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ENERGY OPTIMISATION

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Others	5	11	3	**19**
Overseas	8			**8**
Pune	19	42	28	**89**
Total	**63**	**125**	**59**	**247**

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EDITORIAL

Dear Readers,

The Indian economy has exhibited a stronger than expected recovery as per a recent report from RBI. We need to be meticulous and watchful about the sustainability of demand after this current festival season and extraordinary demand is over. A re-assessment of the market expectations surrounding COVID–19 may also be necessary.

The overall Covid situation in India is continuously improving. The recent "Serological" surveillance conducted in Delhi has suggested that more 50% of those surveyed have developed antibodies against this current pandemic, indicating that the city is moving closer to herd immunity. This may be more or less true for other major metro cities and large towns across India. And given the fact that detection of new cases has been declining over the last four months, some experts and scientists believe that a much higher proportion of the population might have already got infected and cured, than what is officially registered. The vaccination across the country has started earnestly and progressing fairly well with two Indian manufactured vaccines. There appears to be some scepticism about the safety and efficacy of these Indian made vaccines, especially among frontline health workers and medical professionals. People's reluctance to take the shots could be a key hindrance in achieving herd immunity sooner. It will take few more weeks to allay all the fears and doubts surrounding this whole vaccination exercise. Apart from the two vaccines approved for emergency use, multiple other vaccines, some are made in India, are also in the pipe line. We expect that by middle of this year, many more approved vaccines will be available and there will be faster progress in this mass vaccination program. A key benefit of this early vaccination could be faster resumption and recovery of normal economic activities. This will, in turn, generate greater confidence among consumers in returning to market and consumption driven recovery will be quicker. Travel, tourism, hotels, restaurants, malls and the entertainment industry (especially movie halls) will see more foot falls to enable them to return to normalcy. Post pandemic, these sectors may be the early gainers and accelerate the recovery of the national economy.

The International Monetary Fund (IMF), a Washington based international forum, has projected an impressive 11.5% growth rate for India in 2021, making our country the only major economy of the world to register a double-digit growth this year amidst the prevailing pandemic. Further, the report emphasised that, to achieve double digit growth in next fiscal year, it would be important to ensure that the pandemic is well controlled and the distribution and roll out of vaccines are well managed in a time bound manner. There still remains, a good possibility of another surge in COVID infections. Vaccine hesitancy and logical problems in distribution may disrupt the economic activities. The expectation of higher growth rate should not lead to policy complacency. So far, the recovery is uneven and distribution of wealth generated is somewhat distorted. Our economy will continue to need carful policy support. Both central and state government should continue the reform process started diligently.

The sale and share of diesel engine passenger vehicles have dropped to its lowest in recent history, as per data provided by the Society of Indian Automobile Manufacturers (SIAM). In the April to October 2020 period, diesel PVs formed just 17% of total sales, down by half compared to the same period in the previous year (33%). The drop is especially stark in hatchbacks and sedans (just 2% of total sales, down from 14%), and in vans (4%, down from13%). It is only in the utility vehicles (SUVs plus MPVs) space where diesel still has a good demand (43%, but down from 71%). Overall, the sales share of diesel PVs has reduced from 40% in both FY17 and FY18, to 36% in FY19 and 29% in FY20. Analysts argue that this was bound to happen, due to the decreasing fuel price gap between diesel and petrol, carmakers pulling out diesel models with the shift to BS6 emission norms from April 2020 onwards, and petrol cars getting more fuel efficient. In addition to this the policy that only 10-year registered diesel cars in Delhi NCR (compared to 15years for petrol) has contributed to customers shifting to petrol PVs. Such policies, impact the resale value of diesel PVs, not only of those sold in the Delhi market (biggest in India) but also of those in nearby states. These policies are essentially brought in to control and reduce vehicular air pollution.

N. Ganeshan
Editor

Cosmic Energy- The energy of the future (A different perspective)

- Dr. Deepak Ranade, MS. MCh Neurosurgery, Professor and Head,
Department of Neurosurgery, D.Y. Patil Medical College, Pune

Shakti, defined as the "power, ability, strength, effort, energy, capability" is the primordial cosmic energy and represents the dynamic forces that are thought to move through the entire universe in Hinduism. The Manifest universe is considered as a cosmic dance of Shiva and Shakti. **Shiva** represents consciousness, and Shakti , the energy that animates Shiva - this unmanifest totipotent consciousness.

God or "Purusha" is pure and unmanifest consciousness. From a perceptual perspective, He is nothingness, the Shoonya, devoid of any attributes or qualities- Nirguna Brahman. For totally arbitrary, inexplicable reasons, He infuses and sets in motion Prakriti, the universal energy, that was latent in Him, This union is the foundation of all creation, that we know as the universe. The Big Bang according to the ancient Vedic ideology. The big bang activates and sets in motion the latent energy hidden in the cosmic egg (Hiranyagarbha).

All matter that exists in the universe, can be transformed from one state to another. Matter and energy are two sides of the same coin- Prakriti. Matter is energy in its grossest form. The iconic $E=mc^2$ equation of Einstein ratified this belief.

The conviction of all manifestation being an expression of consciousness and energy is being further affirmed by the discovery of positive vacuum energy. Vacuum, or absolute nothingness too is teeming with energy, the so called quantum fluctuations.

One of the most fundamental principles in quantum mechanics, Heisenberg's uncertainty principle, states that there's a limit to how much we can know about quantum particles, and as a result, vacuum isn't empty,. It's actually buzzing with its own strange energy, and filled with particle-antiparticle pairs that appear and disappear randomly. Even at Absolute Zero Kelvin, that's -273 degrees, there is what is called as Zero point. Energy. It's inconceivable, but even this at this temperature, volume for volume, a cubic unit of this vacuum has roughly 10 raised to 80 times, the energy of the equivalent energy of nuclear fuel of the same volume. Mind numbing indeed. Could this energy ever be harnessed?

Fossil fuels have been the scourge of mankind and could be the nemesis of life on and of the planet.

The search for the proverbial energy that suffuses the cosmos and harnessing the same without causing any environmental catastrophe further got a shot in the arm by the irrefutable evidence of generating energy by attenuating the ubiquitous neutrinos.

The **Ethereal Neutrino** - One would naturally scoff at the idea that neutrinos could be harvested for electricity. The sun and other stars emit lots of other subatomic particles as well, and the neutrino is one form of solar-emitted subatomic particle that has puzzled scientists for generations. Traveling at the speed of light, invisible neutrinos bombard every surface on the Earth every hour of every day. They pass directly through the Earth, and come out the other side almost entirely unchanged.The neutrinos were considered to be massless, and therefore this avenue was largely left unexplored, till 2015, whent two scientists stumbled on the same secret at the same time on opposite sides of the world: Neutrinos have mass, which means they also have energy. This discovery won Takaaki Kajita and Arthur McDonald Nobel prizes in Physics, and it got physics to wake to up to the idea that neutrinos could be harvested for energy.

According to Einstein's relativity theory, everything in the universe that has mass must also have energy.

$E=mc^2$ established the equivalency and interconvertibiity of mass and energy. It was discovered that a previously-thought massless subatomic particle did, in fact, have mass (no matter how slight), then such a particle could be harnessed for energy. If such a particle bombarded the Earth 24X7 all through the day and night and was capable of traveling through almost every substance, this energy could be harnessed constantly without any "curtailment".

Scientists have now successfully been intercepting these neutrinos briefly as they pass through the planet. Scientists at the Neutrino Energy Group are harvesting some of the mass that these passing particles possess and transforming it into energy.

The U.S. Department of Energy has announced massive neutrino research programs, At present, neutrinovoltaic technology has been demonstrated to be operable in laboratory settings. It's possible to extract electrical energy from the kinetic energy of passing neutrinos, and the work

has now begun to scale neutrinovoltaic energy production up by developing the next generation of energy-generating, neutrino-capturing devices. The Neutrino Energy Group expects neutrinovoltaic technology to be fully accessible and dispersed throughout consumer populations. As we Skyped with one of the pioneers of this technology - Holger Thorsten Schubart from the beautiful hills of Mount Abu, he revealed the basics of this perpetual energy source.

The concept was to attenuate this constant stream of neutrinos by making them pass through a tight lattice of silicone doped graphene coated on an Aluminium strip. These neutrinos dissipated their kinetic energy by displacing an electron and we were spell bound to see him power up a pocket calculator by connecting it to this strip. It was indeed very awe inspiring to see this device operate on an unending free limitless source of energy. It might be a while, before this could translate into powering up larger devices, but the scaling up process might just be a matter of time, considering the leaps that scientists have been making to evolve an existing technical breakthrough to the next level.

Shiva had indeed lured Shakti in this cosmic dance to redeem his creation from extinction.

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Ordinary Member (MSME)	3000	3540
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Towards Energy Efficient Die Casting

- Dr. S. Shamasundar, Managing Director, ProSIM R&D Pvt Ltd, Bengaluru, India

Abstract:

This paper deals with use of computation and computer simulation to reduce energy consumption in die casting. The gating system can be optimised using simulation, saving up to 20% energy in the process.

Energy costs of foundries accounts for 10 to 20% of operating costs. In Indian context, the electricity costs are continuously increasing due to increasing power tariffs. (in quite contrast to several advanced countries where electricity tariff is reducing significantly, due to lower demand).

Several studies have indicated that foundry profitability can increase dramatically, with each percentage of energy saved. Figure 1 shows the processes in a die casting unit which consume energy.

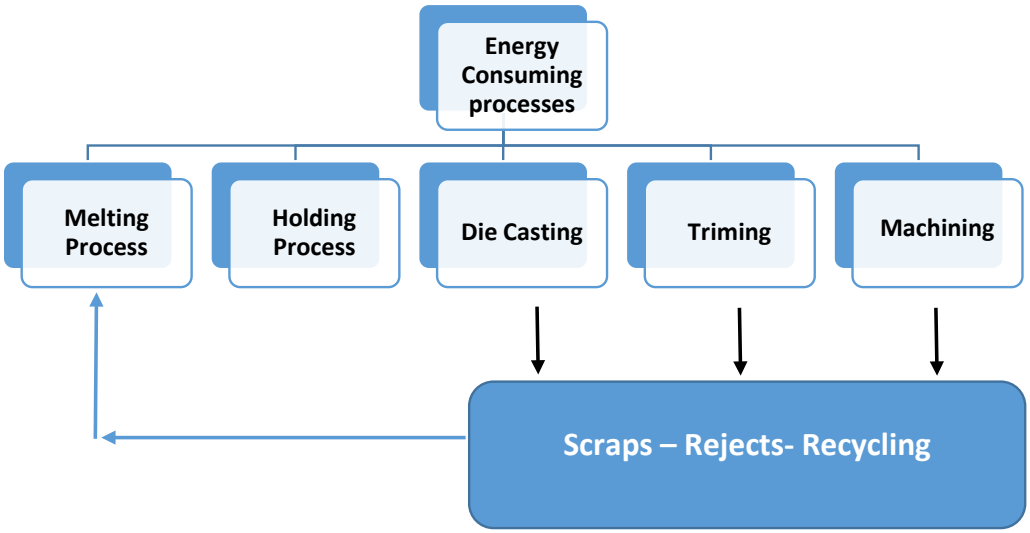

Figure-1: Energy consuming processes in a die casting unit.

In a typical die casting unit, about 55 to 65% of energy consumption occurs in heating and melting furnaces, as has been reported by many researchers including NADCA. (Figure-2)

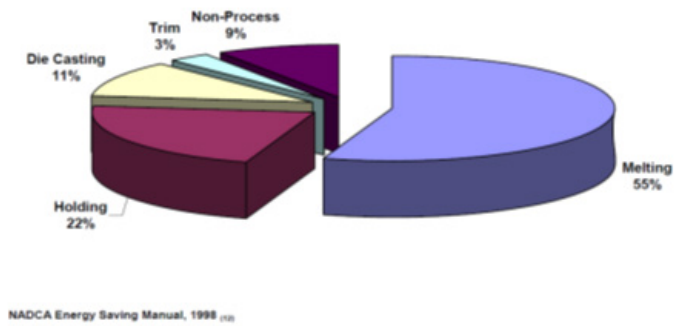

Figure-2: percentage distribution of energy consumption in various stages of die casting

Casting simulation practices can be used to increase the energy efficiency and specific energy consumption in die casting. Casting simulation practice can be used to optimise gates, overflows, vents etc. This calls for good understanding of how the casting simulation software works, and how it can be adapted to the specific plant conditions. In India, a large number of die casters have gained significant experience in using casting simulation of all die casting processes (HPDC / LPDC/ GDC) to arrive at the proper gating system before physical prototyping. The need is to go beyond that and optimise the yield to save energy consumption in melting. ProSIM is working with many die casters to effectively use casting simulation to reduce energy consumption.

Apart from the yield improvement, casting simulation and computational analysis can be used to achieve energy efficiency by the following.

• Identifying the optimum furnace set temperature
• Identifying the exact level of die preheating (specially in GDC)
• Optimising the dwell time of charge in furnace and in holding area.
• Optimising the charge volume
• Optimising the equipment and process

In countries like USA and Europe, the die casting industry is in severe threat due to decreased productivity, and profitability. Government departments in USA such as Dept of Energy (DoE), Environment protection agency (EPA) etc, have initiated various schemes to conduct focussed R&D programs, and assist the die casting industries to become energy efficient. There are multiple schemes to give financial assistance to die casters to achieve energy efficiency. Some programs claim to achieve energy savings to the tune of 50%. In India, there is a need to pitch for similar schemes both for R&D and funding for technology upgradation.

INTRODUCTION

In a die casting unit, (gravity die casting –GDC; or low pressure die casting -LPDC or high pressure die casting-HPDC) energy consumption is broadly described schematically in figure-3. At each of these processes, there is an energy input into the system and energy leakage from the system.

Figure 3 gives a schematic depiction of this energy balance system with energy inputs (shown in straight line arrows); and energy leakage (shown wavy lie arrows) in a pressure die casting set up [1].

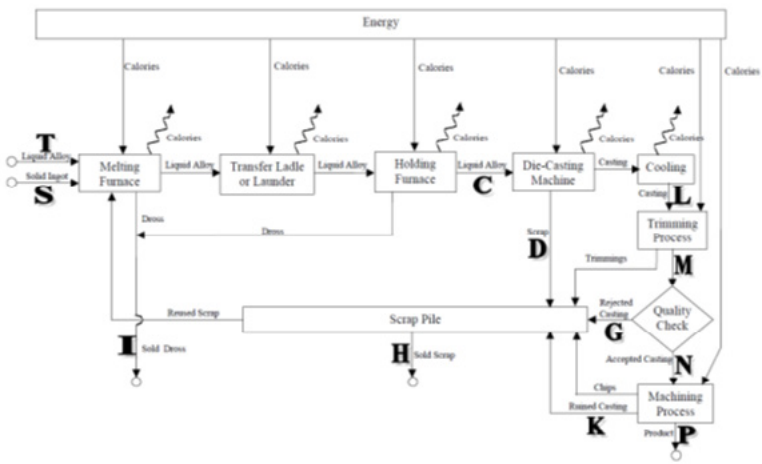

Figure-3: Flow chart of energy input and leakage in different activities of a pressure die casting unit

An analysis of the energy balance based on schematic in figure-3 will help to initiate energy efficiency measures in a casting unit. In simple terms, energy efficiency can be achieved by three kind of activities.
i. To minimise (optimise) the energy input ii. To reduce (optimise) energy leakage.
iii. To reduce wasteful energy consumption (blocks I, D, G, K in figure-3)

To achieve energy efficiency, the management has to invest on things that provide highest rate of return on investment. In a survey of two die casting clusters, Pune and Chennai, some unique features of Indian die casting industry have come out [2]. Pune cluster has a profile of about 60% die casting units in the small and medium sector (producing between 100 to 5000 tons per year); and about 24% of units in the micro category (producing less than 100 tons per year), as depicted in figure-4. This sector of about 84% of casting industry is working with low operating margins. Any energy saving costs will directly add to the operating profits directly.

Table-1: Energy Consumption in Pune Aluminum cluster in 2014.

Energy source	Annual consumption	Equivalent (toe)	Annual energy bill (million rupees)
Electricity	350 million kWh	30,063	2,971
FO	44,153 kL	43,579	1,590
NG	1.206 million SCM	1,025	54
LPG	210 tonnes	263	18
HSD	2592 kL	2536	143
	Total	77,466	4,776

Table-1 shows the energy consumption and cost of energy consumption in Pune aluminium casting sector. About 77,466 toe (tons of oil equivalent- which is more than 90 crore units of electricity) costing Rs 477 Crores.

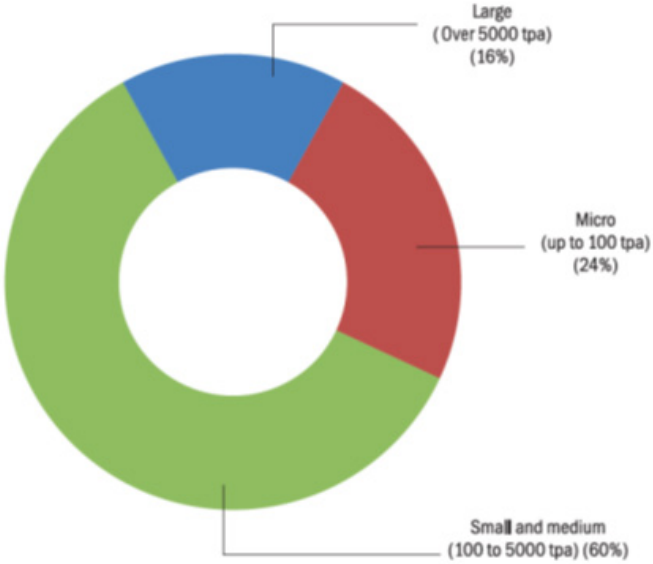

Figure-4: Profile of Pune Aluminium die casting cluster [2]

The study reports energy consumption patterns in Chennai cluster, break up as depicted in figure-5. This is made by a study of 3 different die casting units in Chennai in 2014.

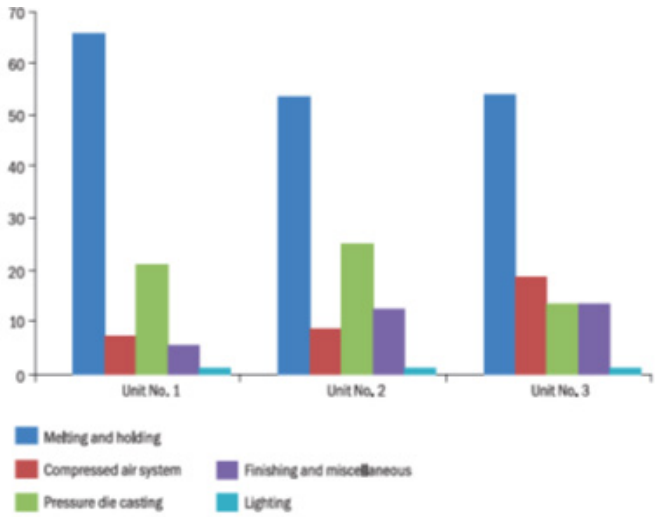

Figure-5: energy consumption profile by 3 different die casting units in Chennai Cluster [2]

It is seen that melting and holding energy account for about 53 to 67%, which is following similar lines as reported by NADCA in 1998 (figure-2).

By using computer simulation of metal casting process (in HPDC, GDC or LPDC), designer can work to reduce the energy consumption. This can be achieved in two different levels

- Optimisation of gating design
- Prediction and reduction / elimination defects; reduce rejections
- Optimisation of process
- Timing /sequencing;
- Cooling
- Coating
- Casting temperature

Biggest benefit of die casting simulation is the fact that the die casting process and gating design can be studied in a comprehensive manner, and the interactions between gating design and process can be visualised by the design engineer.

A significant result of die casting simulation process is to reduce the rejections (consequently increase yield) and to optimise process. This is achieved by a prediction of the defects formed for a particular gating system and process specified. By conducting successive iterations design change, gating system optimisation is achieved by simulation. This will add to increase yield of die casting.

CASE STUDY

High pressure die casting of a magneto housing (automotive application) is considered as a case study. Housing cast with ADC12 alloy, weighing about 400 grams, is produced in cold chamber HPDC process.

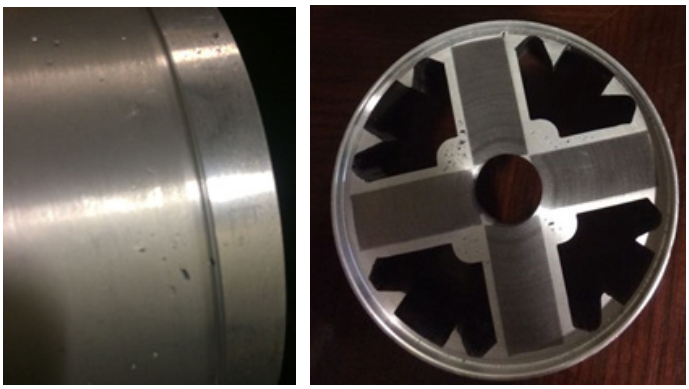

Figure-6: Shrinkage porosity (left) and air entrapment (right) defects observed in the gating design done without using computer simulation

A gating and process was developed without using computer simulation, which resulted in a very high rejection of 42%. Yield was about 49%. Two major defects that were causing the rejections were shrinkage porosity and air entrapment, as depicted in figure-6. Some of these defects occurred in machining area. Castings produced had an RT level-4, against end user expectation of RT level-1.

Computer simulation of the gating and process initially developed by designer was simulated in the first instance to understand the details of what happened to the melt inside the die cavity. Figure-7 shows the results of casting simulation conducted using ADSTEFAN software for the gating design as initially conceived by the designer.

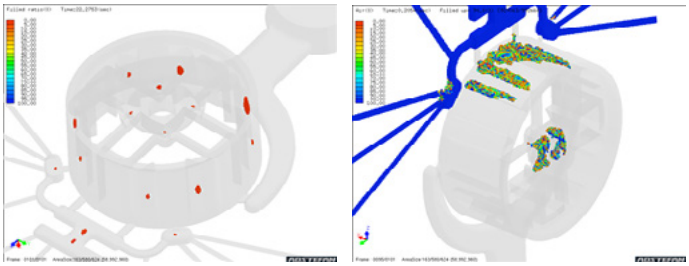

Figure-7: Results of casting simulation using ADSTEFAN software showing the air entrapment and shrinkage porosity defects prediction

By conducting 2 successive simulations for gating design modifications, the problems faced were resolved.

Highlights of design changes made include:
• Modification of gate area,
• Provisioning for overflows in appropriate locations
• Providing fan type runner and extension
• Effect of intensification was studied to achieve optimum level of intensification
• Working on the number of ingates

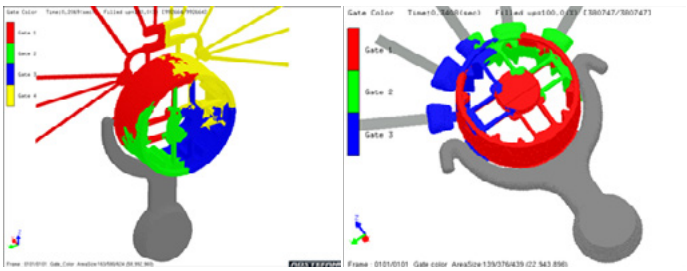

Figure-8: Gating optimisation to increase yield. Reducing the number of ingates.

Figure-8 shows the usage of computer simulation to optimise the gating. Left side picture shows original gating design which had 4 ingates. ADSTEFAN feature of gating contribution to die cavity filling was used to analyse the melt flow into die. It is observed that the gate-2 has very low contribution to the die cavity filling. Gating was redesigned and optimised with 3 ingates (shown in right side picture in figure-8).

Figure-9 shows the effect of pressure intensification on the size of shrinkage porosity. The top curve indicates the maximum size of porosity and bottom curve indicates the minimum size of porosity. Intensification pressure was applied to reduce the size of porosity. It was increased from 20MPa to 70 MPa in stages. Effect of intensification on reduction in pore size was simulated. From casting simulation it was observed beyond 70 MPa, intensification did not yield commensurate benefit to reduce shrinkage porosity size.

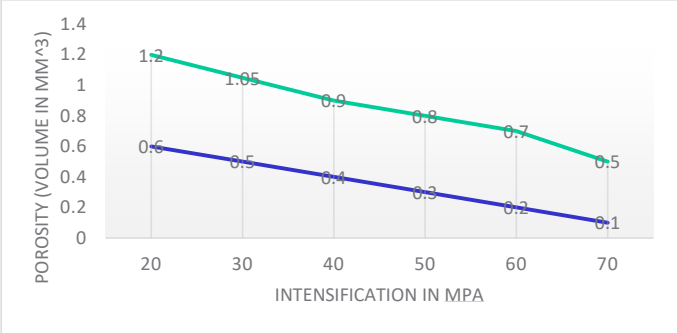

Figure-9: effect of intensification pressure on porosity size. Casting simulation is used to optimise the level of intensification pressure.

BENEFITS OF USING CASTING SIMULATION

- wasteful energy in blocks G and K (due to rejections in casting and after machining) was effectively reduced
- total rejections (casting + machining) came down from 42% to 3%
- RT Level-1 was achieved.
- Working with gate modifications helped to reduce the velocity (and turbulence) to as low as 42 m/s. This results in longer die life
- Intensification pressure was optimised. Saving redundant energy wastage

SUMMARY and CONCLUSIONS

• Energy efficiency measures contribute directly to the operating profit of die casting units.
• Die casting companies can work on optimising energy using casting simulation.
• By working on rejection reduction and yield improvement using casting simulation, melting and holding energy costs are significantly saved.
• Saving in energy costs will result in higher / faster rates of return on investment on the software tools.

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1. US Dept of Energy Grant No. DE-FC07-00ID13843, OSURF Project No. 739022.

2. Sameeksha, Newsletter, March 2016.

This paper was presented in ALUCAST 2018 in Dec 2018

Author:

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Biomass pellet based industrial heating appliances: A Futuristic, innovative & eco friendly clean Technological solution to reduce Fuel costs & emission levels in aluminum die casting industry

- Aman Kwatra, General Manager, Innovations & Business Development,
Enviro Green-Tech Solutions

Abstract:

Fuel costs are an important metrics for the aluminum die casting industry which has a clear impact on the top line as well as bottom-line of a company as choice of fuel also influences productivity, working conditions, maintenance costs as well. There is an ever-growing domestic as well as international competition coupled with government's emphasis on shifting to cleaner fuels making things difficult for manufacturers. Moreover, variability in prices of fossil fuel based fuels due to international oil diplomacy and supply issues is adding to the woes. In last five years, we have supported a large number of aluminum die casters to successfully install and adopt renewable energy devices working on biomass pellets, which is a globally recognized clean and green renewable fuel, to have a significant reduction in their fuel and maintenance costs as well as reducing emission levels while improving their shop floor working conditions.

Keywords: Renewable energy, Biomass Pellets, Cost reduction, Eco friendly, clean technology

Introduction:

The depletion of world's fossil fuel reserves has reached alarmingly low levels and moreover there is a great pressure to reduce greenhouse gas (GHG) emissions to avoid dangerous levels of human-induced climate change to safe. There is a great stress on promoting use of biomass for residential and industrial heating as well as Power generation. Bioenergy today meets about 10% of the world's primary energy supply today [1]. But, unfortunately most of this energy is consumed in developing countries for cooking and heating, using highly inefficient ways like open fires, poorly designed cook stoves resulting considerable negative impact on indoor air quality resulting in pollution , health and environment [2–3].

Most of the lose biomass is suffered from limitations like low bulk density, inhomogeneous structure which results in poor handling properties.

With continuously depleting fossil fuel reserves and unsatisfactory performance of other renewable energy technologies like solar and wind. There is sudden rise in interest related to development of biomass densification technologies such as biomass pelletisation and briquetting [4–8].

Of all the other types of bio energy, Pellet production is the fastest growing at an annual rate of 20% over the last decade. Biomass pellet production [9]. In 2013, 22 million tonnes (Mt) of pellets were produced worldwide in approximately 800 plants with individual capacity of over 10,000 tonnes [10] and has increased dramatically in recent years especially after highly increased focus on mitigating carbon dioxide (CO_2) emissions worldwide [11].

Biomass Pellets:

Fig 1: Biomass Pellet

Biomass Pellets (or Pellet Fuel) is categorized as a biofuel produced from compressed organic matter or biomass [12].

Pellets are produced from any one of the following five categories of biomass [13]:

- Industrial waste and co-products
- Food Waste
- Agricultural Residues
- Energy Crops
- Virgin Lumbar

Pellet fuel is extensively used now in power generation, residential, commercial and industrial heating, as well as cooking.

Wood Pellets are most common type of pellet fuel used worldwide in residential, commercial as well as industrial heating applications and the best one to be used with pellet based appliances and furnaces. It is generally manufactured from compressing saw dust [14] and related industrial wastes from manufacture of wood based products and furniture wastes, construction wood wastes and milling of lumbers [15-16].

Other sources include empty fruit bunches, palm kernel shells, coconut shells, forest wood wastes like branches, tree tops etc….

Pellet Quality is defined in terms of their calorific value (GCV), moisture and ash content. Durability and dimensions Due to their small cylindrical shape and size, automatic feeding, through pneumatic conveyor or auger feeder, into the heating systems and furnaces is possible with very fine calibration.[17-18]

Their high density also permits compact storage and transport over long distance. They can be conveniently blown from a tanker to a storage bunker or silo on a customer's premises.

In this paper Biomass pellets and wood pellets have been used invariably.

Characteristics of Good Quality wood pellets as per Indian Conditions

Though India still has to receive its wood or biomass pellet standards from Bureau of Indian Standards (BIS), on which it is already working. There are few characteristics which can define good quality pellets in India which are as below:

Parameter	Value
Gross Calorific Value (GCV)	>4000 Kcal/Kg
Moisture	<10%
Ash	<2-3%
Diameter	6 mm & 8 mm
Bulk Density	>600 kg/m3
Durability	>97.5%

Table 1: Specifications of Good Quality wood Pellets

Wood Pellets vs. Other Sources of Heat/ Fuel

In this paper we will pitch wood pellets against 5 other sources of energy namely Diesel, Furnace oil (FO), Electricity, Piped Natural Gas(PNG). In the table below we will get glimpse of average calorific value of these fuels along with wood pellets:

Fuel/ Source of heat	Avg. GCV per Unit	Cost Per Unit
Diesel	8800 Kcal/ Ltr.	₹67
Electricity	840 Kcal/kWh	₹10.5
Furnace Oil	10000 Kcal/Kg	₹40
PNG	9200 Kcal/ m^3	₹45
Wood Pellets	4200 Kcal/Kg	₹12

Table 2: GCV & cost of Different Fuels

Advantages of Wood Pellets over other Sources of heating

Wood pellets offer several advantages over other sources of Industrial heating which are listed below:

• One of the lowest fuel cost for a given amount of heat required.
• Renewable energy fuel.
• Easy and safe transportation and storage
• Carbon neutral environment friendly worldwide accepted fuel.
• Negligible quantity of SO2 and NO3 emitted.
• High Flash point of about 350 degree Celsius.
• Abundant Supply
• Stable prices over a longer period of time
• Pellet burning can be automated using Pellet burners, spreader, pellet fired furnaces etc…
• Clean working environment with less emissions.

Biomass/ Wood Pellet application in Aluminum Die Casting Industry:

Pellet based applications have been embraced by lot of players in Indian die casting industry in past 4 years as it offers several innumerable advantages to the industry . At the time when die casting industry is at cross roads amidst increasing raw material costs, slowdown and competition from foreign players, wood pellet based applications offer certain advantages which can assist the industry to reduce fuel costs, improve productivity and be more cost competitive in this dynamic environment and offset raw material price fluctuations while meeting high safety as well as emission norms. Certain advantages are listed below:

• Lower fuel costs and improvement in productivity leads to lower cost of productions of finished goods
• Lower maintenance costs and longer shelf life of machinery and equipment due to absence of SO2 and NO3 compounds, which are acidic in nature and hence causes corrosion.
• More or less stable prices compared to fossil fuels especially over a given period of time.
• Produced from locally available biomass which is available in abundance, free from price variations due to international diplomacy.
• Renewable source of energy. • No pilferage costs.
• Globally accepted fuel for heating
• Safety of industrial unit due to high flash point of about

350 degree Celsius which minimize the risk of causing and spreading accidental fire.
• Environment friendly green fuel.

Case Studies regarding transition from conventional hating systems to biomass pellets:

Case study 1: Transition from Diesel to Biomass pellets for Aluminum melting process:
In 2017, A major aluminum die casting company near Faridabad who do major OEM work large Corporate was troubled with huge fuel costs of running their melting and annealing furnaces on diesel as they didn't have cleaner alternate fuels such as PNG available to them and they do not want to use Pet Coke or Furnace oil due to indoor pollution caused them which deteriorates the shop floor working conditions and hence negatively impact the health of the workers reducing productivity of employees.

The company's melting costs on diesel were as follows:
Qty of Aluminum melted / day = 1600 Kg
Amount of Diesel used/ day = 200 ltrs.
Cost of Diesel/ ltr = ₹67 (approx)
Total cost of Diesel/day = ₹13,400

The company then retrofitted their furnaces with pellet burners initially and then completed the all retrofitting of their existing furnaces as well as installed biomass pellet exclusive furnaces. Post installation melting costs on biomass pellets were found to be:
Qty of Aluminum melted / day = 1600 Kg
Amount of Wood Pellets used / day = 400 kgs
Cost of Wood Pellets/Kg = ₹12 (approx)
Total cost of Wood Pellets used = ₹4,800
Savings on Wood Pellet over Diesel = ₹8600

Based on above calculations, this company was able to save about 64% of fuel costs. In addition to saving the fuel costs, increase in life of the crucible and furnace was reported along with lower maintenance costs as pellets used contain traces of SO_2 (Sulphur Dioxide) and NO_3 (Nitric Oxide) compared to diesel which results in lower acidity in environment and hence lower rate of corrosion of equipments and machines.

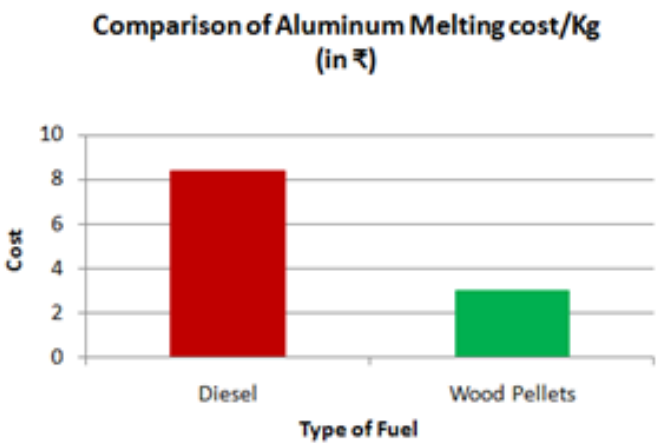

Fig 2: Comparison of Aluminum melting costs diesel vs. wood pellets

Case study 2: Transition from Electricity to Biomass pellets for Aluminum melting process:

Wood/Biomass Pellets give considerable savings over electricity when aluminum melting is considered. Electricity prices are increasing every now and then. Some of the aluminum die cast units which were operating earlier on electricity have now successfully shifted to wood pellets and have been found to receive considerable savings satisfactorily.

The company's melting costs on Electricity were as follows:
Qty of Aluminum melted / day = 1000 Kg
Amount of Electricity used/ day = 1000 Units
Cost of Electricity/unit = ₹10.5
Total cost of Electricity/day = ₹10,500

After the die casters shifted from electricity to wood pellets considerable amount of savings was recorded as far as melting costs are considered.
Qty of Aluminum melted / day = 1000 Kg
Amount of Wood Pellets used/ day = 250kgs
Cost of Wood Pellets/Kg = ₹12 (approx)
Total cost of Wood Pellets used = ₹3000
Total Savings/day using Wood/Biomass pellets over Electricity = ₹7500
Percentage Saving = 71%

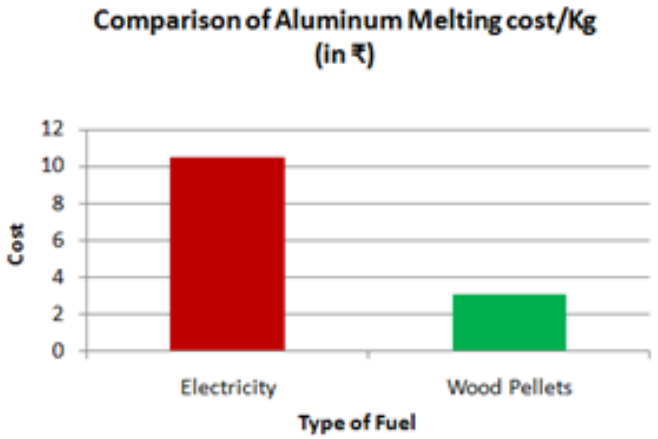

Fig 3: Comparison of Aluminum melting costs Electricity vs. wood pellets

But other than considerable amount of savings shifting to biomass/wood pellets has a little downside compared to electricity such as a slight increase in manpower costs as pellets need to be fed into the burner after a given interval and periodical maintenance of burner and removal of ash.

Case study 3: Transition from PNG and Furnace Oil to Biomass pellets for Aluminum melting process:

Similarly many users shifted from diesel and electricity to PNG as well as furnace oil to reduce their melting costs. But like any other fuel these have their own limitations.

In case of Furnace Oil, though low in cost but it becomes menace to handle furnace oil especially in winter season when it starts solidifying. Moreover there is lot of impurities

and mixing found in FO. There is also lot wastage of fuel reported in case of FO. It has very high indoor pollution as it leaves a large number of fumes and highly corrosive gases. It causes serious negative impact on shop floor environment and health of employees.

While in case of PNG a lot of these issues are not present but it still has a higher costs compared to FO (though Lower than diesel or electricity) and Availability of PNG is limited. In addition to this success (or Performance) of PNG through retrofitting in existing furnaces is questionable due to limiting factors like inadequate/fluctuating supply line pressure issues and existing furnace designs. Replacing existing furnaces with systems exclusively designed for PNG is a major capital cost.

Furnace A: From FO to Wood Pellets

Qty of Aluminum melted / day = 1600 Kg
Qty. of FO used/ day = 175 Kg
Cost of FO/Kg = ₹40
Total cost of FO/day = ₹7000

After converting this furnace to wood pellets we have received following results:

Qty of Aluminum melted / day = 1600 Kg
Amount of Wood Pellets used/ day = 400kgs
Cost of Wood Pellets/Kg = ₹12 (approx)
Total cost of Wood Pellets used = ₹4800
Total Savings/day using Wood/Biomass pellets over FO = ₹2200
Percentage Saving = 31%

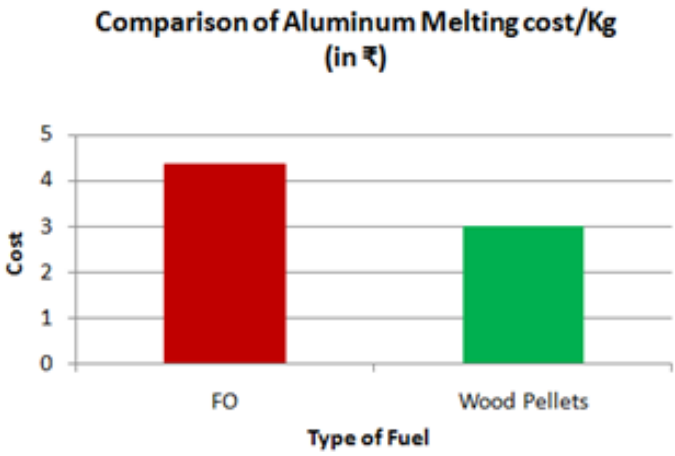

Fig 4: Comparison of Aluminum melting costs Furnace Oil vs. wood pellets

A lot of associated costs related with FO such as additional manpower costs, higher maintenance and wear-tear costs of machinery and furnace due to corrosive acidic fumes from FO burning, cost of melting FO in winters as well as heath cost of employees is not taken into account in above calculation. Considering this quantum of savings achieved by replacing FO with wood pellets is huge.

Furnace B: From PNG to Wood Pellets

Qty of Aluminum melted / day = 1600 Kg
Qty. of PNG used/ day = 200/m3
Cost of PNG/ m3 = ₹45
Total cost of PNG/day = ₹9000

After converting this furnace to wood pellets we have received following results:

Amount of Wood Pellets used/ day = 400kgs
Cost of Wood Pellets/Kg = ₹12 (approx)
Total cost of Wood Pellets used = ₹4800
Total Savings/day using Wood/Biomass pellets over PNG = ₹4200
Percentage Saving = 46%

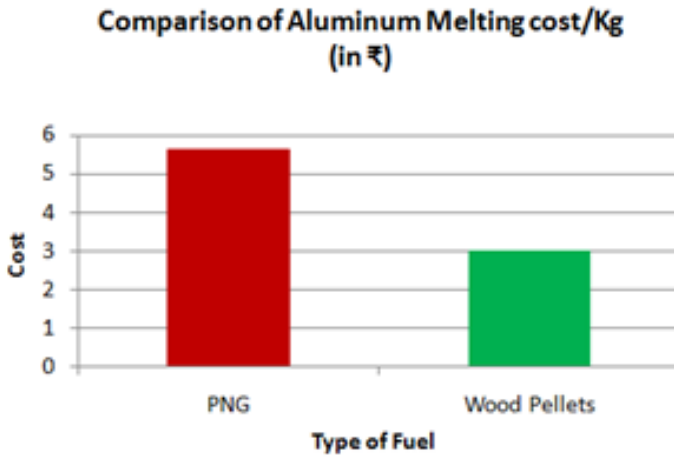

Fig 5: Comparison of Aluminum melting costs Piped Natural gas vs. wood pellets

Case study 2: Transition from Electricity to Biomass pellets For High Perm Process:

About four year ago, A leading stamping manufacturer in Bahadurgarh, Haryana was running their 6 Hi-Perm treatment furnaces for their stampings electricity. Their per batch cost is as below:

Electricity Consumption (per batch) = 100 KW * 6 Hrs = 600 units.
Total expense per batch (@ ₹ 10.5 per unit) = ₹ 6300

The manufacturer due to intense competition and price pressure from its clients was eager to find some technology through which they could reduce their energy costs, hence decrease their production costs which makes their product more viable in the market. They switched to wood pellets using biomass pellet burners and attained following savings:

Pellet consumed (per batch) = 180 Kg
Total expense per batch (@₹ 12 per kg) = ₹ 2160
Total savings per day batch = Rs 4140
Percentage Saving = 65.7%

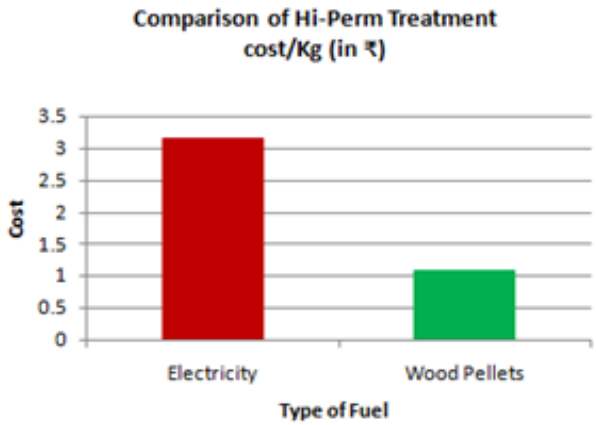

Fig 6: Comparison of Hi Perm Treatment costs Electricity vs wood pellets

Moreover, they also observed 10% increase in their production due to lower time to reach the peak temperature of 700 degree Celsius (inside the furnace). Now, they have shifted all their Hi-Perm furnaces and aluminum melting furnaces to biomass pellets.

Summary

Globally greener, cleaner, renewable and efficient technologies are getting embraced swiftly. Firstly due to reduce dependence on depleting fossil fuel reserves, which are getting costlier and scarce day by day, to ensure energy security for coming generations. Secondly, because of increased awareness and concern regarding impact of pollution and carbon dioxide emission on our environment and lives, we need to have larger involvement of cleaner and greener energy alternatives.

Biomass (or Wood) Pellets are a kind of biofuel derived from compressing biomass (or its waste) this enhances the efficiency of its burning manifold and make its storage, transportation as well as automation convenient.

Wood pellets are generally price stable and gives more heat/energy per rupee spent compared to other similar fuels and is overall cleaner and greener alternative to all other existing fuels.

From above case studies, it is apparent that aluminum die casters have made significant gains in terms of reduction of fuel costs and other related benefits.

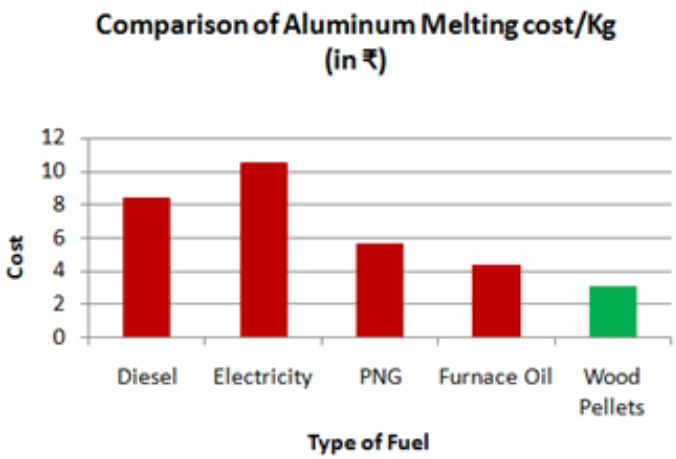

Fig 7: Comparison of Aluminum melting costs Other Sources of Heat vs. wood pellets

Fuels/Source of heating	Percentage Savings achieved using Wood Pellets compared to Other Fuels
Diesel	64%
PNG	46%
FO	31%
Electricity	71%

Table 3: Percentage Savings achieved using Wood Pellets compared to Other Fuels

Conclusion:

There are huge benefits which aluminum die casting industry can avail by embracing biomass pellets to meet their industrial heating requirements. This will also significantly help emergence and more popularity to biomass pellet industry in India. Our resource deficit country will also be benefitted as it will reduce our dependence on energy import bill as well as increase in employment. Biomass pellet based heating solutions have the capability to meet the industry's requirement and support it at this critical juncture where industry is trying to revamp itself to face greater challenges.

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Enviro Green-Tech Solutions

India's Electric Revolution is Here

- Shailesh Chandra, President – Passenger Vehicle Business Unit, Tata Motors

2020 has been a year where we witnessed the boom in the electric car market in India. There is a growing consensus among automotive professionals and the public alike that the future of vehicles is electric. Several surveys indicate that an overwhelming majority of customers state that they are open to considering an Electric Vehicle (EV) for their next purchase. These developments signal a turning point for EVs in India, which has thus far been a laggard in adopting the EV revolution.

In the past, EV adoption was constrained in India by 4 barriers:
1) Lack of suitable vehicles, with practical range and performance
2) Inadequate charging infrastructure for EVs
3) Higher price of EVs
4) Technological uncertainties causing durability and reliability concerns

Even as late as 2017, the above barriers were unaddressed. EVs that were available then had a usable range of under 100 km and were not comparable to ICE vehicles in terms of performance or convenience. There were virtually no charging stations even in major cities. Despite some government incentives for the purchase of EVs, the cost of an EV was nearly twice that of the comparable ICE. Finally, there was little done to assure customers on the reliability or the durability of EVs. As a result, EV purchases were limited to EV enthusiasts.

Over the last 2 years, there have been significant developments to address these barriers. EVs with higher range were introduced, creating a strong demand in fleets due to the low running cost of EVs. Several charging points were set up in major cities, driven by the efforts of EV enthusiasts and fleet users. In addition, several fleets installed their own captive chargers as well, driven by strong total cost of ownership advantage of EVs. The government also drastically brought down the cost of EVs through FAME II subsidies of up to 3 Lacs for EVs in commercial use, reduction of GST rate to 5%, waiver of road tax & registration in several states, and income tax benefits of up to 1.5 Lacs for individuals. OEMs offered higher warranties and AMCs to support fleets and address their anxieties. However, personal buyers still did not have strong offerings to address their concerns.

However, in 2020, the EV industry in India is in a completely different place altogether. The EV industry market has grown by 128% in FY21 at 2955 nos. as compared to 1295 nos. in FY20. The barriers that long threatened adoption have been greatly addressed. With truly high-performance cars with certified battery range of over 300 km, such as the Nexon EV, customers have access to fun and a practical option that just happen to be electric. Both the government and private players are installing charging stations across cities and highways. The government recently announced its plans to install at least one e-charging kiosk at around 69,000 petrol pumps across the country. Tata Power alone has more than 180 charging stations across 20 cities, and is planning to have over 700 charging stations across most major cities and highways by March 2021. Furthermore, backed by global studies that indicate that 85% of charging happens at home, OEMs are offering installation of home charging points, which will address the charging needs of most EV owners.

In addition, with lower GST and road tax & registration waivers, the on-road price of an aspirational EV such as the Nexon EV is now only 20-30% more than that of a comparable ICE vehicle. With special state incentives in Delhi & Mumbai, the on-road price is inching close to that of an equivalent ICE vehicle. Considering that the running cost of an EV is 20% - 25% of an ICE vehicle, this differential is easily recovered over a few years of vehicle ownership. In addition, OEMs are offering an 8 years warranty on battery and motor to completely allay all concerns on durability and reliability. As a result, today's vehicle intenders have a strong reason to consider EVs.

Department of Heavy Industry has allocated funds of Rs. 1,000 Cr for the development of charging infrastructure in India. As a result, 1,000 charging stations is expected be installed across cities and highways. In addition, the Ministry of Power has mandated enabling 20% of parking spaces in commercial and residential buildings, which will create thousands of charging points across India. Most major OEMs are planning EV launches, resulting in multiple options for customers. In addition, cost reduction in EV components is expected through economies of scale and localization, which will further allow OEMs to bring EVs in more mainstream vehicle segments.

As a result, the future of EVs is bright in India, and we will see accelerated EV adoption over the next few years, as customers realize the benefits of EVs. The EV revolution has kick-started, and will transform mobility in India over the coming years.

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SIAM - Summary Report: Cumulative Production, Domestic Sales & Exports data for the period of April-October 2020 with % Change									
Report I - Number of Vehicles									
Category	Production			Domestic Sales			Exports		
Segment/Subsegment	April - October			April - October			April - October		
	2019-20	2020-21	%Change	2019-20	2020-21	%Change	2019-20	2020-21	%Change
Passenger Vehicles (PVs)*									
Passenger Cars	13,08,196	7,80,128	-40.37	9,81,782	6,89,059	-29.82	3,24,548	1,29,805	-60.00
Utility Vehicles(UVs)	6,34,630	5,00,076	-21.20	5,41,480	4,51,821	-16.56	89,322	65,502	-26.67
Vans	82,713	46,670	-43.58	81,779	49,380	-39.62	1,521	378	-75.15
Total Passenger Vehicles (PVs)	**20,25,539**	**13,26,874**	**-34.49**	**16,05,041**	**11,90,260**	**-25.84**	**4,15,391**	**1,95,685**	**-52.89**
Three Wheelers									
Passenger Carrier	6,15,899	2,39,354	-61.14	3,29,456	49,544	-84.96	2,97,337	1,92,899	-35.12
Goods Carrier	71,416	37,986	-46.81	68,225	35,305	-48.25	4,121	2,543	-38.29
Total Three Wheelers	**6,87,315**	**2,77,340**	**-59.65**	**3,97,681**	**84,849**	**-78.66**	**3,01,458**	**1,95,442**	**-35.17**
Two Wheelers									
Scooter/ Scooterettee	38,38,904	21,97,824	-42.75	36,97,478	22,76,855	-38.42	2,34,481	1,03,652	-55.80
Motorcycle/Step-Throughs	91,51,745	67,09,296	-26.69	73,62,882	54,28,210	-26.28	18,45,667	13,69,502	-25.80
Mopeds	3,90,299	3,26,531	-16.34	3,92,458	3,31,434	-15.55	8,232	3,937	-52.17
Electric Two Wheelers	0	1,051	-	0	993	-	0	0	-
Total Two Wheelers	**1,33,80,948**	**92,34,702**	**-30.99**	**1,14,52,818**	**80,37,492**	**-29.82**	**20,88,380**	**14,77,091**	**-29.27**
Quadricycle									
Quadricycle	4,339	1,391	-67.94	903	-27	-102.99	3,834	1,411	-63.20
Total Quadricycle	**4,339**	**1,391**	**-67.94**	**903**	**-27**	**-102.99**	**3,834**	**1,411**	**-63.20**
* BMW, Mercedes and Volvo Auto data is not available and Tata Motors data is available for April - September only									
Society of Indian Automobile Manufacturers (11/11/2020)									

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	2019-20	2020-21	%Change	2019-20	2020-21	%Change	2019-20	2020-21	%Change
Passenger Vehicles (PVs)*									
Passenger Cars	14,74,629	9,74,774	-33.90	11,36,005	8,59,477	-24.34	3,63,913	1,57,253	-56.79
Utility Vehicles(UVs)	7,42,090	6,12,020	-17.53	6,29,841	5,55,746	-11.76	1,08,079	79,045	-26.86
Vans	90,799	58,045	-36.07	92,334	60,804	-34.15	1,661	564	-66.04
Total Passenger Vehicles (PVs)	**23,07,518**	**16,44,839**	**-28.72**	**18,58,180**	**14,76,027**	**-20.57**	**4,73,653**	**2,36,862**	**-49.99**
Three Wheelers									
Passenger Carrier	7,10,489	2,93,551	-58.68	3,75,696	63,506	-83.10	3,44,709	2,29,792	-33.34
Goods Carrier	82,253	48,771	-40.71	77,763	44,969	-42.17	4,576	2,929	-35.99
Total Three Wheelers	**7,92,742**	**3,42,322**	**-56.82**	**4,53,459**	**1,08,475**	**-76.08**	**3,49,285**	**2,32,721**	**-33.37**
Two Wheelers									
Scooter/ Scooterettee	43,94,953	27,21,882	-38.07	41,57,329	27,79,416	-33.14	2,60,872	1,49,070	-42.86
Motorcycle/Step-Throughs	1,04,06,206	80,49,141	-22.65	82,56,420	64,54,915	-21.82	21,16,755	17,03,653	-19.52
Mopeds	4,50,418	3,99,125	-11.39	4,50,008	4,02,184	-10.63	9,900	4,979	-49.71
Electric Two Wheelers	0	1,347	-	0	1,356	-	0	0	-
Total Two Wheelers	**1,52,51,577**	**1,11,71,495**	**-26.75**	**1,28,63,757**	**96,37,871**	**-25.08**	**23,87,527**	**18,57,702**	**-22.19**
Quadricycle									
Quadricycle	4,594	1,721	-62.54	921	-27	-102.93	4,074	1,639	-59.77
Total Quadricycle	**1,83,56,431**	**1,31,60,377**	**-28.31**	**1,51,76,317**	**1,12,22,346**	**-26.05**	**32,14,539**	**23,28,924**	**-27.55**
* BMW, Mercedes and Volvo Auto data is not available and Tata Motors data is available for April - September only									
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Category	Production			Domestic Sales			Exports		
Segment/Subsegment	April-September			April-September			April-September		
	2019-20	2020-21	%Change	2019-20	2020-21	%Change	2019-20	2020-21	%Change
I Passenger Vehicles (PVs)*									
Passenger Cars	16,43,739	11,78,942	-28.28	12,91,234	10,28,101	-20.38	4,04,675	1,90,612	-52.90
Utility Vehicles(UVs)	8,52,686	7,56,835	-11.24	7,25,650	6,77,107	-6.69	1,33,322	99,684	-25.23
Vans	97,580	70,139	-28.12	1,01,036	72,666	-28.08	2,274	877	-61.43
Total Passenger Vehicles (PVs)	**25,94,005**	**20,05,916**	**-22.67**	**21,17,920**	**17,77,874**	**-16.06**	**5,40,271**	**2,91,173**	**-46.11**
II Commercial Vehicles (CVs)** - M&HCVs									
Passenger Carrier	33,554	5,067	-84.90	29,206	2,578	-91.17	5,885	2,829	-51.93
Goods Carrier	1,54,159	88,610	-42.52	1,46,682	77,576	-47.11	11,128	6,915	-37.86
Total M&HCVs	**1,87,713**	**93,677**	**-50.10**	**1,75,888**	**80,154**	**-54.43**	**17,013**	**9,744**	**-42.73**
LCVs									
Passenger Carrier	33,862	9,787	-71.10	35,644	7,426	-79.17	3,132	908	-71.01
Goods Carrier	3,79,612	2,86,283	-24.59	3,59,162	2,70,623	-24.65	26,232	19,642	-25.12
Total LCVs	4,13,474	2,96,070	-28.39	3,94,806	2,78,049	-29.57	29,364	20,550	-30.02
Total Commercial Vehicles (CVs)	**6,01,187**	**3,89,747**	**-35.17**	**5,70,694**	**3,58,203**	**-37.23**	**46,377**	**30,294**	**-34.68**
III Three Wheelers									
Passenger Carrier	7,94,692	3,46,407	-56.41	4,20,269	76,835	-81.72	3,84,905	2,68,065	-30.36
Goods Carrier	91,704	58,067	-36.68	86,985	53,766	-38.19	5,324	3,269	-38.60
Total Three Wheelers	**8,86,396**	**4,04,474**	**-54.37**	**5,07,254**	**1,30,601**	**-74.25**	**3,90,229**	**2,71,334**	**-30.47**
IV Two Wheelers									
Scooter/ Scooterettee	47,67,058	30,56,748	-35.88	44,63,879	31,03,112	-30.48	2,86,278	1,49,607	-47.74
Motorcycle/Step-Throughs	1,13,88,624	91,82,647	-19.37	89,54,239	71,99,152	-19.60	23,87,116	20,15,869	-15.55
Mopeds	4,97,827	4,59,867	-7.63	4,95,677	4,62,107	-6.77	11,437	6,539	-42.83
Electric Two Wheelers	0	1,475	-	0	1,417	-	0	0	-
Total Two Wheelers	**1,66,53,509**	**1,27,00,737**	**-23.74**	**1,39,13,795**	**1,07,65,788**	**-22.63**	**26,84,831**	**21,72,015**	**-19.10**
Quadricycle									
Quadricycle	4,996	2,300	-53.96	954	-27	-102.83	4,434	2,257	-49.10
Total Quadricycle	4,996	2,300	-53.96	954	-27.00	-102.83	4,434	2,257	-49.10
Grand Total of All Categories	**2,07,40,093**	**1,55,03,174**	**-25.25**	**1,71,10,617**	**1,30,32,439**	**-23.83**	**36,66,142**	**27,67,073**	**-24.52**
* BMW, Mercedes and Volvo Auto data is not available ** Daimler & Scania data is not available									
Society of Indian Automobile Manufacturers (14/01/2021)									

ALUCAST 2020 Virtual Conference

(Held on Zoom Platform – 11 & 12 December 2020)

Theme: Aluminium Casting Technology for the 20s

The Conference was inaugurated and addressed by Mr. T Parabrahman, former CEO & Managing Director of Kirloskar Toyoda Machinery Ltd. and the ALUCAST Trustee in Bangalore. He mentioned that this is the first of its kind – a conference resulting out of our experience and response to multiple webinars conducted over the past six months. It has elicited a tremendous response with nearly one hundred and fifty delegates from all over the country registering to listen and interact over the next two days with a galaxy of domain experts covering a wide array of technologies relevant to the die casting industry. We would also have the opportunity to see some unique product presentations to help us brainstorm the way ahead. This effort has resulted in opening of doors to many opportunities for us to become manufacturers for the world. The Prime Minister's call of "Atma Nirbhar Bharat - Produce in India for the World" should not remain as a slogan but a way forward for all of us in the industry. The aluminum casting industry is no exception and we see new opportunities in every aspect of the die casting process. The surging demand from auto, electrical, white goods, aerospace and defense industries is a clear indication that the pendulum which had swung towards gloom and depression has started swinging back with great momentum towards a greater global demand cycle.

The first paper was on Surface treatment on Dies by Dr Stephen Midson, President, Midson Group, Denver, USA and a Consultant with NADCA. This paper was on PVD (Physical Vapour Deposited) AlCrN coating which improves the overall performance of a die and extends its useful life. The next presentation was on thermal vision on real time temperature monitoring of dies by Mr Adarsh Maheshwari, Marposs India. The third paper was on Triggering Technological Transitions by Mr Jayesh Rathod, Godrej Tooling Division. The fourth presentation was on using X-ray Technology to Control Rejections immediately after casting stage. It was presented by Mr Hemant Kumar of Carl Zeiss India, and mentioned about in line defect analysis in a technology which few industries have realised.

The fifth paper was on Digitalisation Application along with Automation by Mr Jagannath V of BFW/m2nxt Solutions by using indigenously developed IRIS system which essentially aids Industry 4. It was an excellent presentation extending to smart intelligent devices to monitor automation. Next was a presentation on "Fusion" the next generation die casting machine by Mr Michael Cinelli of Buhler AG Die Casting in which he highlighted the innovation and capabilities of these new machines. This was followed by a paper on Advanced Aluminium

Refractory Technology by Mr Bryan Nelson of Allied Mineral Products. It was early morning in US and he was up and ready to present his paper. He highlighted the improvement in refractory material which reduces corundum formation, improves refractory lining life in melting and holding furnaces. Last paper on the first day was Vacuum Die Casting Technology and the level vacuum required for good die casting parts by Mr Jan Emmenegger of Fondarex, Switzerland, who explained in detail about vacuum required inside a die as well about die seals.

Day Two began with a Special Address by Mr. Kaushik Manna, COO of Rockman Industries. He remotely released the ALUCAST Conference Technical Volume. He remarked that change is investable and change is now new constant.

The first paper was on Improvement of Melt Quality by using their new MTS 1500 and VMET Melt Quality Assessment by Mr Philippe Kientzler of Foseco International. He mentioned about new fluxes which improve cost saving, reduces loss of metal in dross, better strontium pick up in molten metal, reduced grain size and hence better mechanical properties. This was followed by Advanced and High Performance Die Lubricant Technology for True Cost Saving by Mr John Belyk of Chemtrend L.P. He highlighted the importance of selecting the correct lubricant to improve metal flow characteristics. The third paper of the day was on using Simulation Techniques to Optimise the Casting Process for developing high quality castings. This was presented by Mr B Kaushik of Kaushik International with number of case studies – a presentation that was outstanding and well received. The next presentation was on Shibaura Die casting machines by Mr Deepankar Agarwal on their die casting machines with advanced technology.

The afternoon session was started by Mr Christian Kleeberg of RGU Asia Pte. Ltd. with paper on Digitalisations of Metal Casting Operations and ten common misconceptions on digitalisation. It gave good tips to start Industry 4. The next presentation was by Bharat Fritz Werner on High Speed Machining Solutions for Aluminium Die Casting and presentation was made by Mr Praful Shende who explained in detail about building new generation machine tools to suit customer requirements. The seventh paper of the day was on Tool Steel Solutions by Mr Pulkit Datta of Hitachi Metals India. He explained in detail about melting, refining, re-melting, forging and heat treatment of tool steel. The last presentation was on Autonomous Engineering for Die Casting Applications by Ms Kanaka Lakshmi of Magma Engineering India Pvt. Ltd. An excellent case study was presented.

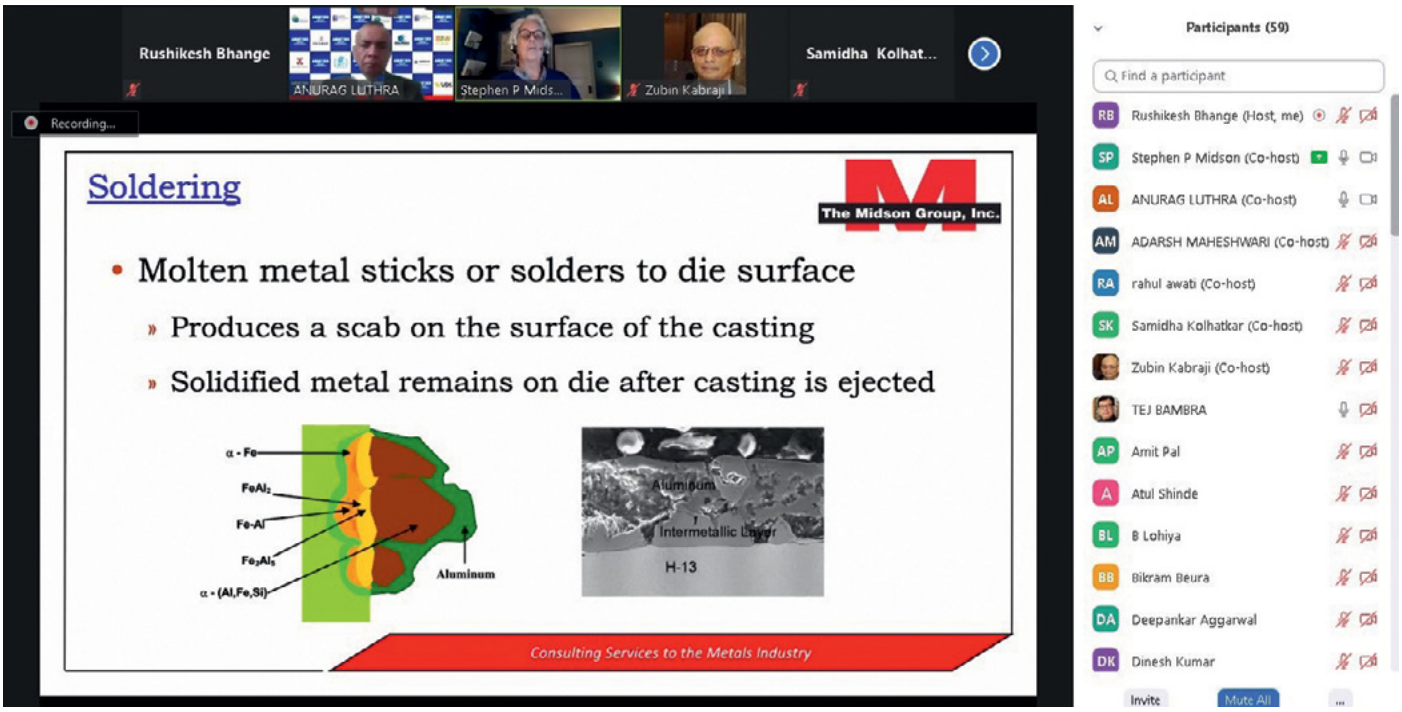
In all we had about sixteen presentations spread over eight sessions on two days. Sessions were chaired by Mr Anurag Luthra (ALUCAST – Delhi), Mr Tej Bambra (ALUCAST – Delhi), Mr Rahat Bhatia (ALUCAST – Delhi), Mr Natarajan Ganeshan (ALUCAST – Trustee) and Mr Niranjan Toraskar (ALUCAST – Trustee & Hon Treasurer).

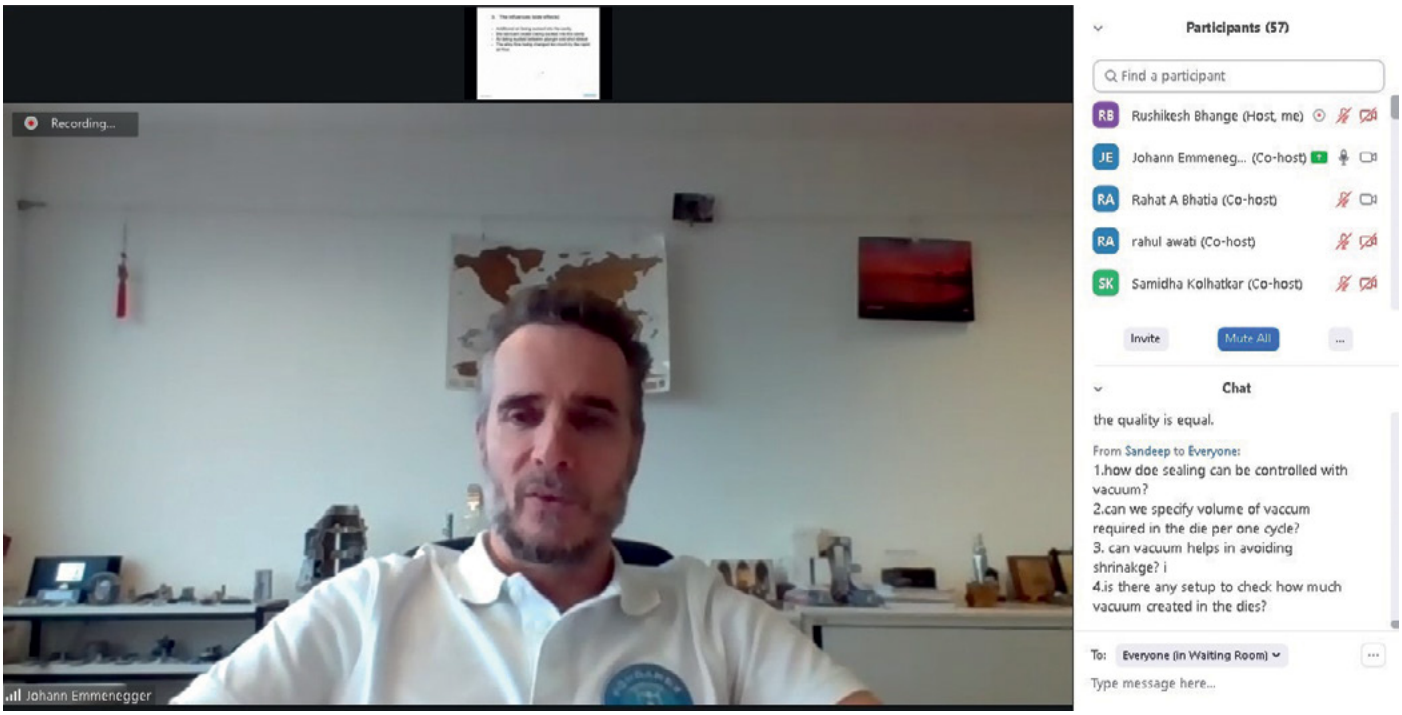
The Principal Sponsor was Rockman Industries Ltd and the Pen Drives were sponsored by the Raga Group.
Associate Sponsors included Endurance Technologies Ltd, Sundaram Clayton Ltd, Jaya Hind Industries Ltd, Bharat Fritz Werner Ltd/M2NXT, Frech India Machinery Pvt. Ltd,(along with Robomat and VDS), Lubrikote Specialities Pvt Ltd, Maini Group and Prex India Automation Pvt Ltd.

Over 150 registered and took part in the event while at remote locations, teams from the supporting companies viewed the proceedings on large screens in conference rooms and halls.

Mr. Vivek Vibhuti and his team from Rockman Industries Ltd managed the platform and conducted the event. Technical assistance for the event came from Brand Studio in Pune, with anchoring by Ms Samidha Kolhatkar (with Mr Rahul Awati). The Advisory Committee to the Conference included Mr Ganeshan Natarajan, Mr. Niranjan Toraskar, Mr. Vishwas Kale, Mr Rajesh Aggarwal, Mr Suhas Palekar and Mr Rajendra Prasad. Marketing efforts were extended by various people, including Mr Govindrao Vasudevan and Mr B B Lohiya.

ALUCAST 2020 Virtual Conference Glimpses


Rushikesh Bhange
ANURAG LUTHRA
Stephen P Mids...
Zubin Kabraji
Samidha Kolhat...
Recording...
Soldering
The Midson Group, Inc.
• Molten metal sticks or solders to die surface
» Produces a scab on the surface of the casting
» Solidified metal remains on die after casting is ejected
α - Fe
FeAl2
Fe-Al
Fe2Al5
α - (Al,Fe,Si)
Aluminum
Aluminum
Intermetallic Layer
H-13
Consulting Services to the Metals Industry
Participants (59)
Find a participant
Rushikesh Bhange (Host, me)
Stephen P Midson (Co-host)
ANURAG LUTHRA (Co-host)
ADARSH MAHESHWARI (Co-host)
rahul awati (Co-host)
Samidha Kolhatkar (Co-host)
Zubin Kabraji (Co-host)
TEJ BAMBRA
Amit Pal
Atul Shinde
B Lohiya
Bikram Beura
Deepankar Aggarwal
Dinesh Kumar
Invite
Mute All


Recording...
Johann Emmenegger
Participants (57)
Find a participant
Rushikesh Bhange (Host, me)
Johann Emmeneg... (Co-host)
Rahat A Bhatia (Co-host)
rahul awati (Co-host)
Samidha Kolhatkar (Co-host)
Invite
Mute All
Chat
the quality is equal.
From Sandeep to Everyone:
1.how doe sealing can be controlled with vacuum?
2.can we specify volume of vaccum required in the die per one cycle?
3. can vacuum helps in avoiding shrinakge? i
4.is there any setup to check how much vacuum created in the dies?
To: Everyone (in Waiting Room)
Type message here...

Measurement System Analysis...

(Ref taken from AIAG MANUAL)

- Sanjay Mergal – Principal Trainer – IATF 16949, Core Tools, VDA 6.3, TPM

Article Contents will be

1. Objective of the Program

2. Sources of variation

3. Types of Variation

4. What is MSA

5. Resolution of Measurement System

6.MSA Planning

7.Why We Measure

8. Accuracy & Precision

9. Types of Error in Variable Data (Bias, Linearity, Stability & GR&R-X Bar, R bar Chart)

10. IATF 16949 Standards Requirements

11.Types of Error in Attribute Data – KAPPA Methods

1. Objective of Article:

• Increase awareness to quality core tools as given by AIAG with Cross Functional Team

• Improve knowledge and skills to use these tools in automotive supply chain

• Capturing the Customer Specific Requirements into QMS Scope

• Demonstrate that Gauging and Measuring is a Process of capturing the Measurement variation.

• Explain part and gauge variation and its effect on quality measurement

• Identify measurement tools and their use

• How to perform Gauge R&R – attribute & variable data

• Provide case studies (examples) for measurement systems

2. Sources of Variations

Sources of Variations are broadly categorised

A. Manufacturing process – Mainly due to

Man	**Machine**	**Material**	**Methods**

B. Product and Process design – Mainly due to

Tool, Jig , Fixture	**Measurement**	Design of Process parameters

3. Types of Variation

A. Part to part variation

• No Two Parts are Perfectly are not identical, due the its Cause

• Variation is in the nature including environment

• It happens due to 4M (Man, Machine, Material, Methods)

B.Measurement Variation

• Variation due to Equipment & Appraisers or Operator

• **Equipment Variation** – Variation observed due to one operator when measured the same parts using the same gauge

• **Appraiser Variation** – Variation observed due to different operators when measured the same parts using the same gauge.

4. What is MSA?

• The Combination study of part to part variation and Measurement variation

• Scientific and objective method of analyzing the error in the measurement introduced by the Equipment , Appraiser or Operators and the parts and validate the Same

• MSA means reducing the error in the measurement process, Emphasis is on the effect due to equipment & personnel

• We test the system to determine numerical values of its statistical properties and compare them to Accepted Standards

"Measurement Systems"

• The Complete Process used to obtain measurements. Input is SWIPE

A measurement system includes;

• Standard

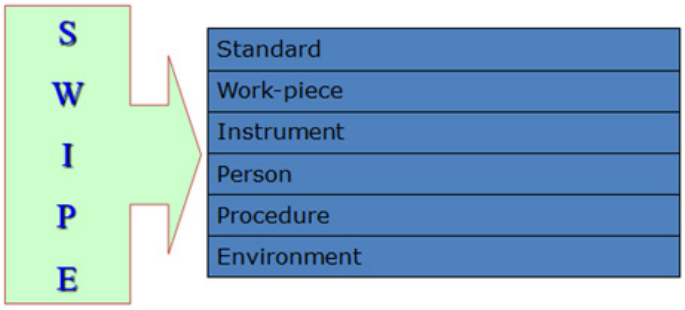
• Work piece

• Instrument

• Personnel / Procedure to use

• Environment under which to conduct the measurement i.e. SWIPE

Measurement systems are the most neglected source of variation



5.0 Resolution for Measurement System

Depends on how much sensitivity of a measurement system to capture the process variation.

• General rule is 10 to 1 rule of thumb,

• Select measurement system least count @10% of tolerance Measurement system should be statistical Control means presence of only common cause and not special cause

6. MSA Planning

• MSA is done either during APQP for new measurement system or once for all measurements systems mentioned in Control plan / Quality plan.

• MSA plan will be prepared in phase 3 of APQP based on Significant characteristics, Internal process improvement needs and CSR.

• It is not regular activity which can be planned like Calibration.

• MSA is to be done again in case any parameter of measurement system changes like appraiser, environment, and method, instrument of higher L.C. or part with lower tolerance introduced. Ensure Calibration is carried out before MSA.

……To be continued in the April 2021 issue……

ALUCAST SNIPPETS

Indian car market may post record 30% growth in 2021 on low base

Growth in Indian's passenger vehicle market could outpace all previous records in 2021, forecast analysts, citing a very low base after two years of double-digit decline and sustained pent-up demand.

A laggard among the top 10 global passenger vehicle markets in 2020 after one of the most stringent and prolonged lockdowns in the world to contain Covid-19, India is expected to be among the fastest-growing this year, probably only next to the US.

New product launches, quick economic recovery and the upside of Covid-19 vaccines will drive buyers back to showrooms, creating a sustained demand for personal mobility, according to forecasters.

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Detroit auto show to be replaced by outdoor event this year

Detroit's big auto show will not take place as scheduled in September, but will be replaced by an outdoor exhibit at a race track in nearby Pontiac. Show organizers on Monday cited worries that the coronavirus pandemic could affect the indoor show, normally held at Detroit's downtown convention center. The new event scheduled for Sept. 21 through 26 is being called Motor Bella. It will take place at the M1 Concourse, which has the track and room for 1.6 million square feet of display space.Brent Snavely, spokesman for the North American International Auto Show, said organizers still have reserved the downtown TCF Center for the fall of 2022 and 2023.

"Will NAIAS return in 2022? We're hopeful, optimistic. That's what we would want," he said. "It's hard to predict the future."

Show Executive Director Rod Alperts said they had to look for new and creative ways of doing business. The show will have track activities, mobility exhibits and a full complement of automaker and technology displays, he said. Auto shows have been struggling to retain their relevance at a time when companies can unveil new vehicles online without having to share the day with others.

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Skills development vital for enabling transition to Industry 4.0

Countries in Southeast Asia should consider developing industry transformation maps in key sectors to enable the transition to fourth industrial revolution (4IR) with adequate investment in skills development for new and repositioned jobs, according to a new study by the Asian Development Bank (ADB).

"The future of jobs is at the heart of development in Asia and the Pacific," said Director General of ADB's Sustainable Development and Climate Change Department Woochong Um.

"While jobs have been lost to automation in recent years, new jobs will emerge as new and disruptive technologies are adopted. Now is the time to invest in skills development that will help displaced workers acquire the abilities necessary to move into new jobs and help job-seekers access quality jobs for greater prosperity," he said in a statement on Wednesday.

The study assesses two industries in each country deemed important for growth, employment and 4IR. Based on employer surveys, the study reports large potential returns to businesses arising from productivity increases from 4IR technologies.

By 2030, there is likely to be a positive net impact in all industries analysed with more jobs created than displaced. Although a third of agro-processing jobs in Vietnam may be displaced, for example, substantial net job creation of 34 per cent is possible.

There could also be net increases of 39 per cent for garments in Cambodia, 14 per cent for food and beverage manufacturing in Indonesia and 11 per cent for IT-business process outsourcing (BPO) in the Philippines.

"The findings of the study point towards a clear path for the future in southeast Asia," said ADB Director General for Southeast Asia Ramesh Subramaniam.

"While the region may face challenges in moving the displaced workers into new jobs due to inadequate skills, we are confident that countries will design appropriate policies and invest in workforce skills particularly to accelerate the post-pandemic recovery. We must do everything possible to ensure that no one is left behind."

ALUCAST SNIPPETS

Employers in all industries surveyed stressed the importance of skills in the context of disruptive technologies. Together, they could need an additional 169 million people trained by 2030 to prepare for the transition to 4IR.

The study recommends strengthening on-the-job training and skills development for the jobs of tomorrow. It calls for developing industry-led technical and vocational education and training programmes with dedicated credentials for 4IR, and flexible and modular skills certification programmes that recognise skills attainment outside of traditional education channels.

While the coronavirus disease pandemic is accelerating digital transformation, the study finds that companies deploying 4IR technologies are likely to recover faster from the disruptions caused by the pandemic and be more resilient in the future.

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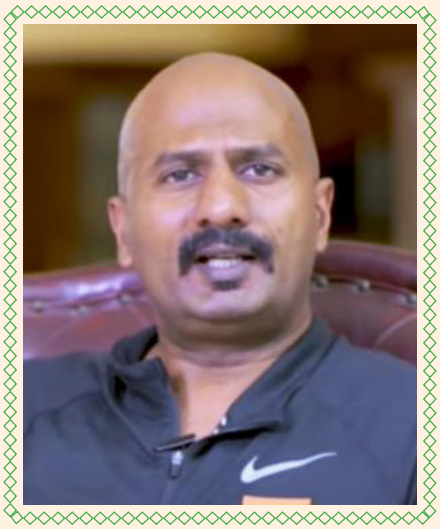
Obituary



KING RICHARD

Proprietor, SKR Engineering, Bengaluru

Date of death: 13th January 2021