much needed."

He also stressed that parameters that make the ecosystem such as scaling up in volumes, quality, standards and basic processing, downstream value addition, geographic reach and markets, price realization / business sense, road quality, logistic support, export orientation, capacity utilization of cold chain infrastructure, transport concessions / fast track clearances, standards for construction and equipment of cold chain infrastructure, compliances and safety standards are vitally lacking and need to be given due attention. Regarding these points Mr. Durrani said, "An awareness building campaign is needed but government support will be crucial. This empowerment comes through free availability of low-cost appropriate technology and infrastructure to make it meaningful. At the other end, a cultural change to demand and consume quality food material should provide the pull to overcome these challenges."

Mr. Bhuta believes the development of a project collectively by the PU industry is the way forward when he said, "IPUA can work with the government and potential donors with whose help, a project could be developed where by highly subsidized warehousing / cold storage facilities can be provided to farmers, through Farmers' Co-operatives and thus, help them protect their crops. If any activity of the IPUA helps in reducing suicides of farmers, it would be a great achievement. We will surely make sincere efforts."

The approach recommended by Bayer MaterialScience and Mr. Durrani is elaborated when he said, "A two-pronged approach featuring advocacy and awareness building on the one hand and technical innovation on the other. Thus, BMS is sitting in the CII Cold Chain Task Force and talking to the government along with industry and striving towards making the holistic development happen. On the technical front, needless to say, the greatest advantage of PU Metal Sandwich Panels which are the backbone of Modern PEB Cold Stores is the speed of installation. While the modern world has already shifted entirely to this and India too with regard to new cold stores, the need to renovate the existing cold stores, which are energy black holes, is reaching a shrill emergency pitch. A concerted effort is in place here."

The PU industry will need to charter a plan to work together and in partnership with governmental bodies such as the Ministry of Food Processing Industries (MOFPI), the National Centre for Cold-Chain Development (NCCD), and Warehousing Development Regulatory Authority to implement existing schemes and create new ones that will bring relief to India's farmers.

Fire Ratings: Will they increase?

By Michael Young
Director Isowall Consulting, UK

It is only some 25-30 years ago that there were few fire regulations relating to insulated panels. The demand for insulated panels with a fire rating has been driven by a variety of factors including:-

- Some serious and disastrous fires utilising insulated panels.
- The increasing cost of the materials stored within an insulated structure which often exceed the value of the structure itself.
- An expansion of the international insurance industry. Requirements demanding that companies insured in one market are required by the terms of their insurance policy to be insured worldwide.
- Increased realisation of the investment and trading cost of a fire.

The growth of fire ratings and certificated insulated panels has certainly brought benefit to the insulation market and to its end users. Being able to work in an environment that is both clean and unlikely to contribute to a fire improves worker safety and reduces the chance of injury or even death.

It is accepted that there are two types of fire resistant panels. The first is the non-combustible panel utilising materials that have themselves met fire codes and been found to be non-flammable. These panels are called 'non-combustible' and it is accepted in many markets that their fire resistance equals that of the materials from which they are constructed. This has occurred primarily in markets which do not have a significant insurance industry and in markets where there are limited internationally recognised testing facilities.

The second type of panel utilised for this application are fire rated panels which carry a certification as to their resistance to fire utilising a variety of North American and European Codes which give a determination, either as a figure in minutes or as a coded assessment. The use of the coded assessment has gained market acceptance and is commonly used throughout the European Union.

Will there be an increased demand for greater fire resistance?

The growth of fire ratings and certificated insulated panels has certainly brought benefit to the insulation market and to its end users.

With the availability of fire rated panels from 30 minutes to 4 hours, utilising a variety of core materials, it is unlikely that the building codes will demand an improvement on this current product range. What will become apparent is the need from fire rated panel in a wider variety of end use applications. These will be both internal and external to the European market and will affect those companies establishing export activities to new and developing markets.

Isowall Consulting would quote as evidence the experience of the Chinese market where, after several significant fires, a variety of insulation materials were banned from use in urban areas. (This was later reversed, and wisely so, due to the nature of the ban.)

An assessment of individual markets is essential for any company seeking to export and understanding the fire codes.

In the future, fire ratings will affect all buildings and fire ratings will drive technical specification. Those companies that are seeking to expand will acknowledge the need for such codes and for their products to be tested.

Michael Young is a Director of Isowall Consulting UK, a specialist and focused Consultant to the insulation, panel, refrigeration and rollforming industries.

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THE HINDU

KOLKATA, MARCH 9, 2015

Sunderbans losing green cover and land mass, says ISRO study

– Shiv Sahay Singh

The Indian Sunderbans has lost 3.71 per cent of its mangrove and other forest cover, while losing 9,990 hectares of its landmass to erosion in one decade, according to a satellite analysis conducted by the Indian Space Research Organisation.

As much as 1,607 hectares of the eroded area had vegetation, says the study comparing satellite data from February of 2003 and 2014. During the 10 years, 216 hectares of landmass had been added, of which 121 hectares has green vegetation.

The Eastern Zone Bench of the National Green Tribunal, which is hearing a case of environmental violations in the Sunderbans, directed holding the study.

The study shows that about 95.14 per cent of the green cover has not undergone gone any change, while fresh vegetation has come up in 1.1 per cent of the entire area.

The satellite mapping, which has not gone into the details of the reason for loss of green cover, says the depletion may be due to natural and anthropogenic (human intervention) processes.

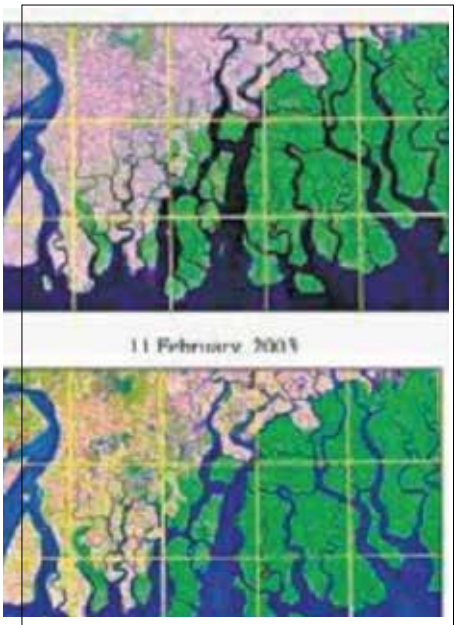
The 9,600-sq.km Indian Sunderbans is highly susceptible to coastal erosion and coastal land dynamics. A recent World Bank report pointed out that the carrying capacity of the landmass had exceeded with the population density of over 1,000 a sq.km.

Ajanta Dey, joint secretary of Nature Environment and Wildlife Society, said the ISRO study once again highlighted that the Sunderbans was a very fragile and dynamic landscape. Ms. Dey, who is assisting the Green Tribunal on the issue, said more studies were required to ascertain the exact loss.

Subhas Datta, environmental activist and *amicus curiae* in the case, said a ground investigation too was required to ascertain the loss of forest and landmass cover.

"In my opinion, the loss is far more than what has emerged in the satellite imaging. This loss has created a

© The Hindu.



Satellite images (with 15′ X 15′ grid overlaid) used by ISRO to make a comparative study of the Sunderbans landmass.

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Email: ramamurthy_k2@dataone.in admin@pu-india.org ramapu42@gmail.com

SAFETY HEALTH & ENVIRONMENT

A Giant man-made hole in Earth's Atmosphere is finally closing up

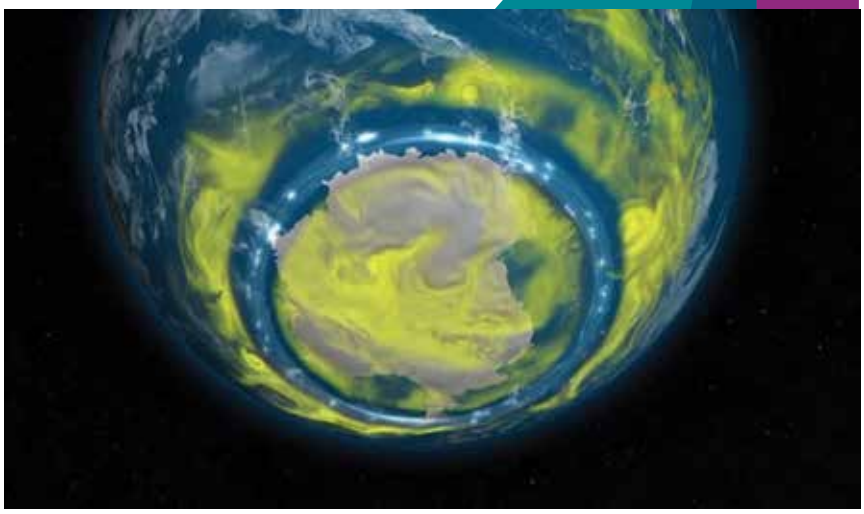
BUSINESS INSIDER By Jessica Orwig | Business Insider

Now that summer is here, you'll likely be slathering up with sunscreen.

Earth, it turns out, is doing the same, according to an encouraging study recently published by a team of scientists at NASA Goddard Space Flight Center and Goddard Earth Sciences Technology and Research at the Universities Space Research Association.

Earth has its own layer of sunscreen called the ozone layer, or ozone shield, which makes up part of the stratosphere and absorbs most of the sun's ultra-violet (UV) radiation. But it doesn't absorb all of the UV light, and what gets through can cause skin cancer and cataracts in humans as well as reproductive problems in fish, crabs, and frogs.

the hole should finally, permanently shrink below 8 million square miles by 2040 and could even be fully recovered by the end of the century Since 1983, scientists have observed a scary phenomenon: Earth's ozone was extremely weak over parts of Antarctica, letting in bouts of harmful UV radiation. The reason, in part, was because a series of man-made chemicals — namely chlorine and bromine — were eating away the planet's protective, sunscreen-like layer.



(NASA Goddard on YouTube)

They called this weaker region Antarctica's ozone hole. Although the hole's size varies each year, it has been consistently larger than 8 million square miles since 1990 — more than twice the size of the entire United States!

In recent years, scientific reports have noted that the hole is slowly healing — thanks to a decrease in ozone-depleting chemicals in the atmosphere — but scientists were not sure when the hole would be completely regenerated.

Now, according to a study published in journal Geophysical Research: Atmospheres, the hole should finally, permanently shrink below 8 million square miles by 2040s and could even be fully recovered by the end of the century.

The source of the problem

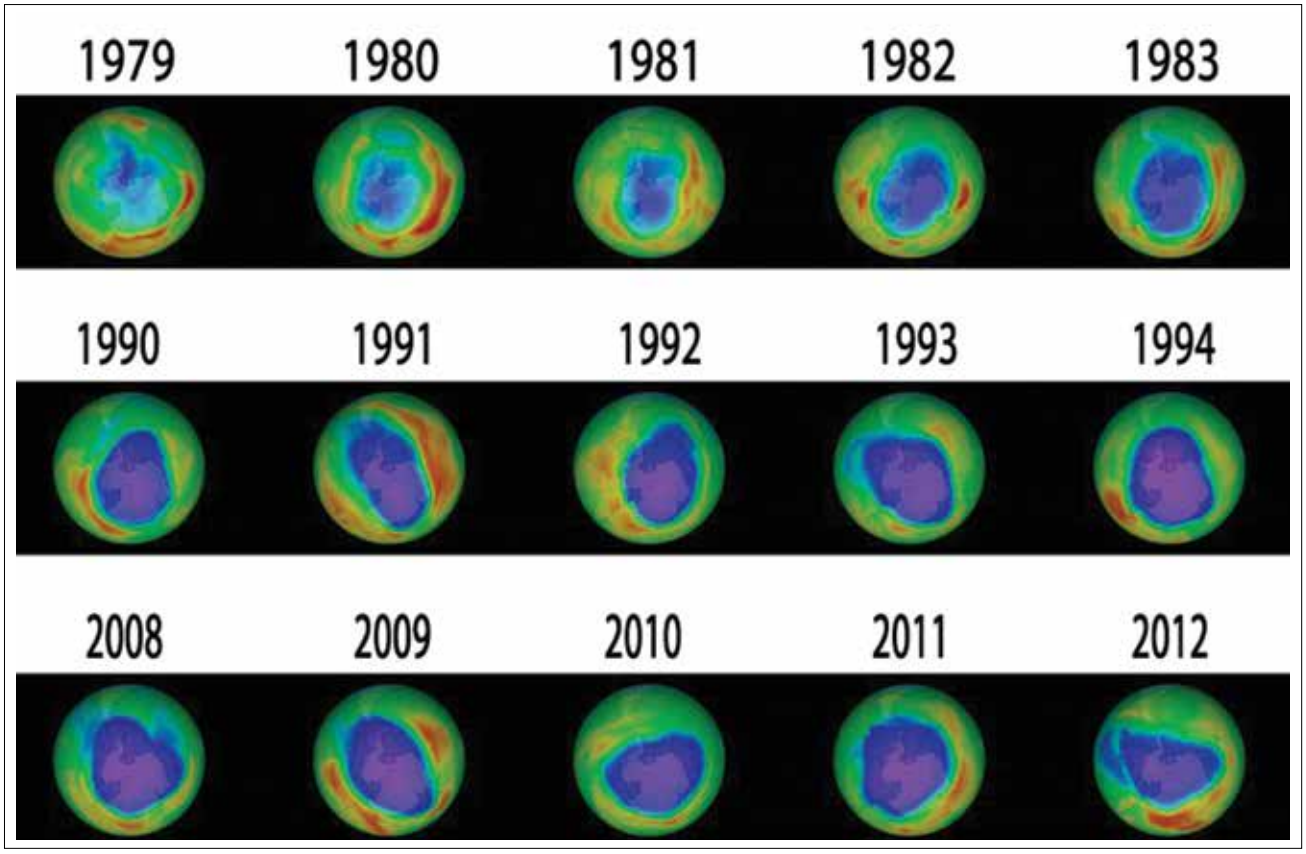
For the middle half of the 20th Century, companies used ozone-depleting chemicals, called chlorofluorocarbons (CFCs), in refrigerators and aerosol sprays that, through use, were getting released into the atmosphere. By the early '80s scientists were beginning to understand the damage that these chemicals were doing to the planet.

When CFCs float up to the troposphere, above the ozone, they interact with UV radiation from the sun releasing chlorine, which destroys ozone. As a result of this discovery, an international treaty called the Montreal Protocol

was enacted in 1989 that began phasing out the production and subsequent emission of ozone-depleting chemicals.

By that point, however, the damage had been done.

These chemicals can hang out in the atmosphere for years after they've entered the atmosphere. Like a series of dominoes, the ozone hole continued to grow even after CFCs were banned. Here's a chart showing the size of the ozone hole, in blue, from 1979 through 2012:



(Images from NASA Goddard Space Flight Centre, graphic by Business Insider)

Ozone depletion above the planet's north and south poles was exceptionally bad because Earth's wind currents were sweeping the chemicals toward either end of the planet.

Once these chemicals reached the poles, a large-scale cyclone, called the polar vortex, was trapping the chemicals where they accumulated over time to high concentrations, ravenously eating away the ozone (see the GIF below). This led to the Antarctic ozone hole as well as the Arctic ozone hole, which in 2011 reportedly had half the ozone it used to.

Using NASA'S Aura satellite — an instrument orbiting Earth that sniffs out certain chemicals, including chlorine — the team of scientists studied the amount of ozone-eating chemicals above Antarctica from 2004 to 2012. From that, they identified a clear relation between the level of chlorine in the atmosphere and the size of the ozone hole.

They then looked at ozone hole sizes from 1979 through 2013 and predicted what future hole sizes will be based on how quickly chlorine levels are decreasing in the atmosphere above the Antarctic.

"With this new information we can look into the future and say with confidence that ozone holes will be consistently smaller than 8 million square miles by 2040," said Susan Strahan, a senior research scientist at NASA Goddard Space Flight Centre, in a video about the study. "And that will really be a milestone that we're finally past the era of big ozone holes."

IPUA VENTURES

India Insulation Forum

The last 6 months have been hectic for the Working Group Committee members of IIF. But confidence levels are high as we are now poised to jointly launch two important events by the third week of June along with the BEE.

The first is the Applicator Training Manual - a comprehensive document targeting the weakest link in the value chain. As it is well accepted, the best insulation materials can be let down through inept application. Many a sorrowful sight has been witnessed when the insulation has been destroyed due to poor workmanship and lack of attention to fundamentals. This manual hopes to help beginning to resolve this issue on a war footing.

Secondly, the IIF website - in today's world, the easiest and most effective communication tool. Frequently asked questions will be addressed, a mine of resources and tools will be publicly available members can learn on the latest on insulation ideas across the country and globally. This will also be a platform where technical marketing space will be available for those concerned in the value chain can reach out.

Aside, as part of the Indo-Swiss Building Energy Efficiency Program, sponsored by the Swiss Development Corporation Ministry of Power, Govt of India, the IIF being project partners, we participated in the Common Training Program for the Laboratories invited to benefit from program implementation. Five labs included in the program are Shriram Testing Center, Isolloyd, CEPT, Nirma University and Spectro. Standardized and accessible testing for all insulation materials is the goal for this Program and this will go a long way to see the implementation of the crucial Energy Conservation Building Code.

Training Programme on "Common Training Programme for BEEP Partner Labs in Insulation Materials Testing", Ahmedabad, 14-15 May 2015

Feedback Form

Name _____

Organization _____

Designation _____

Mobile and Email _____

- **How do you rate your overall experience?**
  Excellent ☐ Very Good ☐ Good ☐ Average ☐ Not Satisfactory ☐
- **How do you rate the technical content of the training programme?**
  Excellent ☐ Very Good ☐ Good ☐ Average ☐ Not Satisfactory ☐
- **How do you rate management of the event?**
  Excellent ☐ Very Good ☐ Good ☐ Average ☐ Not Satisfactory ☐
- **Which lectures/subjects did you find most useful?**
- **Subjects that were necessary, but were not covered adequately in the programme ?**
- **Remarks and suggestions.**

Participants of Common Training Programme on Insulation Material Testing held at Ahmedabad on May 14-15. 2015

S. No	Name	Organisation	E-mail
1 2	Mr. Deepak Rastogi Mr. Vijay Kumar	Isolloyd Engineering Technologies Ltd, Baddi	deepak.rastogi@isolloyd.co.in
3	Dr. Rajesh Kumar Raina	Shriram Institute for Industrial Research, Delhi	rkraina@sriraminstitute.org
4	Dr. Purshottam Joshi	Shriram Institute for Industrial Research, Bangalore	tech@shriraminstitute-bangalore
5 6	Mr. Vishwa Bandhu Gupta Mr. Sudhanshu Singhal	Spectro Analytical Labs Limited, New Delhi	vbg@spectro.in
7 8	Dr. Rajesh N Patel Dr. V J Lakhera	Nirma University, Ahmedabad	rnp@nirmauni.ac.in Vikas.lakhera@nirmauni.ac.in
9 10	Mr. Yash Shukla Prof Rajan Rawal	CEPT University, Ahmedabad	yash.shukla@cept.ac.in rajanrawal@cept.ac.in
11	Mr. Isaac Emmanuel	India Insulation Forum (Bayer Material Science)	isaac.emmanuel@bayer.com
12	Mr. K K Mitra	India Insulation Forum (Lloyds Insulation)	kk.mitra@lloydinsulation.com
13	Mr. Amol Desai	Supreme Petrochem Ltd	Amol_desai@spl.co.in
14	Ms. Neha Dave	GIFT International Finance Tec-City Company Ltd	neha.dave@giftgujarat.in
15	Ms. Jannahvi Ghelani	GIFT International Finance Tec-City Company Ltd	jannahvi.ghelani@giftgujarat.in
16	Mr. Prashant Bhanware	Greentech Knowledge Solutions Pvt Ltd/ BEEP PMTU	prashant@gkspl.in
17	Mr. Ravi Kapoor	BEEP PMTU	ravikapoor_newdelhi@yahoo.co.in
18	Dr. Claude-Alain Roulet	BEEP PMTU	claude.roulet@apples.ch
19	Dr. Anand Shukla	Swiss Agency for Development & Cooperation	Anand.Shukla@eda.admin.ch
20	Dr. Sameer Maithel	Greentech Knowledge Solutions Pvt Ltd /BEEP PMTU	sameer@gkspl.in

ECONOMIC UPDATE

India becoming one of world's fastest growing economies: IMF

By Arun Kumar | IANS

IANS

Washington, May 7 (IANS) India's growth rate is expected to rise to 7.5 percent this year and next, making it one of the fastest growing economies in the world, according to the IMF's latest economic health check.

The other Asian giant China's economy is slowing to a more sustainable pace - 6.8 percent GDP growth in 2015, and 6.3 percent in 2016, according to the International Monetary Fund's Regional Economic Outlook for Asia and the Pacific.

Growth in Asia and the Pacific will continue to outperform the rest of the world, and is expected to remain steady at 5.6 percent in 2015, easing slightly to 5.5 percent in 2016, said the report released Thursday. Growth will be driven by domestic demand, underpinned by healthy labour markets, low interest rates, and the recent fall in oil prices.

The global recovery, while moderate and uneven, will continue to support Asia's exports, says the report.

The IMF's Regional Economic Outlook calls for a strong push for structural reforms across most, if not all, economies in the region.

The report notes that in addition to boosting productive capacity, structural reforms can help rebalance growth toward consumption, which remains a priority for some major Asian economies.

Major reform areas include measures to address supply-bottlenecks in India, state-owned enterprises, and financial liberalisation in China, and initiatives to raise services productivity, and labour force participation in Japan.

Maintaining flexible fiscal and monetary policies to effectively manage aggregate demand will remain important in the future, say the report's authors.

The report noted that lower oil prices have provided an opportunity to undertake further fiscal reforms aimed at lowering energy subsidies, and measures have been taken in a number of countries, including India, Malaysia, and Indonesia.

Asia, which accounts for nearly 40 percent of global output, but contributes nearly two-thirds of global growth, will remain the global growth leader.

Financial and macro-prudential policies should continue to address financial sector risks.

This will be particularly important to increase resilience to shocks, and to contain the buildup of systemic risk associated with shifting financial conditions, and volatile capital flows, the report said.

Asia, which accounts for nearly 40 percent of global output, but contributes nearly two-thirds of global growth, will remain the global growth leader, even though potential growth-the economy's speed limit-is likely to slow, it said. But the outlook could be vulnerable to adverse events, says the report.

Most Asian policymakers have in place broadly appropriate interest rate and fiscal policy settings, although the risk of renewed financial volatility may warrant a somewhat tighter monetary policy stance in some countries, it said.

Arun Kumar can be contacted at arun.kumar@ians.in

April 3, 2015

It's Time to Love Capitalism Again

By Peter Blair Henry Follow @peterblairhenry

The author is dean of the NYU Stern School of Business and author of TURNAROUND: Third World Lessons for First World Growth.

Why You Should Care:

Because philosophical objections can and might create an economic disaster.

It's been said that capital goes where it's loved.

In our Match.com century, investors' options have multiplied now that more and more once-closed countries are opening their arms to welcome foreign capital. Today, for example, Prime Minister Narendra Modi actively courts foreign multinationals to "Make it in India," a shift from years of fury over foreign investment; Mexico has become a more welcoming place to do business with millions of manufacturing jobs and thriving innovation centers.

But neither love nor economics is ever simple. We may be on the verge of a nasty breakup with capitalism. Why? It started with understandable outrage over income inequality. Think of Occupy Wall Street or French economist Thomas Piketty's bestselling Marxist-revivalist tome Capital in the Twenty-First Century. Think also of the ire over corporate tax inversions — if a company considers merging with a foreign corporation and moving its headquarters outside the country, it gets vilified as "unpatriotic."

What no one is saying is this: We need more jobs — and capitalism creates them.

Although well-intentioned (after all, what good conscience does not wish for greater equality?), there's a real economic danger posed by the anti-capitalism movement. It puts us on an extremely costly collision course with one of the most important economic trends of the next two decades: the explosion of working-age populations throughout the developing world.

> What no one is saying is this: We need more jobs — and capitalism creates them. If we continue on this trend of bashing capital and open markets, our labor markets don't stand a chance.

Between 2015 and 2030, the working-age population in the least developed countries of the world is expected to increase by 2.5 percent per year. Sub-Saharan Africa, led by regional giant Nigeria, is at the epicenter of this trend, but this isn't purely an African phenomenon. Many economically and geopolitically important developing countries in Asia and the Middle East are already seeing significant increases in their working-age populations.

This year an astounding 1.1 million new workers per month will join the labor force in the least developed countries on Earth — that number will be an even more stunning 1.7 million in 2030. That's the number of new jobs those countries will have to create. China, by comparison, added an average of 1.1 million workers per month in the decades following the onset of its economic reforms under Deng Xiaoping in 1978. Bluntly, in order to absorb these new workers over the coming decade and a half, developing nations will need to create jobs at almost twice the rate that China did when it delivered one of the most miraculous performances of economic growth the world has ever seen.

> Those who want to hoard capital at home: Consider that economic fortunes of advanced, developing nations are bound together.

The ability of countries such as Egypt, India, Pakistan and Turkey to provide meaningful employment

ECONOMIC UPDATE

to the millions of youths entering the labor force — especially young men — will determine whether the demographic changes afoot turn out well or spell disaster.

Which is why we must learn to love capital again.

Kickstarter, or other laudable microfinance solutions that raise money for small-scale entrepreneurs in developing countries, can't be the only answer. Those kinds of solutions, favored by many of the same liberals who decry capitalism, fill a certain need. But they won't create 1.7 million jobs a month. The best hope lies in additional low-cost, large-scale manufacturing hubs — the kind of manufacturing investment that is the specialty of the maligned major multinationals.

But manufacturers won't build or maintain factories abroad if they are punished, so we'd do better to revise the tax code so that decisions about whether to locate production at home or abroad are based not on evasive loopholes but on what makes the most economic sense, in broader terms.

Possessive types who want to hoard capital at home should consider that the economic fortunes of advanced and developing nations are tightly bound together. Just recall the global financial crisis, when continued growth in emerging markets buffered the free fall of advanced countries.

As advanced nations face aging populations and battered banks, now more than ever the global north and global south need one another to succeed.

As for our dating game, we'd do well to stop gambling our best prospects. It's time to settle down with capitalism once more. If we don't, our global economy risks not only love but labor lost.

World could have 40% water shortfall by 2030, warns UN

AP, New Delhi - Updated: Mar 21, 2015

The world could suffer a 40% shortfall in water in just 15 years unless countries dramatically change their use of the resource, a UN report warned Friday.

Many underground water reserves are already running low, while rainfall patterns are predicted to become more erratic with climate change. As the world's population grows to an expected 9 billion by 2050, more groundwater will be needed for farming, industry and personal consumption.

The report predicts global water demand will increase 55% by 2050, while reserves dwindle. If current usage trends don't change, the world will have only 60% of the water it needs in 2030, it said.

"Unless the balance between demand and finite supplies is restored, the world will face an increasingly severe global water deficit," the annual World Water Development Report said, noting that more efficient use could guarantee enough supply in the future.

The report, released in New Delhi two days before World Water Day, calls on policymakers and communities to rethink water policies, urging more conservation as well as recycling of wastewater as is done in Singapore. Countries may also want to consider raising prices for water, as well as searching for ways to make water-intensive sectors more efficient and less polluting, it said.

In many countries including India, water use is largely unregulated and often wasteful. Pollution of water is often ignored and unpunished. Climate change is expected to make the situation worse, as higher temperatures and more erratic

weather patterns could disrupt rainfall.

"Unsustainable development pathways and governance failures have affected the quality and availability of water resources," it said.

"Economic growth itself is not a guarantee for wider social progress," it added.

Wednesday 13 May, 2015

Sweet apples leave a bitter taste for farmers in Kashmir

Ishfaq-ul-Hassan

Nearly 23 lakh Kashmiris are associated with Horticulture.

In the paradise, apples are no longer sweet for the farmers. Unprecedented hail storm coupled with untimely rains have wreaked havoc to the fruit orchards in Kashmir. Fruit growers have suffered Rs200 crore loss due to the untimely fall of fruit flowers.

This is the second time that the fruit growers have suffered losses in the last two years. Last year, the fruit growers suffered loss of over Rs1425 crore due to the devastating floods.

"We have suffered the loss of Rs200 crore this year. The hail storm wreaked havoc to the orchards. It was the flowering stage and the hail storm caused the premature fall. This means our production will be hit because of this phenomenon," Bashir Ahmad Bashir, president, New Kashmir Fruit Association, told dna.

Official figures reveal that seven per cent of the fruit orchards have been hit by the hail storm in south and north Kashmir. "There is almost seven per cent loss to the flowering due to the hail storm. Mostly south Kashmir and Rafiabad belt in north Kashmir have been hit. Despite this we are expecting a good crop this season", Manzoor Ahmad, subject matter specialist at the department of horticulture Kashmir, told dna.

Official figures reveal that seven per cent of the fruit orchards have been hit by the hail storm in south and north Kashmir.

Horticulture is the mainstay of the economy in Kashmir with 23 lakh people associated with this sector. More than 2.37 lakh hectares of land is under the fruit cultivation in the Kashmir valley. Of which 65 per cent comprise of the apple orchards. Last year, the government was expecting the record fruit production of 22.76 lakh metric tonnes. However the September 2014 floods coupled hit the fruit production badly. Crops on 1.47 lakh hectares of land were ruined. Against the expected production of 22.76 lakh metric tonnes, only 13.55 lakh metric tonnes of fruit production was recorded in 2014.

According to official information, it is revealed that last year the losses were Rs1425 crore. However, the fruit growers had submitted the memorandum to the Centre putting the loss at Rs 2890 crore.

Even before the farmers could cope up with the last year's devastation, the unusual climatic pattern is making the things worse this year too. "We expect that the government will take steps to help us in saving our crops", said Bashir. Experts are hopeful that this year they would be able to stem the rot since the season is conducive for corrective measures. "We have recommended certain measures to the growers. This is the season when the recovery process could yield results," said Manzoor.

MAKE IN INDIA

India clean energy investments set to breach the $10bn mark in 2015

Clean Energy Investments In India Jumped To $7.9Bn In 2014, Helping The Coun-Try Maintain Its Position As The 7Th Largest Clean Energy Investor In The World. The Upswing Was Driven

By The Newly Installed Government Elected In May 2014 Which Supports Clean Energy Reforms.

The numbers, just released by research firm Bloomberg New Energy Finance, show that the govern-ment's ambitious plan of 24/7 power for all Indians is gaining traction. Bloomberg New Energy Finance estimates that 2015 will be the second time ever that clean energy investments will pass $10bn. A record $13.1bn was deployed in 2011. BNEF analysis shows that India has one of the lowest levelised costs of renewable energy generation in the world. With the rising cost competitiveness of renewables and increasing.

interest in clean energy consumption by large commercial and industrial consumers, project installa-tions are also expected to rise this year. Wind installations are estimated to reach 2,800MW – up 22% from 2014. The government is working on introducing big ticket reforms in the power sector by amending the Electricity Act of 2003. Major reported highlights include the unbundling of power distribution, enforcement of renewable purchase obligations, and introduction of renewable genera-tion obligations on power producers.

The Asia Pacific region has become the centre of global energy growth. Until 2030 it will add as much power capacity as the rest of the world combined. Renewables will play a key role, attracting two-thirds of investment or an average of $252bn a year. By 2030 BNEF anticipates that 47% of installed power capacity and 33% of electricity generated will be from renewable sources.

Make In India

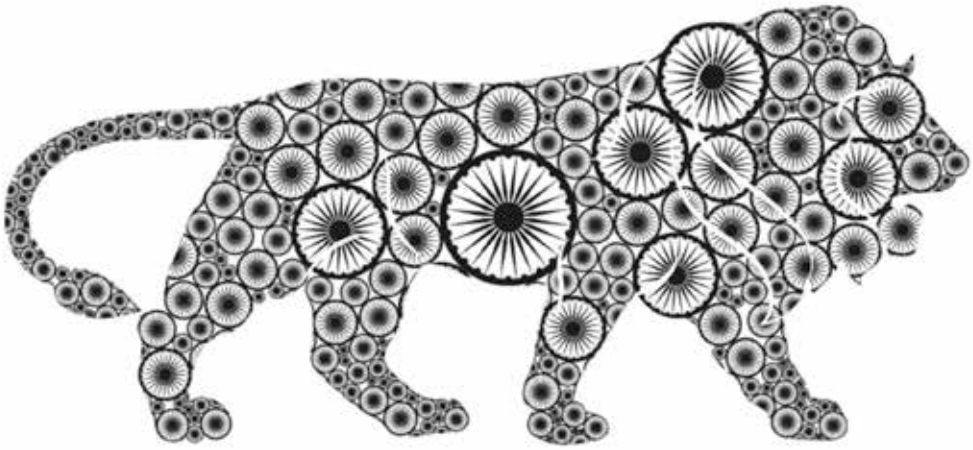
http://www.makeinindia.com/

New Initiatives

The Make in India program includes major new initiatives designed to facilitate investment, foster innovation, protect intellectual property, and build best-in-class manufacturing infrastructure.

New Processes

- Doing business in India just got easier – new de-licensing and deregulation measures are reducing complexity, and significantly increasing speed and transparency.
- Process of applying for Industrial License & Industrial Entrepreneur Memorandum made online on 24×7 basis through eBiz portal.



USE OF THE 'MAKE IN INDIA' LOGO IS STRICTLY PROHIBITED WITHOUT PERMISSION OF DIPP.

- Validity of Industrial license extended to three years.
- States asked to introduce self-certification and third party certification under Boilers Act.
- Major components of D products' list excluded industrial licensing.
- Dual use items having military as well as civilian applications deregulated.
- Services of all Central Govt. Departments & Ministries will be integrated with the eBiz – a single window IT platform for services by 31 Dec. 2014.
- Process of obtaining environmental clearances made online.
- Following advisories sent to all Departments/ State Governments to simplify and rationalize regulatory environment.
- All returns should be filed on-line through a unified form.
- A check-list of required compliances should be placed on Ministry's/Department's web portal.
- All registers required to be maintained by the business should be replaced with a single electronic register.
- No inspection should be undertaken without the approval of the Head of the Department.
- For all non-risk, non-hazardous businesses a system of self-certification to be introduced.

New Infrastructure

India's manufacturing infrastructure and capacity for innovation is poised for phenomenal growth: new smart cities and industrial clusters, being developed in identified industrial corridors having connectivity, new youth-focused programs and institutions dedicated to developing specialized skills.

- Impetus on developing Industrial Corridors and Smart Cities.
- A new 'National Industrial Corridor Development Authority' is being created to coordinate, integrate, monitor and supervise development of all Industrial Corridors.
- Work on 5 smart cities in progress as a part of the Delhi-Mumbai Industrial Corridor: Dholera, Shendra-Bidkin, Greater Noida, Ujjain and Gurgaon.
- Chennai-Bengaluru Industrial Corridor: master Planning for 3 new Industrial Nodes [Ponneri (TN), Krishnapatnam (AP), Tumkur (Karnataka)] in progress.
- The East Coast Economic Corridor (ECEC) with Chennai-Vizag Industrial Corridor as the first phase of this project: Feasibility Study commissioned by ADB.
- Amritsar-Kolkata Industrial Corridor: DMICDC selected as Nodal Agency for doing Feasibility Study, which is being conducted at fast pace.
- North-eastern part of India planned to be linked with other Industrial corridors in cooperation with government in Japan.
- New Industrial Clusters for promoting advance practices in manufacturing.
- Approval accorded to 21 Industrial projects under Modified Industrial

MAKE IN INDIA

Infrastructure Upgradation Scheme with an emphasis on:

1. Use of recycled water through zero liquid discharging systems.

2. Central Effluent Treatment plants.

- Approval accorded to 17 National Investment and Manufacturing zones.

- Nurturing Innovation – approval obtained for strengthening Intellectual Property regime in the country through:

1. Creation of 1,033 posts.

2. Further upgradation of IT facilities.

3. Compliance with global standards.

4. Application processes made online.

- An Act recognizing National Institute of Design (NID), Ahmedabad, as an institute of National Importance notified. This will enable NID to confer degrees, promote research and function as an Apex body in Design Education. Four more NIDs are being developed.

- Major impetus given to skill development through Indian Leather Development Programme:

1. Training imparted to 51,216 youth in the last 100 days.

2. It is further planned to train 1,44,000 youth annually.

3. For augmentation of training infrastructure, funds released for establishment of 4 new branches of Footwear Design & Development Institute at Hyderabad, Patna, Banur (Punjab) and Ankleshwar (Gujarat).

New Sectors

With the easing of investment caps and controls, India's high-value industrial sectors – defense, construction and railways – are now open to global participation.

- Policy in Defence sector liberalised and FDI cap raised from 26% to 49%.

- Portfolio investment in Defence sector permitted up to 24% under the automatic route.

- 100% FDI allowed in Defence sector for modern and state of the art technology on case to case basis.

- 100% FDI under automatic route permitted in construction, operation and maintenance in specified Rail Infrastructure projects such as:

1. Suburban corridor projects through PPP

2. High speed train projects

3. Dedicated freight lines

4. Rolling stock including train sets and locomotives/coaches manufacturing and maintenance facilities

5. Railway electrification

6. Signaling systems

7. Freight terminals

8. Passenger terminals

9. Infrastructure in industrial park pertaining to railway line/sidings including electrified railway lines and connectivities to main railway line.

10. Mass Rapid Transport Systems

- Easing of norms underway for FDI in the Construction Development sector.

New Mindset

Most importantly, the Make in India program represents an attitudinal shift in how India relates to investors: not as a permit-issuing authority, but as a true business partner.

- Dedicated teams that will guide and assist first-time investors, from time of arrival.

- Focussed targeting of companies across sectors.

INFO.: http://www.makeinindia.com/policy/new-initiatives/

High Performance & Fire Retardant Polyurethane Insulation Innovations Unveiled at Utech Europe 2015

UTECH Europe Exhibition and Conference, April 2015, MECC, Maastricht, The Netherlands

Energy-saving thermal insulation to keep heat in buildings and maintain low temperatures in cold stores are among the many applications where polyurethanes play a vital role in construction and temperature control. The latest innovations in the formulation and manufacture of polyurethanes for increased thermal performance and enhanced fire retardance were unveiled at the triennial UTECH Europe conference and exhibition, at the MECC in Maastricht, The Netherlands in April 2015.

Featuring over 90 detailed technical papers delivered in a total of 11 sessions, the UTECH Europe conference covered the latest developments in the world of polyurethanes and revealed unique insights into the global market. The afternoon of Day Two of the conference (15 April) featured a session of 11 papers dedicated to innovations in the use and manufacture of polyurethanes in rigid foams with speakers from Dow Polyurethanes, DuPont, Bayer MaterialScience, Momentive, Air Products, ICL-IP, Foam Supplies Inc, BASF, Honeywell and Lambiotte.

Dow's global technology leader Giuseppe Vairo presented an *Overview on Latest Fire Reaction Technologies for Polyurethanes in Construction.* Dow has developed in an innovative panel concept, providing produce Insulated Metal Panels (IMP) manufacturers with a step-change fire reaction performance that will allow a broader use of Polyurethane (PUR) and Polyisocyanurate (PIR) cored panels to the highest fire safety standards.

Marc Fricke of BASF delivered a paper introducing the company's SLENTITE – a new high performance insulation material for climate management applications. It is a novel type of organic aerogel based on polyurethane chemistry. Aerogels are highly porous materials consisting of up to 90% in their volume of air-filled pores. The exceptional insulation performance is made possible by optimized pore size in the nanometer range. The new material is said to offer a 25-50 per cent slimmer insulation compared to conventional products.

David Williams, Director of Technology at Honeywell covered - *Energy and Environmental Benefits in the Cold Chain Sector through the Adoption of High Performance LGWP Blowing Agent Solstice Liquid Blowing Agent.* Solstice LBA is being adopted by residential and commercial appliance manufacturers worldwide, including Whirlpool, Haier and Midea, and spray foam

and panel construction insulation companies like LaPolla, Kingspan, and SoflanWiz, to reduce their environmental footprint and comply with environmental and energy efficiency regulations.

Insulation Innovations in the Exhibition

At the UTECH Europe exhibition more than 190 companies showcased their latest offerings for the polyurethanes industry. Exhibitors specifically showing insulation innovations included:

Dow Polyurethanes featured-a halogen-free flame retardant VORATHERMTM CN 100 Series PIR technology for construction insulated metal panels that enables B-s1,d0 Top Euro class fire reaction performance. Its PASCAL™ PRO technology was also on show and delivers a breakthrough in energy efficiency and productivity for the professional cold chain industry and cold storage panel manufacture. It also profiled its VORAFORCE™ systems for composites manufactured by pultrusion or filament winding and used in construction and infrastructure applications.

ICL-IP is introduced a new reactive all phosphorus technology that incorporates fire resistance into the polymer matrix of rigid polyurethane thermal insulation materials.

INVISTA showcased innovations that included both TERATE® HT polyols — a family of robust, high-performing aromatic polyester polyols for use in rigid insulation foam.

IPUA'S REPORT

U Tech 2015 – Maastricht

Europe being the founding location of polyurethane and one of the largest consumers of its own invention, it was in the fitness of things that the most advanced and comprehensive exhibitions on polyurethane was held at Maastricht, The Netherlands. This triennial event

Ms. Sue Rothwell - Business Dev. Manager and Mr. Steve Crowhurst, M D of Crain Communications

▲ *Visitors from Renault R & D team*

was very keenly awaited by the polyurethane industry with great hope and excitement.

More than 150 companies from almost all over the world exhibited at U-Tech 2015 Expo at the MECC Centre, Maastricht, The Netherlands, from 14- 16 April 2015. The last U-Tech was held in 2012 and was considered as one of the best in terms of papers presented at the seminar, and in terms of technologies and products displayed etc. Therefore this year, it was a challenge for the organizers to live up to their past achievements and they did not fail. In fact, this year the whole Expo has gone one notch higher in the eyes of the participants and visitors at large.

UTech Expo is seen as a bench mark Expo for high tech inputs for the Polyurethane industry, be it raw materials, additives, machinery, formulations, processes etc. To take advantage of the presence of the all the key decision makers' presence at this premier Expo, all the industry leaders made their presence felt by taking stalls and displaying in them their strengths. The Expo saw a huge foot-fall of professionals to understand the new technologies, products, processes and services on display.

Indian Polyurethane Association (IPUA) was one of the media partners in this year's UTech Expo along with a few others and had a booth. The physical presence of IPUA at UTech evinced key interest amongst the visitors and they all wanted to know about the polyurethane scenario in India, where the business is seeing new positive sentiments. There were visitors at the IPUA stall who were enquiring about not only of Polyurethane raw materials and finished products but also other raw materials for the plastics industry. Apart from IPUA, M/s AS Enterprises one of India's largest manufacturers and exporters of polyurethane foam machinery and Manali Petro, manufacturers of Polyol from India also had booths at the UTECH 2015 to show case their products.

As with any international exhibitions, here at U Tech 2015 also there were seminars on all three days running concurrently with the exhibition. The sessions were divided into easily acceptable sections like, Renewable Sources, Material Innovation, Machinery Innovation, Automotive, Flexible Foams, Rigid Foams, Polyurea, Composites, and CASE etc. There was also the session from ISOPA on Safety, Health, Environmental,

▲ *Visitor to IPUA stall*

PREVIEWS & REPORTS

Sustainability and Regulatory issues which is very relevant for an industry like Polyurethane. There were about 80 odd papers presented by specialists from all over the world over the 3 day programme. There were two key note addresses, one from the President of Huntsman, Mr. Tony Hankins and the second from the Chairman of INOAC Corporation, Japan, Mr. Soichi Inoue, the man who introduced Polyurethane in Asia-Pacific way back in 1955.

People who participated could take with them on the latest that is happening in terms of new products and machinery on the anvil and plan their future business plans accordingly. All the international companies like BASF, Bayer MaterialScience, Baule, Dow, Huntsman, Du Pont,

Honeywell, Solvay, Wanhua, Evonik, Chemtura, Momentive Performance Chemicals, Arkema, and Air Products etc who have achieved fame in the polyurethane business through their products and technologies were represented at U Tech Expo.

Brand New Report Global Markets For PU Panels Ial

IAL is pleased to announce the release of a brand new report on the global markets for polyurethane panels. It builds upon IAL's ongoing research into various sectors of the polyurethanes industry, and has been compiled in conjunction with Isowall.

This new title examines the national, regional and global markets for polyurethane in panel systems. It also explores the market trends driving demand, and future growth opportunities, and includes five-year market forecasts.

The study presents data for 2013 on the consumption of polyurethanes in panel systems, along with forecasts for 2018, in metric tonnes. The report also includes demand data expressed as square metres of panels produced, for both 2013 and 2018.

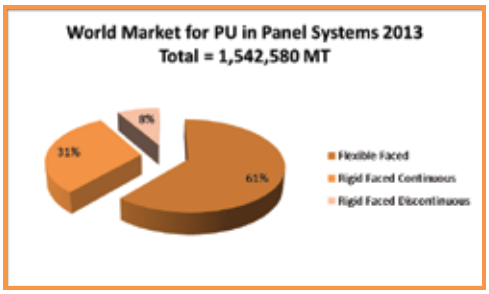
The report is presented in a single global volume and can also be purchased in regional sections as follows:

Volume 1 – Europe Western Europe: Austria, Benelux, France, Germany, Greece, Ireland, Italy, Nordics, Portugal, Spain, Switzerland, United Kingdom. Eastern Europe: CIS, Czech Republic, Hungary, Other Eastern Europe, Poland, Russia, Slovakia, Slovenia.
Volume 2 – Middle East & India Saudi Arabia, Turkey, UAE, India.
Volume 3 – Asia China, Indonesia, Japan, Malaysia, Philippines, Singapore, South Korea, Taiwan, Thailand, Vietnam.
Volume 4 – Americas North America: Canada, Mexico, USA. South America: Argentina, Brazil, Chile, Colombia, Peru, Rest of South America, Venezuela.

Polyurethane insulation materials have been used in a wide variety of formats for many years. Their use as panels in a variety of facings has become a standard building system throughout the world, either as a prefabricated panel or part of the general building 'envelope'.

The total global demand for PU materials in panel systems is calculated as follows:

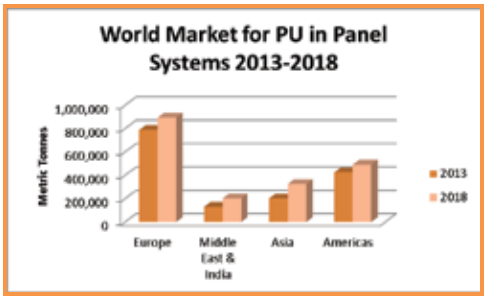
- 2013: 1,542,580 MT
- 2018: 1,909,880 MT
- Growth rate: 4.4% p.a.



Europe is currently the largest regional market for polyurethanes for panel systems, although its share of the global market will fall over the forecast period as developing regions such as Asia and the Middle East increase their share.

The significant drivers in the global insulated panel market will be:

- Increasing energy costs
- New national government building codes
- Incentives to invest in insulation
- Increased demand for rapidly constructed houses and buildings
- Recovery from the global financial crisis



The fastest growth is expected in developing regions such as Asia, South America and the Middle East. Notably the Asia region is predicted to show average annual growth of around 10%, and the Middle East (including India) 9%. The country with the highest forecast growth is India, where an increasing industrial market and a rapidly rising income group demanding pre-prepared and frozen foods, as well as increasing food chain and retail development, will boost demand for insulated panels at a significant rate.

EVENTS & TRENDS

International INTERNATIONAL

31 August – 2 September 2015
PU CHINA 2015
Crain Communications Communications
Guangzhou, Prc

5 – 7 October 2015
2015 POLYURETHANE TEECHNICAL CONFERENCE
American Chemistry Council
Orlando Florida, USA

13 – 15th Oct 2015
INTERNATIONAL ELASTOMER CONFERENCE
Rubber Division Acs
Cleveland, Ohio

12 – 14 Nov 2015
PU TECH EURASIA
Artkim Fuarcilik
Istanbhul

10 – 13 Jan 2016
PLASTIVISION ARABIA
Expo Centre
Sharjhah

PLASTIVISION Arabia

26 – 28 Sept 2016
2016 POLYURETHANE TECHNICAL CONFERENCE
American Chemistry Council
Baltimore, Maryland, USA

11 – 13 October 2016
INTERNATIONAL ELASTOMER CONFERENCE
Rubber Division Acs
Louisvelle Kentucky, USA

4th – 10th May 2017
INTERPACK
Dussseldorf *GMBH*
Dusseldorf

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INNOVATION FOCUSED ON YOU

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DOW

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