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PRAGYAN

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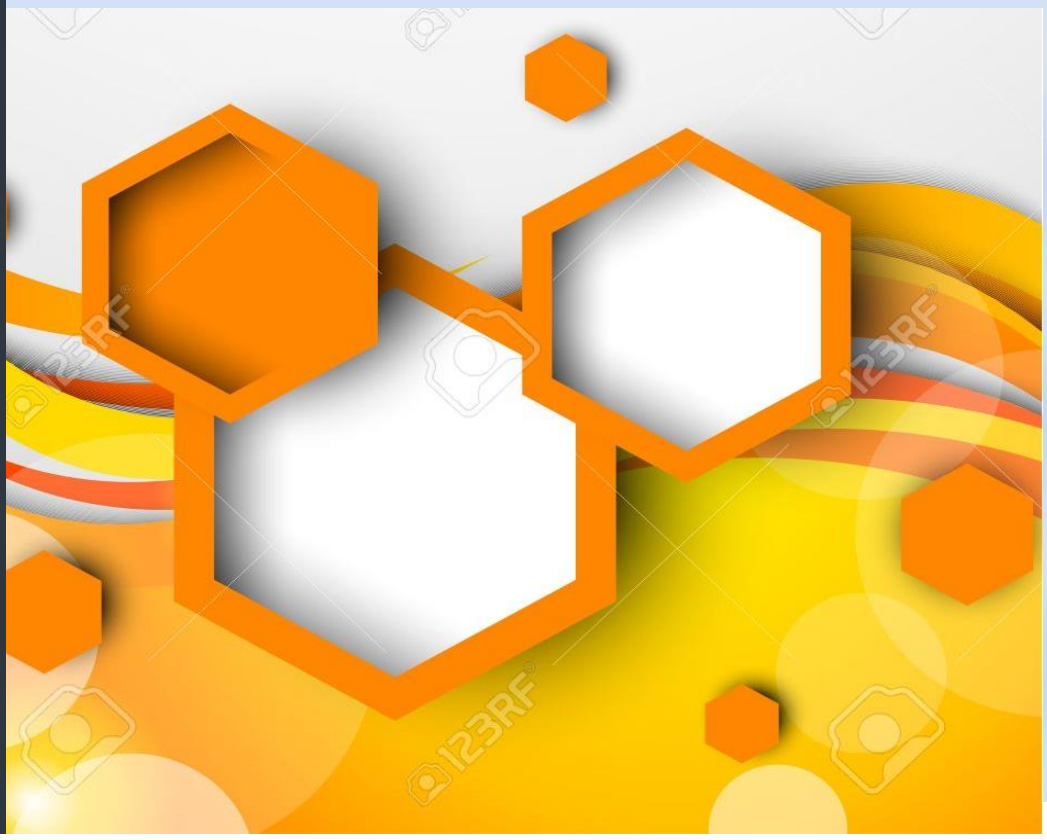

Advance Manufacturing System (Just in Time Manufacturing)

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Introduction

Just-In-Time (JIT) manufacturing has been implemented successfully in Japan for the past 20 years. It is a philosophy as well as a technique that guides a manufacturing company in organizing and managing its business more effectively, and in planning and controlling its operations more efficiently. It is a way to achieve high velocity manufacturing. Just-in-time (JIT) manufacturing, also known as just-in-time production or the Toyota Production System (TPS), is a methodology aimed primarily at reducing times within production system as well as response times from suppliers and to customers. Its origin and development was in Japan, largely in the 1960s and 1970s and particularly at Toyota. Just-in-time (JIT) manufacturing is a production model in which items are created to meet demand, not created in surplus or in advance of need. The purpose of JIT production is to avoid the waste associated with overproduction, waiting and excess inventory, three of the seven wastes categories defined in the Toyota Production System. High Velocity Manufacturing

Traditionally, a manufacturing business competes on price, quality, variety, after service, etc. Now, these conditions are merely prerequisites. Few businesses exist today without offering low prices, high quality, and good service. The key competitive factor has become speed. All else being equal, the faster a business responds to its customers, the more profitable it is. The shorter the lead-time in which a manufacturer can supply its products, the higher the probability that it will survive. High velocity manufacturing is a common goal for all manufacturing businesses. In high velocity manufacturing, everything is moving. Machines, people, funds and materials are constantly moving. Therefore, inventories in storage or on the shop floor are moving inventories rather than sitting inventories. Inventories are stocked only for a very short time, and will move to other locations only moments after being stocked. The conditions of high velocity manufacturing include flow manufacturing, line balancing, level schedule, and linearity.

1. Flow Manufacturing

A product or a group of similar products are processed through a series of workstations arranged in a fixed sequence. The materials flow through each workstation at a constant production rate.

2. Line balancing

Line balancing is required in high velocity manufacturing. Under this condition, tasks must be designed so that the work assigned to each workstation will require about the same amount of time to complete. There is no bottleneck and no buildup of work-in-process (WIP) inventories. For cases where bottlenecks are unavoidable, the theory of constraints (TOC) is applied. TOC will be discussed later.

3.Level Schedule

The schedule sets the flow of material coming into and passing through the manufacturing system. Since the flow of materials must be even in a high velocity manufacturing system, the schedules are designed to be level.

4.Linearity

Linearity refers to production at a constant rate or the use of resources at a level rate that is measured at least daily

Seven waste

- Waste of stock
- Waste of waiting
- Waste of processing
- Waste of defection production
- Waste of over production
- Waste of motion
- Waste of transportation

Objective of JIT

JIT Manufacturing tries to smooth the flow of materials from the suppliers to the customers, thereby increasing the speed of the manufacturing process. The objectives of JIT are to change the manufacturing system gradually rather than drastically:

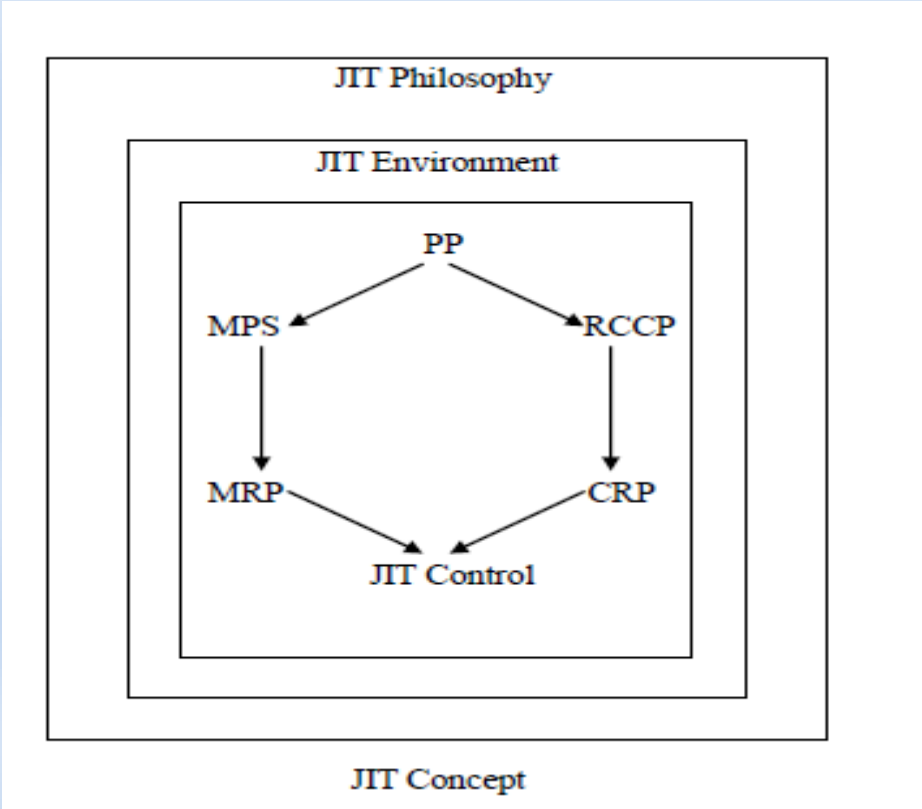
1. To be more responsive to customers,
2. To have better communication among departments and suppliers,
3. To be more flexible,
4. To achieve better quality,
5. To reduce product cost.

JIT WORK

The simplest tool used to increase the performance of your application is the Just-In-Time (JIT) compiler. A JIT is a code generator that converts Java bytecode into native machine code. Java programs invoked with a JIT generally run much faster than when the bytecode is executed by the interpreter.

JIT Concept

The operations planning and control system is an information system running throughout the manufacturing environment. For example, dedicated special facilities are used in make-to-stock environments; general purpose machines are used in make-to-order environments. Dedicated production lines can be designed in a balanced way with minimal setups in order to maximize the flow rate of the materials, while a general purpose machine must be set up before producing a specific item. In setup operations, the material flow is interrupted. Manufacturing environments can be changed to make planning and control systems simpler and more effective. For example, products are designed to have high similarity in processing and are mixed in a dedicated production line with negligible setups. Since lead-times are shortened, this turns a make-to-stock product into a make-to-order product. Just-in-time is not only a control technique, but also a way to improve the manufacturing environment. JIT control systems are only effective in JIT environments. Introducing kanban systems into a non-JIT environment means nothing to a company. JIT Control can be incorporated into an ERP system as a control part with a condition that the system has to be in a JIT environment. The JIT philosophy guides the development of the JIT environment. The JIT environment provides the foundation for implementing the JIT control techniques.



Different Types of JIT

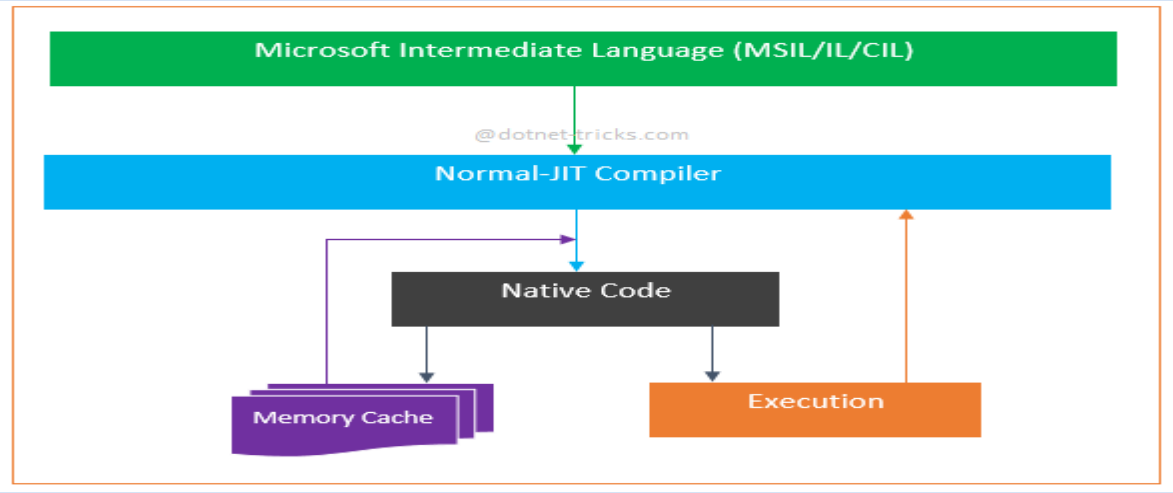
1.Normal JIT

2.Econo JIT

3.Pre JIT

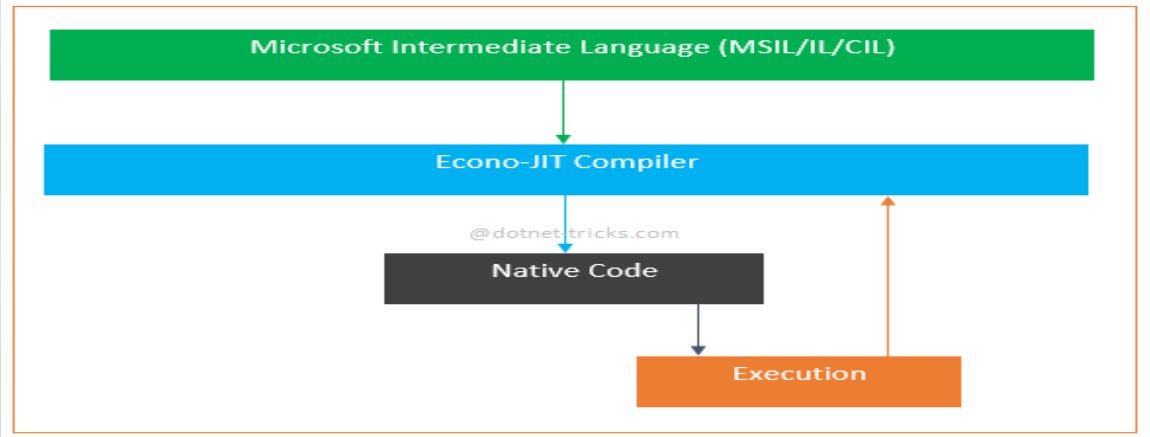
Normal JIT

This complies only those methods that are called at runtime. These methods are compiled only first time when they are called, and then they are stored in memory cache. This memory cache is commonly called as **JITTED. When the same methods are called again, the complied code from cache is used for execution.**



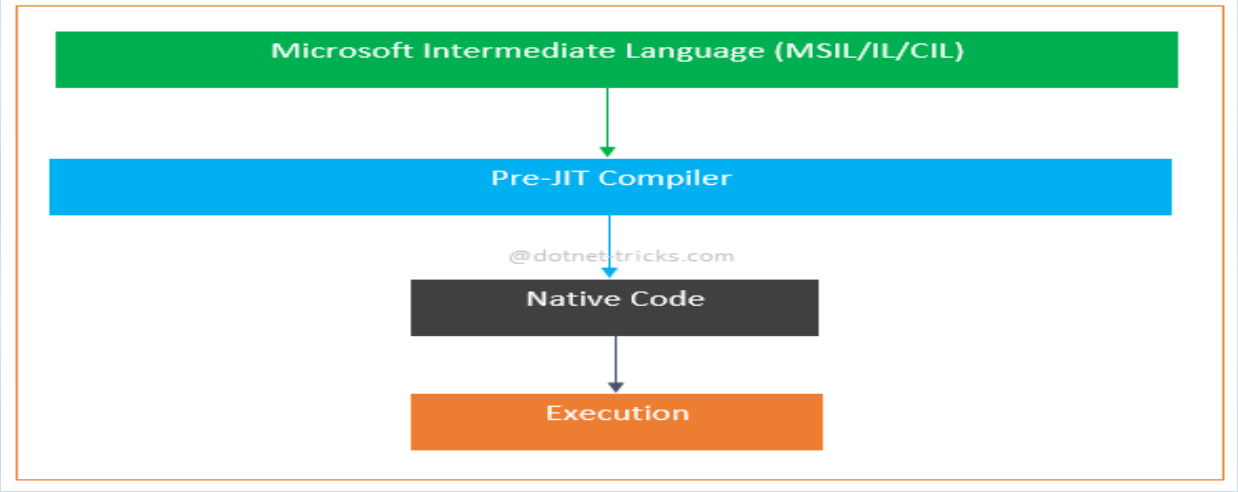
Econo JIT

This complies only those methods that are called at runtime and removes them from memory after execution.



Pre JIT

This complies entire MSIL code into native code in a single compilation cycle. This is done at the time of deployment of the application.



JIT as a Philosophy

Elimination of waste

Any activity that does not add value to the product or service in the eyes of the customer is a waste. Poor product design such as the inclusion of fancy functions not required by the customer is a waste. A product design causing difficulty in manufacturing is a waste. Standardization reduces the planning and control efforts, the number of parts, and the inventory required. A poor product design without enough standardization leads to waste. In addition to waste resulting from poor design, Toyota identifies seven examples of waste resulting from poor manufacturing methods below.

1. Waste of overproduction
2. Waste of waiting
3. Waste of movement
4. Waste of inventories
5. Waste of motion
6. Waste of making defects
7. Waste of process itself

1. Waste of overproduction

Overproduction is the production of goods more than what are immediately Just-In-Time Manufacturing needed. Overproduction causes extra material handling, quality problems, and unnecessary inventories. Consuming materials for unnecessary products may cause a shortage of material for other products that are needed. Never overproduce products to keep men and machines busy. If the required loading is less than the capacity, leave it alone. The labor can be switched to other departments, cleaning or maintaining the machines, accepting training and education, etc.

2. Waste of waiting

A material waiting in queue is a waste. An operator waiting for material or instruction and having no productive work to do is a waste.

3. Waste of movement

Poor plant layout results in materials having to be moved extra distances and cause unnecessary material handling costs. Work centers should be close to each other in order to reduce the move distance. Someone may say that close work centers provide no room for WIP inventories. That is fine! No room for WIP inventory forces the WIP to decrease.

4. Waste of inventories

Inventory causes costs of interest, space, record keeping, and obsolescence. Moreover, inventory can mask problems which could cause more inventory buildup. For example, WIP inventory between work centers can hide the symptoms of an unbalanced production rate. Finished goods inventory can mask poor forecasting, poor quality, and poor production control. Inventory is not an asset; it is a waste!

5. Waste of motion

Improper methods of performing tasks by the operators cause wasted motions. Reaching far for materials or machine buttons is a waste of motion. Searching for tools is a waste of motion. Any activity that does not add value to the products should be eliminated. Bad layout or training causes waste of motion. Just-In-Time Manufacturing

6. Waste of making defects

The cost of scraps is a waste. But it is the least important compared with other wastes caused by making defects. Defects interrupt the smooth flow of materials in the production line. If the scrap is not identified, next workstation will try using it to produce more wastes, or waste time waiting for good materials.

7. Waste of process itself

Bad process design is a waste. For example, wrong type or size of machines, wrong tools, and wrong fixtures are wastes.

The principle of eliminating the wastes includes:

1. All waste should be eliminated.

2. Waste can gradually be eliminated by removing small amounts of inventory from the system, correcting the problems that ensue, and then, removing more inventory.

3. The customers' definitions of quality should drive product design and manufacturing system.

4. Manufacturing flexibility is essential to maintain high quality and low cost with an increasingly differentiated product line.

5. Mutual respect and support should exist among an organization, its employees, its suppliers, and its customers.

6. A team effort is required to achieve world class manufacturing capability.

7. The employee who performs a task is the best source of suggested improvements.

JIT as an Environment

In addition to philosophical concepts, JIT also provides an environment in which products are manufactured in a simpler way.

1.Repetitive Manufacturing
2.Total Quality Management (TQM)
3.Total Productive Maintenance (TPM)
4.Total Employee Involvement (TEI)
5.Supplier Partnership

1.Repetitive Manufacturing

Repetitive manufacturing is the production of discrete items in a production line with fixed routings. The items can be a product or a family of products. The product is standard or made from standard modules. The manufacturing environment is make-to-order (MTO) or assemble-to-order (ATO). The production line consists of workstations located close together and in sequence. Materials flow from a workstation to the next at a relatively constant rate. Material handling systems are normally used to move the materials from process to process in the production line. Normally, the capacity of the production line is kept sufficient. The repetitive manufacturing is based on an uninterrupted flow of materials.

2.Total Quality Management (TQM)

Total quality management is a management approach used to achieve improvement and long-term success through customer satisfaction. TQM involves all members of the organization, and is meant to improve the quality of all processes, products, services, operations, and corporate culture.

3.Total Productive Maintenance (TPM)

"Preventive maintenance" is a restrictive term which mentally prohibits us from thinking more broadly. TPM means preventive maintenance and continuing efforts to adapt, modify, and refine equipment in order to increase flexibility, reduce material handling, and promote continuous flows. It is operator-oriented maintenance involving all qualified employees in all maintenance activities.

4.Total Employee Involvement (TEI)

Elimination of waste and continuous improvement are the central ideas of the JIT philosophy. They can be accomplished only when employees are cooperative. A successful JIT environment should have the cooperation and involvement of everyone in the organization. Traditionally, operators take orders from management and do what they are asked to do, while management is in charge of planning, supervising, inspecting, etc. In a JIT environment, operators take responsibility for controlling the equipment, inspecting for quality, correcting the deviations, maintaining the machines, and improving the processes.

5.Supplier Partnership

In order to establish a smooth flow of materials into the factory, a close and reliable relationship with the suppliers is very important. Supplier partnership is the establishment of a working relationship with a supplier whereby the two organizations act as one. Relationships with the suppliers should be based on mutual trust, cooperation, and long-term commitment.

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Mustang Car

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Introduction

The Ford Mustang is an American car manufactured by Ford. It was originally based on the platform of the second generation North American Ford Falcon, a compact car. The original 1962 Ford Mustang I two-seater concept car had evolved into the 1963 Mustang II four-seater concept car which Ford used to pretest how the public would take interest in the first production Mustang. The 1963 Mustang II concept car was designed with a variation of the production model's front and rear ends with a roof that was 2.7 inches shorter. Introduced early on April 17, 1964 (16 days after the Plymouth Barracuda), and thus dubbed as a "1964½" by Mustang fans, the 1965 Mustang was the automaker's most successful launch since the Model A. The Mustang has undergone several transformations to its current sixth generation. The Mustang created the "pony car" class of American muscle cars, affordable sporty coupes with long hoods and short rear decks, and gave rise to competitors such as the Chevrolet Camaro, Pontiac Firebird, AMC Javelin, Chrysler's revamped Plymouth Barracuda, and the second generation Dodge Challenger. The Mustang is also credited for inspiring the designs of coupés such as the Toyota Celica and Ford Capri, which were imported to the United States.

Lean and Mean

Acting on information from engineering about “usable space” in the engine bay, the 2018 Mustang design team lowered the hood and grille for a lean, more athletic look. New headlamps are lower, and more sinister. More modern as well, with all-LED front illumination[1] – including signature lighting, low and high beams, turn signals and fog lamps[2] – adding additional shine to the 2018 Ford Mustang.

More Horsepower, More Torque, More Mustang

Increased torque on the 2.3L EcoBoost® engine encourages wide-open throttle acceleration. The upgraded 5.0L V8 revs higher than any Mustang GT before, and improvements to the 6-speed manual allow it to handle more torque. A new 10-speed SelectShift® automatic transmission[2] improves responsiveness and all-around performance for both engines.

Power to Personalize

12 wheel designs. 5 new instrument panel finishes. A new, fully customizable 12" LCD digital instrument cluster.[2] An all-new Mustang MyMode[2] that allows you to save your favorite drive settings,

including suspension, steering and exhaust note[2] preferences. And a new "pulsing" start button that pulses red from the moment the door is unlocked until the engine roars to life. Now more than ever, the new Mustang puts the power directly into your hands

Leave Everything Behind

While designers strengthened its iconic look, a passionate team of Mustang engineers beefed up just about everything else. 2.3L EcoBoost® engine upgraded for optimal torque. 10-speed automatic[2]: new, with quick shift times and exceptional low-speed tip-in response to help heighten already legendary performance. Shock absorbers and innovative stabilizer bars: new, to help improve responsiveness and ride control. MagneRide® Damping System[1]: now available on EcoBoost and GT models, to optimize ride and handling in all situations. Hood vents: new to EcoBoost, and functional, of course. Just another sign that every Mustang is built for speed.

12 Aluminum Wheels

17" Sparkle Silver-painted aluminum wheels are standard. Options include 19" wheels[2] to help make Mustang truly your own.

Interior Upgrade

Choose the Carbon Sport Interior Package to cover the instrument panel and shift knob with sleek carbon fiber, while Alcantara® inserts enhance the door trim and Ebony leather-trimmed seats.

Rear Redesign

Revised LED tail lamps are just one of the changes out back. There's a new bumper, fascia and performance rear wing.[2] A new dual exhaust with rolled tips completes the athletic look.

Smart Hardware. Smart Software. Smart Design.

SYNC® 3 is our easy-to-use, responsive voice-activated technology. Experience the capacitive touchscreen with impressive responsiveness. Locate your favorite restaurants with simple destination entry via the available navigation. You'll also find a sleek user-friendly interface to help you connect to and control your smartphone.27 SYNC 3 also brings you the power of Apple CarPlay160 and Android Auto compatibility to your Mustang.

...less Ford Pass – A Smarter Way to Move

Ford Pass is the one-stop app that can help you move more freely throughout your day.

Here's how:

•Lock, unlock and start your vehicle remotely*

•Use Ford Pay to conveniently pay for service

•Receive key vehicle info and schedule service

•Compare fuel prices at stations along your route

•Find parking[169] ahead of time

•Get Ford Pass help from a friendly Ford Guide

These are just some of the great things you can do with Ford Pass. If you haven't already, download the Ford Pass app on the App Store or get it on Google Play. Ford Pass Connect includes complimentary 1-year subscription for remote features excluding Wi-Fi hotspot, and starts with vehicle sale date. Subscription is subject to compatible 4G network availability. Evolving technology/cellular networks may affect future functionality. Certain restrictions, 3rd-party terms, or message/data rates may apply. Remote start capability available with automatic transmission

With a more powerful, higher-revving 5.0L V8 than before. Thanks to a new dual-injection system featuring low-pressure port fuel injection and high-pressure direct injection, 2018 Mustang GT power output increases to 460 hp[1] and 420 lb.-ft. of torque.[1] Maximize this higher level of performance by adding the GT Performance Package. Contents include: 19" Ebony Black-painted aluminum wheels with Michelin® Pilot® Sport 4 summer-only tires, TORSEN® differential, K-brace, Brembo brakes with 6-piston front calipers, a Gauge Pack in the instrument cluster, stiffer springs and upsized rear sway bar, and even a performance rear wing (fastback only). To help keep you down to earth.

GO [illegible] ON

Stock

When you're ready to take your Pony to the next level, look no further than Ford Performance Parts. Using a convenient search tool at performanceparts.ford.com, you can select your model year to view the full list of performance parts specifically designed for your Mustang. You'll find everything from superchargers to handling packs, exhaust and brake upgrades, appearance items and more. They are all engineered, developed and tested, by the people who know your Mustang best – which gives you the performance, reliability and durability that you've come to expect from the Blue Oval.

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VEHICLE-2020

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Abstract

Autonomous cars are the future smart cars anticipated to be driver less, efficient and crash avoiding ideal urban car of the future. To reach this goal automakers have started working in this area to realized the potential and solve the challenges currently in this area to reach the expected outcome. In this regard the first challenge would be to customize and imbibe existing technology in conventional vehicle to translate them to a near expected autonomous car. This transition of conventional vehicles into an autonomous vehicle by adopting and implementing different upcoming technologies is discussed in this paper. This includes the objectives of autonomous vehicles and their implementation difficulties. The paper also touches upon the existing standards for the same and compares the introduction of autonomous vehicles in Indian market in comparison to other markets. There after the acceptance approach in Indian market scenarios is discussed for autonomous vehicles.

Introduction

This paper can help one understand the trends in autonomous vehicle technology for the past, present, and future. We see a drastic change in autonomous vehicle technology since 1920s, when the first radio controlled vehicles were designed. In the subsequent decades, we see fairly autonomous electric cars powered by embedded circuits in the roads. By 1960s, autonomous cars having similar electronic guide systems came into picture. 1980s saw vision guided autonomous vehicles, which was a major milestone in technology and till date we use similar or modified forms of vision and radio guided technologies. Various semi-autonomous features introduced in modern cars such as lane keeping, automatic braking and adaptive cruise control are based on such systems. Extensive network guided systems in conjunction with vision guided features is the future of autonomous vehicles. It is predicted that most companies will launch fully autonomous vehicles by the advent of next decade. The future of autonomous vehicles is an ambitious era of safe and comfortable transportation. Google and Uber on Driverless Car Systems. It is predicted that by 2020, we will have vehicles that will be fully autonomous vehicles running on roads but only under specific circumstances. Self-driving car, also known as an autonomous car, driverless car, or robotic car, is a vehicle that is capable of sensing its environment and moving safely with little or no human input. Self-driving cars combine a variety of sensors to perceive their surroundings, such as radar, Lidar, sonar, GPS, Odometry and inertial measurement units. Advanced control systems interpret sensory information to identify appropriate

navigation paths, as well as obstacles and relevant signage. Long distance trucks are seen as being in the forefront of adopting and implementing the technology.

Active Window Displays

This is even referred to as head-up-display technology, which has a transparent display on the windshield. Hence, you would no more need to keep checking your cellphones for any the routes to your destination and can just focus right on the road. This technology has changed itself completely since the start 20 years back. It would more like a navigation system that highlights the next turn on the windshield as you approach it. Active glass display technology is a technique of displaying the information in 3-D. The advance heads up display system is monitor the location of driver's head in order to arrange in a line the real objects in amplified reality and the image should be nursed with zero dormancy, which require high speed processors. By the use of automotive active window display the windows or windshield can be accessed through an in-built touch-less hand gesture, voice recognition system allow to choose the direction of path.

Biometric Vehicle Access

Biometric Technology is making its presence in almost all the industries. We have already seen the use of like finger print lock and retina scan in lot many places. Our cars would soon come enabled with this feature called as Biometric Access. And yes you can expect your cars to go keyless and use finger prints or your eyeball as the key of it. Biometric technology is an automated access monitoring system, based on behavioural or physiological characteristics, used for verification and recognition of a manual access.

- Many versions of biometric security system are available in the market such as voice verification, fingerprints, hand geometry and retina/ iris/ face recognition. It's a user-friendly, reliable and convenient identification and monitoring method.
- A few biometric vehicle control access systems have made their way to the market such as driver identification, automatic engine starter, biometric seats etc.
- The biometric car access or identification system provides better anti-theft protection and a great sense of comfort and safety to car owners.

Major auto-brands like Mercedes-Benz, BMW, Ford and Volkswagen are working on this technology and finding innovative ways to strengthen their vehicles' safety and security system.

Solar Cars

- A shift in the nature of people has been observed in these recent years. They are moving more towards the green technology. You are going to witness this nature soon in your cars in the form of Solar Cars. The Solar cars will derive their energy from the energy of the Sun. There are some places in the world where the Sun's energy is not present in abundance. But you can always use the little which is available. Toyota is the forerunner in the technology. With cars like this you can store the solar energy as a reserve power. The body panels of car would collecting and storing the solar energy if they are made with polymer fiber and carbon resin.Solar car is a solar vehicle used for land transport. Solar cars usually run on only power from the sun, although some models will supplement that power using a battery, or use solar panels to recharge batteries or run auxiliary systems for a car that mainly uses battery power.

Health Monitoring

Ford is among the first comers for this technology. It has already previewed the use of sensors in the seat belt and steering wheel to track the some of the vital statistics of human body. And since we have already made lot of developments in wearable technologies, this could also be used in combination with the health monitoring technology in the car. We usually write about new health technology that people wear, hold, carry, or use in their homes. We have noted studies that indicate self-driving cars will support aging at home and covered the Vigo headset monitor that tracks truck driver alertness. Despite the amount of time Americans spend in their cars, however, there have not been many health tech developments for use in vehicles. Now it appears the time has come for in-vehicle health tech development.
Transparency Market Research recently published a report that forecasts the global market for automotive active health monitoring systems will increase at a 67% compound annual growth rate from 2018 to 2026.

Conclusion

The networks of autonomous vehicle could allow interaction and prevent collision, traffic jams ect.,The effective navigation way in bad weather. If the people's thought hasn't changed about the self-driving cars being safe, these cars are already safe and are becoming safer. ... Driverless cars appear to be an important next step in transportation technology.

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GREEN ENERGY

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Abstract

The Rising energy prices, geopolitics and concerns over the impact of greenhouse gas emissions on climate change are increasing the demand for biofuel production. On the price and volume effects from green certificates in the energy market. gas emissions. They propose instruments that directly or indirectly stimulates and foster the expansion of renewable or so called green energy. The development and utilization of control strategies are closely linked with progress and requirement of society.

Introduction

Green energy comes from natural sources such as sunlight, wind, rain, tides, plants, algae and geothermal heat. ... Green energy can replace fossil fuels in all major areas of use including electricity, water and space heating and fuel for motor vehicles. Green energy comes from natural sources such as sunlight, wind, rain, tides, plants, algae and geothermal heat. These energy resources are renewable, meaning they're naturally replenished. In contrast, fossil fuels are a finite resource that take millions of years to develop and will continue to diminish with use. Renewable energy sources also have a much smaller impact on the environment than fossil fuels, which produce pollutants such as greenhouse gases as a by-product, contributing to climate change. Gaining access to fossil fuels typically requires either mining or drilling deep into the earth, often in ecologically sensitive locations. Green energy, however, utilizes energy sources that are readily available all over the world, including in rural and remote areas that don't otherwise have access to electricity. Advances in renewable energy technologies have lowered the cost of solar panels, wind turbines and other sources of green energy, placing the ability to produce electricity in the hands of the people rather than those of oil, gas, coal and utility companies. Green energy can replace fossil fuels in all major areas of use including electricity, water and space heating and fuel for motor vehicles.

Types of green energy

The research into renewable, non-polluting energy sources is advancing at such a fast pace, it's hard to keep track of the many types of green energy that are now in development. Here are 6 of the most common types of green energy:

Solar Power :

The most prevalent type of renewable energy, solar power is typically produced using photovoltaic cells, which capture sunlight and turn it into electricity. Solar energy is also used to heat buildings and water, provide natural lighting and cook food. Solar technologies have become inexpensive enough to power everything from small hand-held gadgets to entire neighborhoods.

Wind Power :

Air flow on the earth's surface can be used to push turbines, with stronger winds producing more energy. High-altitude sites and areas just offshore tend to provide the best conditions for capturing the strongest winds. According to a 2009 study, a network of land-based, 2.5-megawatt wind turbines in rural areas operating at just 20% of their rated capacity could supply 40 times the current worldwide consumption of energy.

Hydropower:

Also called hydroelectric power, hydropower is generated by the Earth's water cycle, including evaporation, rainfall, tides and the force of water running through a dam. Hydropower depends on high precipitation levels to produce significant amounts of energy.

Geothermal Energy:

Just under the earth's crust are massive amounts of thermal energy, which originates from both the original formation of the planet and the radioactive decay of minerals. Geothermal energy in the form of hot springs has been used by humans for millennia for bathing, and now it's being used to generate electricity. In North America alone, there's enough energy stored underground toproduce 10 times as much electricity as coal currently does.

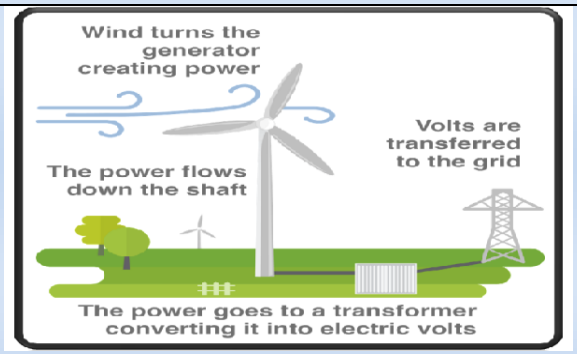
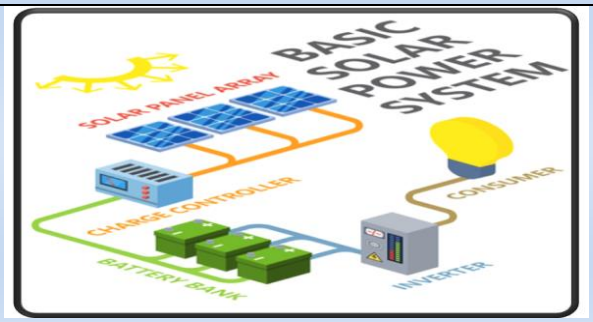
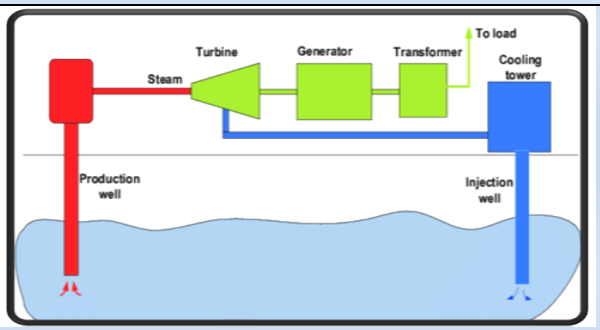
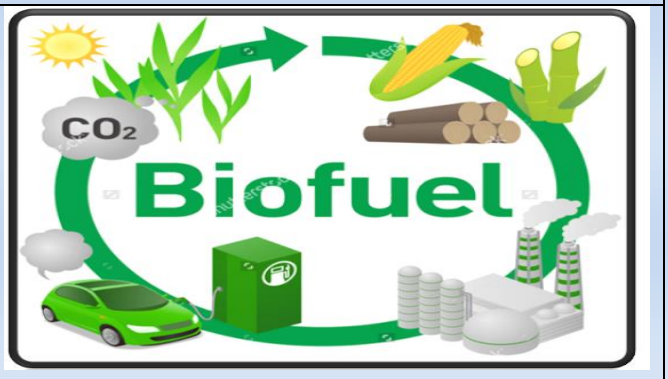
Biomass:

Recently-living natural materials like wood waste, sawdust and combustible agricultural wastes can be converted into energy with far fewer greenhouse gas emissions than petroleum-based fuel sources. That's because these materials, known as biomass, contain stored energy from the sun.

Biofuels :

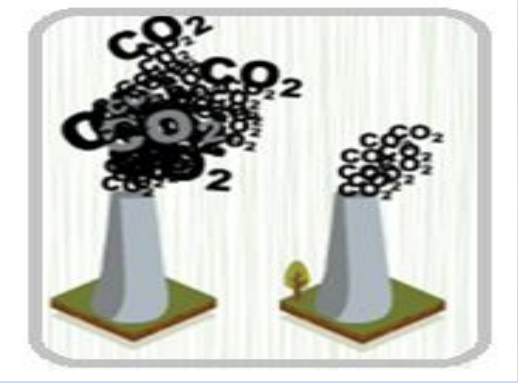
To burning biomass to produce energy, sometimes these renewable organic materials are transformed into fuel. Notable examples include ethanol and biodiesel. Biofuels provided 2.7 percent of the world's fuels for road transport in 2010, and have the potential to meet more than 25 percent of world demand for transportation fuels by 2050

Types of Green Plant

Name of the Plants	Image
1.Wind Plant	
2.Solar Plant	
3.Hydro Plant	
4.BioFuel Plant	

Potential Economic & Environmental Impacts

Sustainability assessment of renewable energy technologies should certainly include analysis of environmental impact. By substituting notoriously harmful fossil fuel combustion, the renewable energy options help to mitigate such problems as air and water pollution, excessive water and land use, wildlife and habitat loss, damage to public health, and global warming. At the same time, we must understand the non-zero impact of those alternatives when assessing their use at a particular locale. The intensity of environmental impact would vary depending on geographic location, climate, and other factors. For example, biomass energy generation may produce stronger environmental and economic impact in the areas where the land resources are limited, and energy crops would compete with food production. Also, technologies that are associated with significant water withdrawal for cooling and other operational needs can potentially strain the region where water shortages are an issue. So, careful decisions need to be made about deployment of particular technologies so that the most abundant local resources can be used most effectively, and overall impacts are minimized.

Description	Image
1.Creating Jobs(In Rural Areas)	
2.GreenHouseGas Emission(Reducing)	

3.AmericaEnergy Independence (Strengthening)	
4.Energy Cost(Stabilizing)	

Benefits of Bioenergy

● Promoting high yielding bioenergy crops with positive attributes with respect to water use and soil impacts

● To Increase the share of bioenergy derived from wastes and residues

● To integrate bioenergy production with crop production systems and in landscape planning

● To increase crop land productivity especially in developing countries, freeing up crop land for bioenergy crops, with a particular focus on pasture intensification for livestock production

● To Deploy marginal or degraded lands together with breeding of crops that can maintain productivity on marginal land

● Remove the correct amount of plant material to avoid reducing soil fertility, cause loss of organic matter or predispose the soil to erosion

● To Avoid deforestation by promoting agro ecological zoning● adopting voluntary market-based incentives for appropriate resource management

● To consider externalities, giving value to clean water, clean air, and other ecosystem services to encourage their protection

● To establish financial incentives to reduce carbon emissions

● To Integrate bioenergy production into existing activities (forest products, buffer strips, perennial rotations)

● Producing bioenergy in land that makes a small contribution to food production, which includes the huge quantity of global pasture land

Conclusion

Bioenergy is renewable energy derived from recently living biological material, or biomass. Pressure is increasing for bioenergy to meet energy demands, reduce greenhouse gas emissions, improve soil and water quality, and provide economic development and other socioeconomic benefits. Bioenergy & Sustainability provides a guide to bioenergy possibilities, paths for sustainable expansion and recommendations for realizing its techno-economic potential. It shows there is probably no one-size-fits-all solution for bioenergy development with different paths available for adoption depending on resources endowment, technology suitability and appropriate policy frameworks. It also highlights the gaps in knowledge and proposes the science and technology needed for bioenergy to realize its maximum benefits. Enough land is available, that need not pose a threat to food security, biodiversity and ecosystem services, and the improvements this industry has been attaining (improving soils, integrated chains, use of co-products, improved conversion technologies) add up to reach climate mitigation much more effectively while improving economic performance to benefit broader societal needs.

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Waste Management

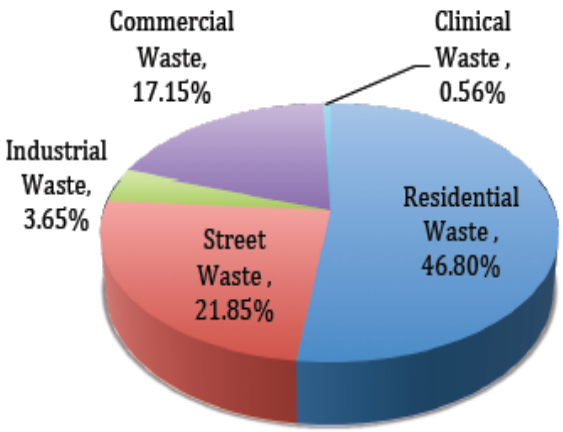
Subaraj J
DME – II Year

Introduction

The Waste Management Project has been designed at Green Channel to resolve the waste problem in Bangladesh. According to a World Bank estimate, an individual in a developing country produces an average of 0.45 - 0.50 kg of municipal solid waste. The cities and towns of Bangladesh generate approximately 17,000 tons of waste per day most of which do not get treated or disposed off in the right manner. Within the next 25 years, the number is estimated to reach 47,064 tons per day.

Close to half of the waste (46.8%) generated in Bangladesh come from Residential sources. Another approximate 40% comes from Street and Commercial sources. It is important to know the sources of waste in order to make sure that the collection process (the next step) can be organized most efficiently. The following pie chart shows the exact percentages of waste collected from each source.

SOURCES	
Residential Waste	*46.8%*
Street Waste	*21.85%*
Commercial Waste	*17.15%*
Industrial Waste	*3.65%*
Clinical Waste	*0.56%*



And the following pie chart shows a breakdown of the composition of waste in Bangladesh. More than two-thirds of the waste (70%) is composed of Food and Vegetables, which are biodegradable. The next largest percentages consist of Garden Waste (11%), Plastic (5%) and Paper Products (4%), which are also either recyclable or biodegradable. This is helpful to know so that once we have identified our sources and created a systematic process of collection, we can also set up an efficient system of segregation at the very point of origin

Stages of Involvement

Waste is usually handled in four stages. The Waste Management Project at Green Channel will be involved in all four of the stages in the following manner:

Generation	*Analyze and reduce the sources of waste*
Collection	*Identify and improve systems of collection*
Segregation	*Identify & evaluate existing processes and put in force more efficient ones*
Treatment	*Identify & evaluate current systems and put in force more efficient ones*

Collection

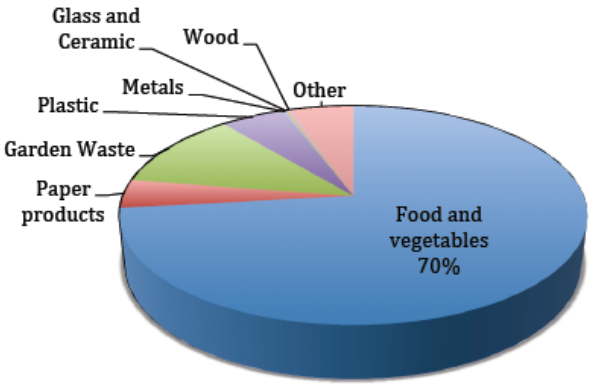
The waste-collection process is very poorly set up in Bangladesh. Only about 2% of the Dhaka City Corporation's budget goes towards Waste Management; its only source of income being the fees collected from house to house for the waste collection.

Segregation:

Waste in Bangladesh is also not segregated at the point of origin, contaminating the biodegradable part and hindering the proper process of decomposition. Over time, due to the lack of attention given to the management of the system, current municipal solid waste has become a mixture of different kinds of dangerous constituents like toxic radioactive substances, methane gas, pathogens, industrial effluents, medical, pathological and harmful chemicals.

COMPOSITION

Food and vegetables	*70%*
Garden Waste	*11%*
Plastic	*5%*
Other	*5%,*
Paper products	*4%*
Glass and Ceramic	*0.25%*
Wood	*0.16%*
Metals	*0.13%*



Treatment:

There are four possible ways of treating waste in general. And they are:

1. *Open Dumping Ground*
2. *Sanitary Landfills*
3. *Composting*
4. *Incineration*
5. *Plasma Technology*

Out of the 5 major ways of disposing waste outlined above, Bangladesh solely uses the first option - Open Dumping Grounds. The open dumping ground option simply allows the dumping of waste (unsegregated in the case of Bangladesh), without any sort of treatment.

Problems under this option:

Even under just this one option, many things go wrong in Bangladesh. The height of the landfills should not be below the highest flood level of the locality, which is never ensured. The low level of the ground consequently facilitates anaerobic fermentation in place of aerobic fermentation, thus delaying the process of settlement and stabilization from 2-3 years to decades.

Authorities in Bangladesh do not bother to purchase lands for this purpose at most times. They utilize private properties for dumping. And under such arrangements the landowners get to take advantage of raising their lands to a higher level free of cost by providing their land for open dumping ground purposes.

Some of the hazards of the existing open dumping sites in Bangladesh are that they follow no engineering design; the dumpsites are neither separated from other lands or water bodies nor contain retained walls to revert drainage of leachate. No safety measures are followed either. The landfills are also usually not provided with bottom liners or top covers.

Possible treatment solutions:

Given 85% - a major chunk of our total waste - is biodegradable, composting is a great waste treatment option. It is also suitable because of the high moisture content in our waste. Moisture is one of the most important factors in waste management. Municipal solid waste in Bangladesh contains as much as 65% of moisture, whereas it is only 23-32% in India, and 15-35% in Europe, making the waste here more suitable for composting. Moisture in municipal solid waste helps quicker and easier decomposition and fermentation.

Biodegradability in the waste also allows it to get absorbed into the soil without affecting the environment if it does not include hazardous materials and plastic in the mix. Waste with biodegradable properties is also suitable for biogas generation through disposal in properly designed sanitary landfills.

Sanitary Landfill: Solution for Non-biodegradable Waste

The second option, the building of Sanitary Landfills, is the process of dumping waste after treating it to eliminate hazards, and to control methane gas emissions through the surface. Ground treatment, design and engineering work are the prerequisites for conducting this method, thus requiring an initial capital investment. Bangladesh does not operate any sanitary landfill to this day. JICA undertook a project to convert a dumping ground into a sanitary landfill earlier in the decade but failed to complete the project because the preconditions were not met.

Options Not Suitable For Bangladesh

Incineration

Since there is high moisture in our waste, incineration is not a good option for us. Wet waste takes more heat and energy to be burnt. The moisture value for residential and commercial waste is 50% and 54% respectively, which are rather good for composting.

Plasma Technology

Plasma technology is far too advanced and expensive for Bangladesh. It is not going to be an option for a very long.

Considering all the options and the socio-economic context of Bangladesh, the building of Sanitary Landfills is an essential for Bangladesh in order to ensure safe treatment of waste, prevention of health hazards and any dangerous impact on the environment. This method also controls the emission of methane gas and allows for the generation of electricity from waste, which may very likely draw the attention of the private sector, opening up possibilities for economic growth.

Goal #1: Create Efficient and Sustainable Systems

The existing waste management system in Bangladesh is managed extremely poorly. The Waste Management Project of Green Channel will aim to create an efficient system of processes at every level (collection, segregation and treatment) in a way that will sustain itself in the future.

Goal #2: Reduce generation of waste

Besides creating efficient and sustainable systems of waste management the Project will also aim to reduce the generation of waste across the country through mass scale education and awareness programs.

Goal #3: Design Creative Solutions

The Project will be continuously involved in Research and Development in order to incorporate new ideas, creative solutions and innovative thinking into our already established systems and processes.

Goal #4: Operate Systems using the most Advanced Technology

The Project will also seek to incorporate the most advanced technology in their work and any systems design.

Systems Focused Projects:

Collection and Segregation Projects

Given the major sources of waste in Bangladesh, that make up 85.5% of the total waste, come from just three sources, Action Projects designed under the Collection Category will focus mainly on those three sources: Street Waste, Residential Waste and Commercial Waste.

Also given the major composition categories of waste in Bangladesh come from just three categories as well, that make up 90% of the composition, Action Projects under the Segregation Category will focus on those three categories: Biodegradable Waste (food, vegetables & garden waste) Paper Products and Plastic.

Action Project #1: Project Trash Patrol (Organizing Street Waste)

This Project aims to organize the collection of Street Waste by setting up trashcans in all public roads of Bangladesh. The project was first launched in Dhaka back in 2012 and will be launched in the rest of the Divisions in the subsequent years. This is also a project undertaken in partnership with the City Corporation that is in usually charge of emptying the trash from these receptacles, while we fund, manage and maintain them.

Design The Trashcans are made out of steel and come with a heavy chain and pad-lock to ensure *durability, prevention of theft and convenience of installation*. The unit price for each trashcan and its accessories is about $60.

Timeline:	*Jan – June 2015*	*Phase 5-10*
(Dhaka)	*July – Dec 2015*	*Phase 6 –16*
Budget:	*USD 45,000*	

Evaluation Factors: *Number of Trashcans Set up*
Number of Trashcans in Good / Excellent Conditions
Number of Trashcans being used regularly
Qualitative Feedback from society (by area)

Starting 2016 the Green Channel Projects Team will work to create a system of segregation for Street Waste at the point of origin (most likely by providing classified trashcans alongside our green-colored trashcans).

Action Project #2 (Residential Waste)

Project #2 will aim to organize waste collection and segregation from Residential sources in Dhaka and will be designed in more detail starting 2016.

Action Project #3: (Commercial Waste)

Action Project #3 will aim to organize waste collection and segregation from Commercial sources in Dhaka and will be designed in more detail starting 2016.

Project # 1, 2, and 3 will be replicated in the rest of the country only after building a successful model in Dhaka.

Awareness-Based Programs

Awareness Building and Public Education is a very important aspect of our every day work. Environmental Education and Waste-Management Discipline is greatly lacking in Bangladesh. The Waste Management Project Team will design Awareness-based Programs to promote environmentally friendly practices across the country

Conclusion

This Project will design research-based creative programs for children (of varying ages) that will be introduced into the school curriculums across the country. The Project will aim to promote environmentally friendly practices in children from an early age. There will be four programs designed; each for a specific age group and all the programs will incorporate the components: creativity, thought leadership and the learning of best practices.

Hydraulic Hybrid Vehicles

R.Sabarinath

DME-II Year

Abstract

This paper presents a hydraulic hybrid vehicle drive train to improve the fuel efficiency of a passenger car. The hydro mechanical system demonstrates excellent fuel economy potential, yet requires development work in the area of pump/motors with high efficiency at low displacement fractions. The fuel consumption of off-road machines is strongly reduced if part load operation of the engine and throttled control of the hydraulic implements are avoided. This is the aim of the _Hybrid‘: a full hybrid hydrostatic drive train and control system. The Hybrid has hydraulic accumulators for energy storage and power management, hydraulic transformers for efficient power control, and highly efficient and compact in-wheel motors. System behavior demonstrates that the new control strategy takes advantage of high power density and efficiency characteristics of hydraulic components, and minimizes disadvantages of low energy density, to achieve enhanced overall efficiency. EPA is leading the development of hydraulic hybrid vehicles. This breakthrough technology can cost-effectively reduce emissions and drastically reduce fuel consumption while maintaining or improving performance. A delivery vehicle is an excellent application for hybrid technology since its service cycles involve numerous braking events. Hydraulic hybrid technology has significant commercial potential for a wide range of medium-sized vehicles such as urban delivery trucks, shuttle/transit buses, and waste disposal vehicles. In our paper we research about hydraulic hybrid vehicle. We used compressed nitrogen to run the vehicle under economic and pollution free conditions. Hydraulic hybrid vehicles, or HHVs use a pressurized fluid power source, along with a conventional internal combustion engine (ICE), to achieve better fuel economy and reductions in harmful emissions. They capture and reuse 70% - 80% of the vehicle's braking/decelerating energy compared to 55% for electric hybrids. For trucks and buses, this can also be less expensive than electric systems, due to the price of batteries required for the latter. Hydraulic hybrid vehicle systems can also weigh less than electric systems, due to the high weight of the batteries. This can lead to a lower impact on payload capacity, especially for heavy vehicle classes.

Introduction

Global market competition, oil production forecasts, and environmental protection forces are stimulating work on significantly improved fuel economy of all classes of vehicles. In recent years, fuel consumed by trucks grows at a much faster rate than that of passenger cars. This is a consequence of increased proportion of light trucks and sport-utility vehicles, as well as a higher demand for ground transportation of goods. In case of trucks, the availability of new technologies for improved fuel economy is somewhat limited compared to passenger cars, due to the fact that heavier trucks already use very efficient diesel engines, as well as constraints on the potential for weight and air drag reduction imposed by payload

carrying requirements. Hence, advanced hybrid propulsion systems are critical to achieving future fuel economy goals for trucks. A major component of global energy consumption is transportation, which consumes 4.8 billion barrels of crude oil per year. Of the transportation industry, passenger cars consume 2 billion barrels of oil per year with a value of $100 billion. A hybrid vehicle contains two sources of power consisting of an internal combustion engine and a second power source that allows for energy storage. The energy storage is used during braking events and other drive train control strategies to minimize fuel consumption. Two auxiliary power sources have been found most practical: electric motor/generators combined with batteries and hydraulic pump/motors combined with hydraulic accumulators. Electric hybrid vehicles have been the first hybrid technology to be mass produced for the commercial passenger car market. Strength of electric hybrids is the high energy density of electric batteries, allowing for large energy storage in relatively compact and lightweight batteries. A substantial shortcoming of electric hybrids is the relatively low power density of both electric motor/generators and batteries at approximately 30-100 W/kg.

Switching the second hybrid power source to hydraulics realizes benefits in a multiple areas:

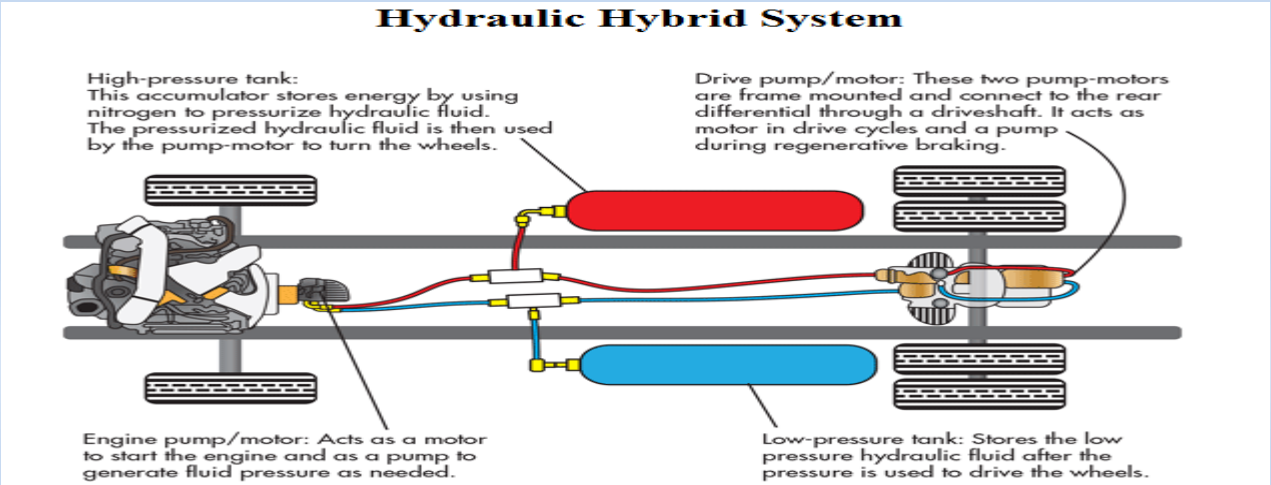
1) The power density of hydraulic pumps/motors and accumulators is very high at approximately 500-1000 W/kg.

2) Hydraulic components are inexpensive when compared with electrical components, especially advanced battery packs.

3) Certain hybrid architectures allow for independent control of the torque at each wheel, which opens numerous possibilities for vehicle dynamics control.

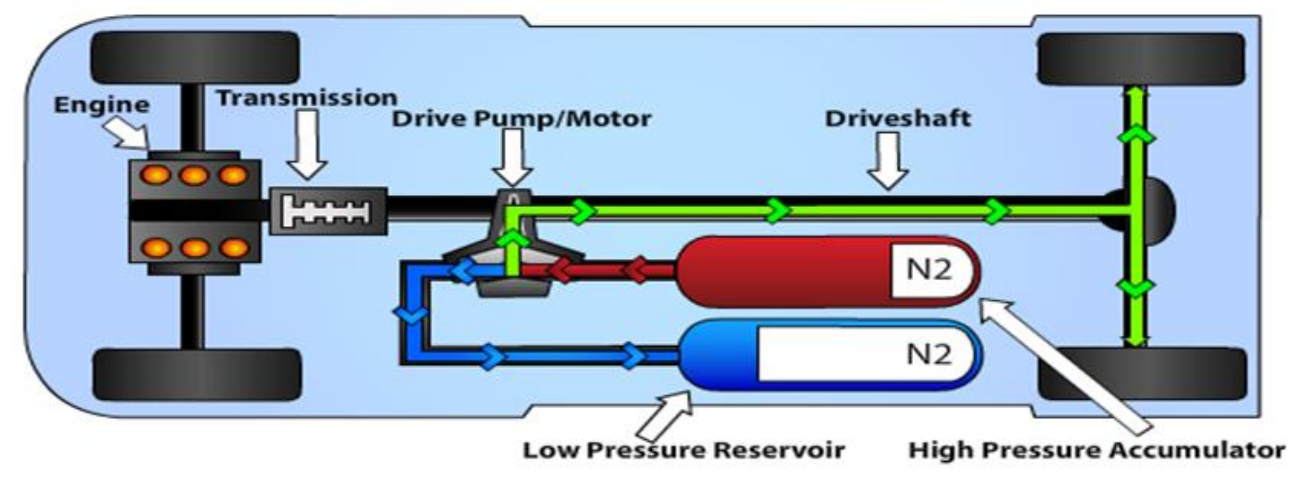
Hydraulic Hybrids consist of 3 Main Components

- Low pressure tank(reservoir)
- High pressure tank
- Pump/motor



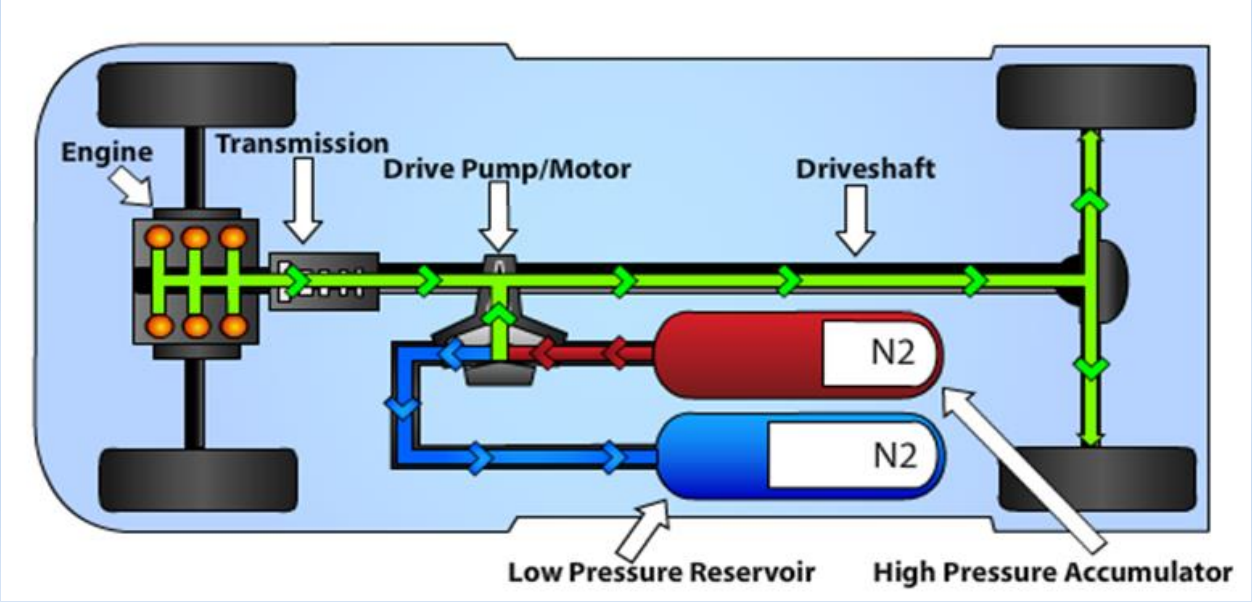
Acceleration in Hydraulic System

During acceleration high pressure fluid is transferred from the high pressure tank through the VANE and drive the driveshaft. Now low pressure fluid is routed to the low pressure tank for storage.

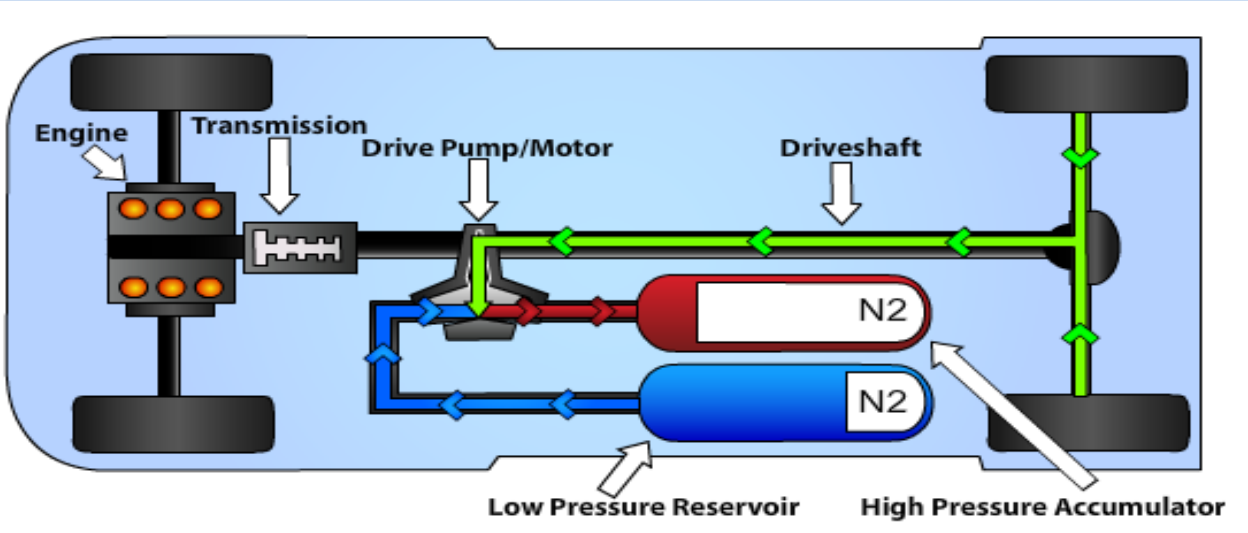


Cruising in Hybrid System

A fully electric system that combines electric propulsion with stored electricity from batteries that are topped up with solar power is an option if you just cruise for short day-trips. ... This leaves us with the various hybrid systems that combine electric and diesel power and here are several options. Once the high pressure reservoir is depleted, the engine provides power to either a pump or driveshaft.

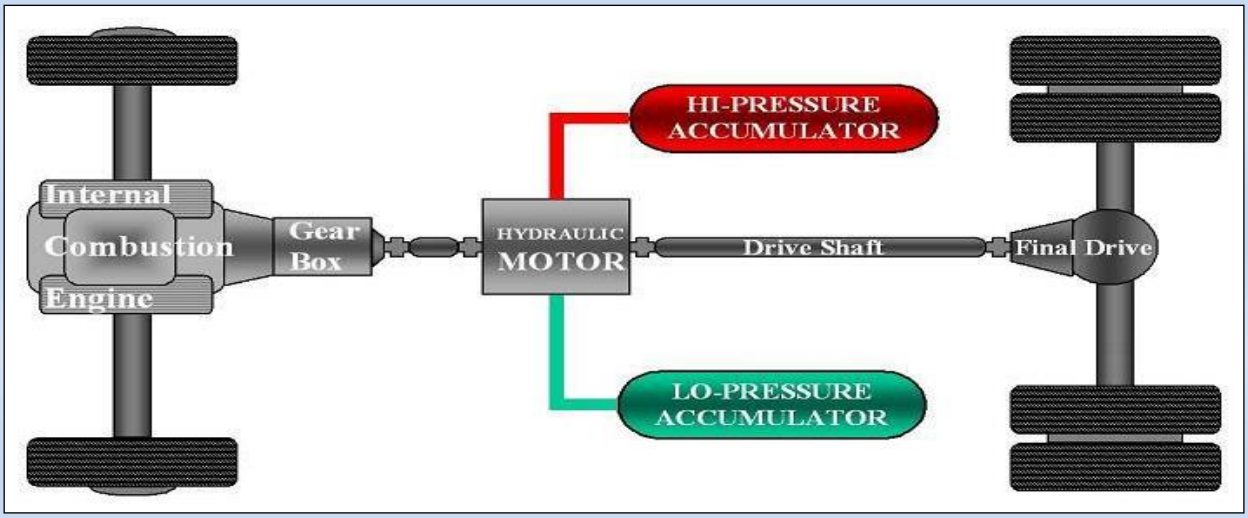


Braking in Hybrid System



During braking, fluid is pumped from the low pressure reservoir to charge the high pressure accumulator. The fluid is then stored for later use during acceleration.

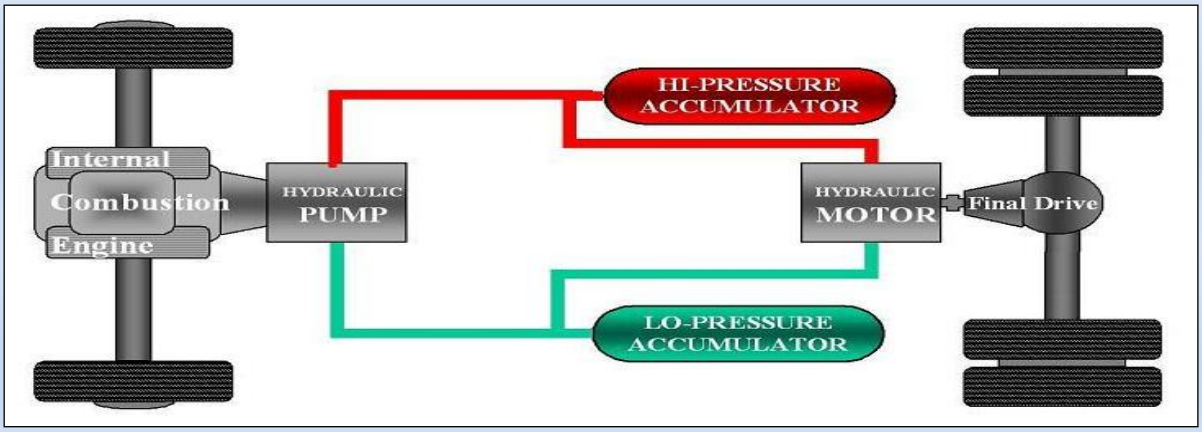
Parallel Hybrid

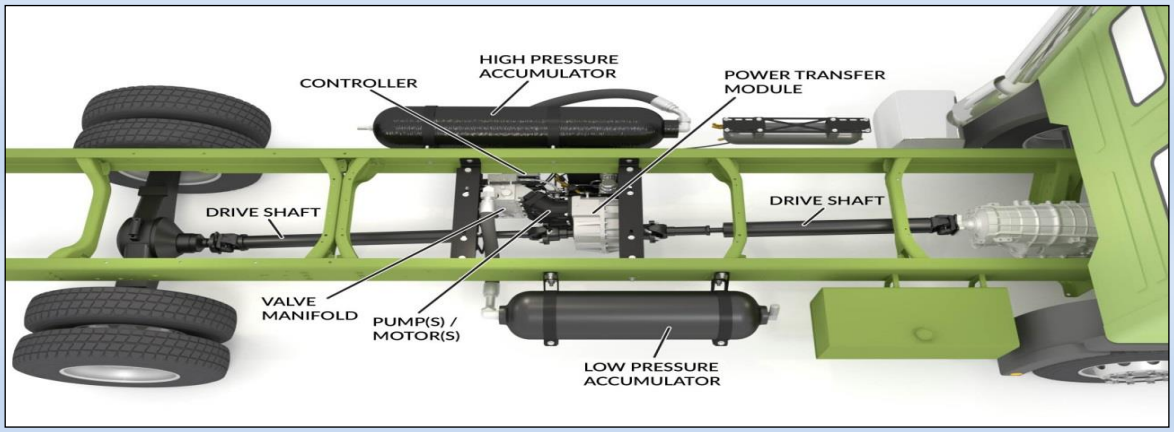


In a parallel hydraulic hybrid, the engine still has a mechanical connection through the pump to the drive wheels.

Series Hybrid

In a series hydraulic hybrid, the engine is directly connected to the hydraulic pump with no direct connection to the wheels.





Benefits of Hydraulic over Electric Hybrids

- No expensive of batteries.
- Safer for technicians to work on.
- Less electronics
- Less training.
- Lack of transmission.

Advantage of Hydraulic Hybrid Vehicle

- Compare that to mere 25% from electro –hybrid system.
- Increase the overall fuel efficiency 50%-100%
- Decrease in greenhouse emissions 30%-50%
- Very less noise pollution at low speed.
- Lower level of CO_2 emissions.
- Up-to 75% energy recovery.

Conclusion

The hybrid vehicles give very good mileage and it produces less pollution. The incoming years hybrid car will become the most common vehicle in the world. The novel innovation presented in this paper that enables independent wheel torque control needs to be exploited for advances in the control of vehicle dynamics. While a good deal of research has previously explored these types of vehicle dynamic controls, they have primarily relied on applying braking systems to certain wheels, which is inherently inefficient. Furthermore, the high torque capability of hydraulics allows a much greater torque differential between wheels, even allowing antilock braking without friction brakes. This drive train architecture has the potential to spawn completely new vehicle dynamic control. In summary, the hydro-mechanical drive train with independent wheel torque control has the potential for excellent fuel economy in a passenger vehicle operated in an urban environment. The drive train combines a highly efficient power transmission through the mechanical branch and infinite speed variation through the hydraulic branch. Through modeling it was demonstrated that the pump/motor units typically operate at low displacements, creating poor efficiency in the current generation of pump/motors. This reveals a significant research and development project to develop units that operate efficiently in this regime. Through continued development and optimization, this drive train offers an attractive alternative to curb increasing energy consumption.

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