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# MECHZINE

GET TO KNOW THE WORLD !



**A Robot You Can Relate To**



**A STUDENT INITIATIVE TECHNICAL MAGAZINE**

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**MECHZINE**  
GET TO KNOW THE WORLD !



**jibo**  
A Robot You Can Relate To



A STUDENT INITIATIVE TECHNICAL MAGAZINE

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**5 achievements by ISRO proves that the space agency had a record-breaking 2017**

**- D C Padmaja**

We might not have the best technology in the world, but we do have some of the most brilliant minds working hard to put India on the world map among the top space agencies. And the record-breaking achievements in 2017 by ISRO, is the result of those efforts and hard work.

Let's take a look at some of the achievements by ISRO in 2017:

**1. Launching 104 satellites with one rocket**

On February 15, ISRO kicked off 2017 with a historic record-breaking launch. In one of the most complicated missions in the history of Indian space exploration, India, with the help of six other nations, launched 104 satellites into space.



These satellites were launched in a single launch onboard PSLV-C37. The launch took place on the Sriharikota spaceport in Andhra Pradesh and successfully managed to put these satellites into their desired orbit in one go.

**2. South Asia Satellite (GSAT-9) launch**



The 2230 kg satellite was launched by Geosynchronous Satellite Launch Vehicle Mark-II (GSLV-F09) into its planned Geosynchronous Transfer Orbit (GTO) on May 5, 2017. This was the fourth consecutive success achieved by GSLV carrying indigenously developed Cryogenic Upper Stage. The GSLV-F09's main objective is to establish a smooth communication network amongst the South Asian nations by providing them with applications in Ku-band, which gives them a higher frequency range to communicate in.

**3. Launch of ISRO's 'Fat Boy'**

The 640-tonne Geosynchronous Satellite Launch Vehicle-Mark III (GSLV Mk III), also called 'fat boy', weights equal to 200 full-grown Asian elephants. The GSLV Mk III rocket carried a satellite weighing more than three tones into a high orbit above Earth.



**4. 31 satellites in a single flight**

On June 23, ISRO achieved this feat too. It must have been a walk in the park for ISRO to launch 31 satellites in one go after already launching 104 satellites in one rocket. The 995 kilogram rocket that comprised 31 satellites from countries like the US, UK and Germany was PSLV-C38 (Polar Satellite Launch Vehicle). The satellite is being used for monitoring roads and keeping track of water distribution.

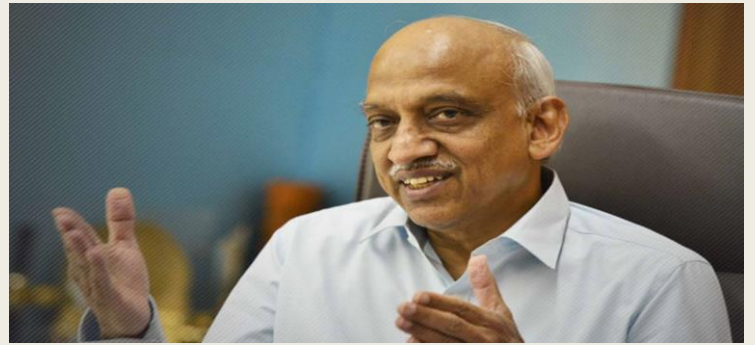


**5. Sending another communication satellite in the space by the GSAT-17**

With already 17 Indian satellites circling the planet, on July 29 ISRO launched 18th communication satellite, GSAT-17, to join the fleet. The GSAT-17 has been designed for an operational lifespan of about 15 years. The spacecraft carries equipment to aid meteorology and search and rescue operations primarily over the Indian sub-continent.



If you are thinking that 2017 was amazing for ISRO, you must note what A.S. Kiran Kumar, Chairman, ISRO said last month:



"We are planning to have at least one launch mission a month in 2018 to deploy satellites in the earth's orbit for various applications." You all ready for another record-making show by ISRO? We are!



**Trending app 2018: Playo**

There are hundreds of apps that cater to sports fanatics but none like Playo. Built by Bengaluru-based TechMash Solutions, this app takes pride in creating a community platform for sports and fitness enthusiasts. Whether you need help with meeting 'playpals' or with booking courts, joining playgroups, finding trainers, and registering for marathons – Playo has an option for everything. It boasts of an extensive category of activities - Cricket, Badminton, Football, Hockey, Swimming, Volleyball, Tennis, Table Tennis, Basketball, Rugby, Ultimate Frisbee, Kabaddi, Squash, Paddle Tennis, Yoga, Workouts, Running, Cycling, Adventure Sports, Trekking, Water Rafting and more. In addition, users can gain what this app calls "Karma points" for their activities over time, and use it to redeem against bookings



# Latest Advancements In CNC Machining Center

**-Sai Pranay Unnam**

Any CNC milling or drilling machine is referred to as a CNC machine center. These machines tend to include an automatic tool changer along with a table to clamp the workpiece. The way it works is that a tool rotates while the workpiece stays in place. Most important characteristic of this machine is the orientation.

This machine makes use of Computer Numerical Control and allows precise control over a majority of the parameters like speed, location, coordination as well as the feed rate. It is possible for a single programmer to control the machine work using a computer console on a CNC machine. This is the equivalent of multiple operators working on other machines like lathes, grinders, routers and mills. These computerized automated machines are usually more efficient as well. This article goes on to explain benefits of using this machine, how the horizontal CNC machining one is different from the vertical CNC and their applications.

## Why CNC Machining Center?

The main reason for using CNC machine is because of all the automation features. Besides that, it is faster, has a higher production rate and is highly accurate as well. These machines have good cutting quality. These machines make the process of working on complex surfaces easier.

There are many other reasons of using these machines as per this list:

- Labor safety
- Lowers chances of going wrong
- High accuracy
- Ability to monitor process
- Less need for test runs
- Greater Flexibility
- Higher cutting parameters
- Past, Present and Future of CNC Machining Center

A lathe machine has been around since the 3rd century BC in ancient Egypt. Mycenaean Greek implemented it during the 13th and 14th century BC as per various discoveries made. There is also a painting from the 3rd century of a lathe device and several artefacts from the 6th century. It was an important device during the industrial revolution and is the mother of all machine tools. Prior to the late 19th century, this machine was mechanically driven however, it has been replaced with electric motors since then. Further advancements lead to the introduction of the computerized control panel.

Precision level of these machines is expected to become better in the future. Some of the next generation technology includes a next generation computer numerical controls (CNC), advanced CNC programming, implementing CNC intelligence along with automation & 3D printing as well as virtually reality.

## How Horizontal & Vertical CNC Machining are Different?

The main difference between a vertical CNC machine and horizontal machine center is spindle structure; one has a vertical spindle and the other a horizontal. There is a difference movement pattern as well. The vertical machining center column usually does not move. Moveable ones will do so only in X and Y direction. On the other hand, the horizontal machining center is a moving column of type T. It moves along X direction, and the column of an inverted T type moves along Z direction. A vertical machine is also easier to install and operate. The debugging process is also easier. Structural complexity of the horizontal one is higher, and production capacity is lower.



## Industrial Application of CNC Horizontal Machining Centre

□ A Horizontal Machining Centre is best suited for heavy duty and high-speed machining as well as when machining is necessary on multiple sides. It is useful for big and small parts and applicable in a high or low production environment. It is useful for both low as well as high volume production requirements.

## Industrial Application of CNC Vertical Machining Centre

□ Vertical machining centre is useful for die sinking. VMCs are known for milling and have several applications in many industries include the oil industry. There are many advancements in CNC machine tools and thus are useful in a greater number of applications.

# WHY GATE.....?!!

## Importance of GATE Exam

Why GATE Exam is Important



### WHY GATE EXAM IS IMPORTANT ?

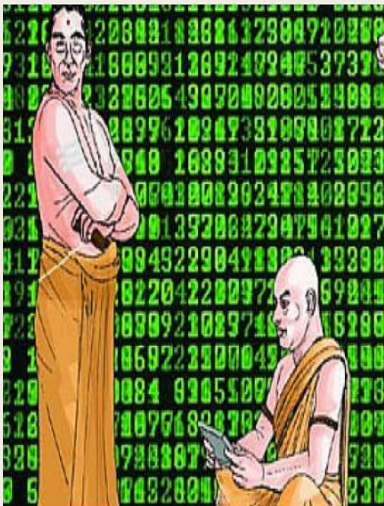
<b>M.TECH</b>	Average 40-45% Hike in Annual Salary with better position in companies or R&D Firms
More than 45 Public Sector Undertaking Firms or PSUs Hire GATE Candidates	<b>PSU JOBS</b>
<b>LECTURERSHIP</b>	Join Any Reputed Educational Institute as faculty
Join any Central or State Research Lab as Junior or Senior Research Fellow	<b>RESEARCH</b>
<b>EXPERTISE</b>	To Be Subject Matter Expert, Gain More Knowledge, Technical Value Addition

## LYNQ: A Compass That Points to Family and Friends

Who hasn't worried about getting separated from friends at a crowded event or losing track of a loved one on a family vacation? LynQ, a new location tracker, offers a fix. Using a combination of GPS technology and long-range radio frequencies, LynQs can find other LynQs up to three miles away; an onscreen dot then points each user in the right direction, like a compass. As a bonus, parents or pet owners can also set up "safe zones" to be alerted when a wandering child or animal leaves a given area. Unlike smartphones, LynQ doesn't require a cell signal or monthly subscription, and it's easier for kids to use than full GPS handsets.



### Chakravala method of algorithms - Brahmagupta



The chakravala method is a cyclic algorithm to solve indeterminate quadratic equations, including the Pell's equation. This method for obtaining integer solutions was developed by Brahmagupta, one of the well known mathematicians of the 7th century CE. Another mathematician, Jayadeva, later generalized this method for a wider range of equations, which was further refined by Bhāskara II, in his Bijaganita treatise.

## Guide to your world of robotics: HANDLE !

**HANDLE** is a mobile robot for moving boxes in the warehouse. Handle's small footprint, long reach, and vision system enable it to unload trucks, build pallets, and move boxes throughout your facility.

**TECHNOLOGY: AUTONOMOUS**

Handle utilizes deep-learning vision software to identify and locate boxes. It unloads trucks, palletizes, and de palletizes at the push of a button.

**FLEXIBILITY:**

Handle does multiple jobs with one robot. It's designed to reach boxes high and low with the ability to fold into a compact form to move throughout your facility, or to another warehouse altogether.

**MOBILITY:**

Handle's mobility enables it to operate in multiple work cells, moving through facilities along with the flow of goods.



**APPLICATIONS:**

**Truck Unloading**

Handle unloads boxes to a conveyor to simplify truck and shipping container unloading.

**Order Building**

Handle navigates distribution center aisles, picking from multiple inventory locations to build mixed-SKU pallets.

**Palletizing**

Handle moves boxes from conveyor to pallet and can service multiple manufacturing lines



**PERCEPTION:** 3D + 2D

**PICK RATE:** Up to 360 boxes/hr

**PLATFORM:** Wheeled

**SPEED:** 4 m/s

**POWER:** Battery

**REACH:** 3 m

**CAPACITY:** 15 kg

## Minimum Quantity Lubrication: Benefits and Challenges

- D.Kondala Rao, Assistant Professor



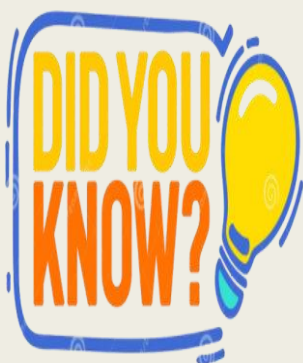
MQL technologies have demonstrated in high volume automotive powertrain manufacturing to reduce the operation costs, energy, and waste compared with the traditional flood cooling, and also result in capital and operational cost reductions. MQL as a result is seeing increasing adoption in the automotive powertrain machining and in airframe and other large structural applications. This article provides a summary of MQL on various topics based on both industrial and academic experience, aimed at providing an integrated and practical knowledge. MQL implementation involves the multiple facets including machine tools, cutting tools, delivery systems, and optimized parameters. As this implied, the development requires the joint efforts from machine tool makers, tool designers, MQL system developer, and also the end users (manufacturers and engineers).

Despite a successful history of MQL, the understanding of many concepts is still at the stage of hypothesis, particularly at the microscale lubrication mechanism. The future research direction is encouraged to tie fluid mechanics to machining mechanics and enable a systematic development as opposed to individual MQL components. Full usage of MQL will significantly impact the global-manufacturing industry. The ultimate goal is to create a clean, sustainable, and high-efficient production environment.

### OVERVIEW

MQL is a micro lubrication technique that facilitates near-dry machining. It eliminates large quantities of water and mineral oil-based cutting fluids and replaces them with a small quantity of environment-friendly lubricant (mostly vegetable oils) mixed with air. In MQL-assisted machining, a small

amount (10–250 mL/h) of cutting fluid is introduced to the chip-tool interface region along with compressed air, which acts as the carrier medium, as a replacement for several liters per hour of conventional coolant. Supplying a small amount of cutting fluid is less expensive and consumes less power and thus reduces the cost. The main benefit of MQL is that it primarily focuses on improving the frictional behavior therefore controlling the heat generation at its source rather than just trying to remove as much heat as possible such as conventional cooling does. This results in improved tool life and good workpiece surface integrity. The chips generated during MQL machining are nearly dry and are easy to recycle. The cutting performance and the overall quality of the parts manufactured by utilizing MQL therefore depends on optimizing the appropriate process parameters including the type and flow rate of the lubricant and the nozzle position and pressure. The multi performance ability of MQL machining such as heat management, cutting interface lubrication, environment-friendliness, and energy efficiency are the primary motivation for its



- ✓ *IIT-Roorkee is the first engineering college to be born on the Indian Soil.*
- ✓ *India produces 25% of the world's engineers.*
- ✓ *There are 10396 colleges offering engineering education in India.*
- ✓ *Based on the ranking, IIT Kharagpur is considered the best engineering college in India.*
- ✓ *Petroleum Engineering is the branch that attracts the highest salaries in the world and in India.*



**MLQ with Oil**

MLQ is designed to eliminate some of the disadvantages associated with conventional fluid delivery. Some preliminary results show that applying 4 ml/min ester oil as compared with 11 l/min of mineral oil when grinding 16MnCr5 material with micro-crystalline aluminium oxide reduced normal and tangential forces. The disadvantage was that grinding wheel wear and roughness were increased (Brunner, 1998). Brinksmeier concluded that MLQ is only suitable for fine grinding because of reduced cooling and lubrication. MLQ is best suited to free-cutting hardened steel rather than soft steel and other long-chipping materials that increase the tendency to wheel loading and clogging.

However, despite the opportunities and benefits MLQ machining can offer, there are still challenges to overcome and some key considerations in implementation:

- MLQ does not have comparable chip evacuation abilities to those of wet machining.
- MLQ is still not well suited for deep-hole drilling, energy-intensive processes such as grinding, special operations like honing and small-hole drilling, or for difficult-to-machine materials such as titanium and nickel-based alloys.
- MLQ still produces a very fine mist, which can be more difficult to filter.
- MLQ implementation may require changes to the machine tool and processing strategy.

Despite these challenges, Optis says MLQ provides a cleaner, greener alternative to classic fluid supply, on which could take manufacturers forward in embracing sustainability initiatives and

implementing “Factory of the Future” capabilities. However, industry uptake has been relatively low so far. This reticence may be due to how counterintuitive it seems that using less fluid will yield the same cooling and lubricating properties as traditional flood or high-pressure systems. The fluid itself must be carefully selected based on the material that’s being cut, and its application must be carefully considered based on tooling , type of operation, cutting parameters and machine tool being used, the company says.



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- ElectricIQ

**ME MechMantra**

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- Quiz
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- Paper Presentation
- Engnex
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- Navekaran

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- Literary

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Wow !

# Inventions That Changed the World



**COMPASS:** This modern invention may have originally been created for spiritual purposes. Later it was adapted for navigational purposes. The earliest compasses were most likely invented by the Chinese, around 200 BC. Some were made of lodestone, which is a naturally-occurring form of the mineral magnetite. There is also evidence that other civilizations may have also used lodestone. At some point, possibly around 1050 CE, people began suspending the lodestones so they could move freely, and using them for navigation. A description of a magnetized needle and its use among sailors occurs in a European book written in 1190, so by that time, it is likely that the use of a needle as a compass was commonplace.



**AUTOMOBILE:** Although the birth of the modern car is often said to have occurred in 1886, when German inventor Karl Benz patented his Benz Patent-Motorwagen, automobiles had been in the works since 1769, when Nicolas-Joseph Cugno developed the steam-powered automobile capable of human transportation. Over the years, a huge number of people contributed to the development of the automobile and its constituent parts. In the early 20th century, Henry Ford innovated mass-production techniques that allowed automobiles to become affordable to the masses. These techniques then became standard with General Motors, and Chrysler following suit. The history of the automobile really reflects a worldwide evolution. The work of many people was required in order to develop the internal combustion engine and the other systems the automobile relies on. Dozens of spin-off industries were also involved, including oil and steel

**Airplane:** On December 17, 1903, Wilbur and Orville Wright achieved the first powered, sustained, and controlled flight. While flying machines had been dreamt up since Leonardo da Vinci's time, and likely long before, and thanks to the work of countless inventors over several centuries, the Wright Brothers became the first people to achieve controlled, powered flight. Beginning with their work on gliders, the duo's success laid the foundation for modern aeronautical engineering by demonstrating what was possible.

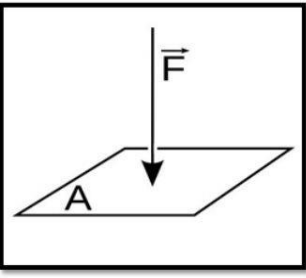
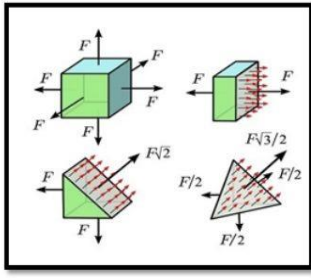


# Fun Zone

What's the difference between pressure and stress ?

One of the very important characteristics of a student is to question. Let the students ask questions

Difference between Stress and Pressure

Pressure	Stress
	
Pressure represent intensity of external forces acting at a point	Stress represent intensity of internal resisting forces develop at a point
Pressure is always acts normal to the surface	Stress may also act either normal or parallel to the surface
Magnitude of pressure at a point in all direction remain same	Magnitude of stress at a point in all the direction are unequal
Pressure can be measure by using measuring device. like pressure gauge	Stress can't be measure directly by using any device.














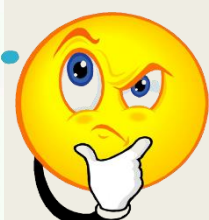
## MATH TRICK

- Step 1: Think of any number
- Step 2: Multiply that number by 3
- Step 3: Add 45 with the result
- Step 4: Double the result
- Step 5: Divide the result by 6
- Step 6: Take away the number you originally thought of in step 1 from the result in step 5.

And the answer is ....



 +  +  = 30  
 +  +  = 18  
 -  = 2  
 +  -  = ?

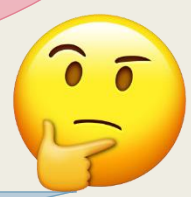


## SOLVE SUDOKU

			3					1
	2			4	9	5		
					2		3	
	9	6				3		
5		4				6		
	1		9					8
2			6		7			
4			1	9				5
		5						

There are two girls: one is facing the South, the other faces North. Yet they can see each other without mirrors. How can it be?

ANS: They are facing each other





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