

A Report

On

“Industrial Visit –AMIN EQUIPMENTS JCB ”

For the Students of Automobile Engineering Department. (Semester – IV)

From: 4th April to 6th April 2018.

- **Objective:** “Special Purpose Vehicles technology related to the basics of Automobile Engines subject in Sem IV.”
- **Venue:** “Amin Equipments JCB, Markarba, Sarkhej, Ahmedabad”
- **Number of Students:** 78 (IV semester, Automobile Engineering)
- **Head of the Department:** Ms. Prexa H. Parikh
- **Faculty Coordinator’s:**
 1. Mr. Abrarkhan M. Pathan (Asst. Prof. Mechanical Engg. Dept.)
 2. Mr. Vivek Y. Parikh (Asst. Prof. Mechanical Engg. Dept.)

1. OVERVIEW:-

JOSEPH CYRIL BAMFORD (JCB)

J.C. Bamford Excavators Limited, universally known as JCB, is an English multinational corporation, with headquarters in Rocester, Staffordshire, manufacturing equipment for construction, agriculture, waste handling and demolition. It produces over 300 types of machines, including diggers (backhoes), excavators, tractors and diesel engines. It has 22 factories across Asia, Europe, North America, and South America; its products are sold in over 150 countries.

JCB was founded in 1945 by Joseph Cyril Bamford, after whom it is named; it continues to be owned by the Bamford family. In the UK, India, and Ireland, the word "JCB" is often used colloquially as a generic description for mechanical diggers and excavators and now appears in the Oxford English Dictionary, although it is still held as a trademark.

Production of the first engine designed and manufactured by JCB, the JCB444 diesel engine, started in 2004. In 2005, for the first time in nearly forty years, JCB bought a company, purchasing the German equipment firm Vibromax. In the same year, the firm opened a new factory in Pudong, China. By 2006, the firm had 4000 employees, twice what it had in 1975.

During that year, JCB announced plans to make India its largest manufacturing hub. Its factory at Ballabgarh in Haryana, was to become the world's largest backhoe loader manufacturing facility.

JCB has 18 factories in the UK, Germany, North and South America, Australia, India, China, and CIS. The company employs some 12,000 people on four continents and sells its products in 150 countries through 1500 dealer depot locations. The company has a range of more than 300 products.

JCB is headquartered in Rocester, United Kingdom, which is also the production site for backhoe loaders and telescopic 'Loadall' handlers. It has a further three factories in nearby Cheadle, Staffordshire (JCB Earthmovers, JCB Landpower and JCB Compact Products), one in Rugeley (JCB Cab Systems), three in Uttoxeter (JCB Attachments, JCB Heavy Products and

JCB World Parts Centre), one in Foston in Derbyshire (JCB Power Systems) and one in Wrexham in North Wales (JCB Drivetrain Systems). In July 2013 the company opened a dedicated logistics hub in Newcastle-Under-Lyme. This facility is the central hub for component distribution to production facilities, as distinct from the World Parts Centre in Uttoxeter which distributes spare parts to dealers and customers.

In December 2013 it was announced that the Rugeley Cab Systems plant would move to a new facility in Uttoxeter which would allow the in-sourcing of cab assembly currently contracted to third parties. This investment is to be accompanied by the expansion of the Rocester and Cheadle production sites by 2018.

Its Indian factories are based in Faridabad (Haryana), Jaipur and Pune, its US factory is in Pooler, Georgia, its Brazilian factory in Sorocaba, and its Chinese factory was completed in 2005 in Pudong near Shanghai. JCB also owns Vibromax, a German compaction equipment company based in Gatersleben.

JCB has also licensed its name and image to a line of consumer power tools, manufactured by Alba PLC.

The products are sold through franchised dealerships, many of which are often exclusive and cover whole countries.

JCB dominates the Indian construction equipment market with every three out of every four construction equipments sold in India being a JCB. JCB India's revenue rose more than 12 times to \$1 billion in 2012–13 from \$75 million in 2001. The Indian operations of the UK company account for 17.5% of its total revenue.

2. ORGANIZATIONAL STRUCTURE OF THE VISIT:-

The number of students who attended the visited Amin Equipments JCB is 78 accompanied by 3 faculties. On the day of visit, the students and the faculty reached the venue at 2:15 pm. The students as well as faculty travelled by their own vehicle and reach the place accordingly on time. A brief overview of JCB was given by Mr. Amar Contractor, Mr. Sagar Choksi and Mr. Hardik Shah to the students and their attendance was taken.

VISIT. AMIN EQUIPMENTS JCB

The visit was started at Amin Equipments JCB around 2:30 pm. The number of students was divided in batch of 30 and visit was done on three consecutive days of Automobile branch.

Visit was initiated with brief introduction of different departments. After meeting General Manager, he introduced floor incharge Mr. Colonel (Ex. Army officer) to us who was expert in JCB. He explained about different models of JCB Backhoe available at Amin Equipments like 2DX, 3DX and 4DX. The engine capacity of 3DX was told to us as 92 hp, Turbo Charged, water cooled JCB engine ecoMAX for better performance in hot and dusty working conditions.

Mr. Colonel then explains about different components of engine like piston, piston rings, connecting rod, cylinder used in JCB.



Then Mr. Colonel explained about the overall structure of JCB its engine capacity, lifting load capacity, different types of bucket available. Students were then shown different parts of JCB along with different attachment.

Then about the **engine** he explained that, in a typical backhoe loader, the tractor, loader and backhoe are all powered by a diesel engine. The engine has a 4-cylinder, 4-stroke, direct-injection design. It also features a dry-type, radial-seal two-stage air filter and a thermal starting aid that allows the engine to start up even at -20 degrees Fahrenheit (-29 C). The basic model is naturally aspirated, but some backhoes have a turbocharged design.

He then explain about the **transmission** - To apply the engine power to the tractor and the backhoe and loader hydraulic systems, you need a transmission. It lets the operator switch between gears, go forward or in reverse and use engine power efficiently. Backhoe loaders come with either automatic or manual transmissions. The power-shuttle transmission below provides four speeds, as well as forward and backward. It has forward and reverse hydraulically shifted shuttle clutches, which let the operator change direction and travel speed on the go. It also has a torque converter that enables maximum power efficiency.

Students were explained about the **Axles** - The wheels in a backhoe loader are turned by axles. The Caterpillar standard rear axle shown below has a special enclosed design that protects it from the elements. Backhoes use hydraulically-actuated, self-adjusting disc brakes to stop the tractor. They have a separate parking brake that the operator applies with a hand lever.

Then he explains about the **tractor**, the core structure of a backhoe loader is the tractor. It has a powerful, turbocharged diesel engine, large, rugged tires and a cab with basic steering controls (a steering wheel, brakes, etc.). Backhoe cabs are either completely enclosed or have an open canopy structure to give the operator protection.

Mr. Colonel then explained students about the **loader**. It is attached in the front and the backhoe is attached in the back. These two components serve very different functions. The loader can do several different things. In many applications, you use it like a big, powerful dustpan or coffee scoop.

Basically, the backhoe is a big, extremely powerful version of your arm or finger. It has three segments: **The boom, the stick and the bucket**



One of the employee explained about the steering mechanism, hydraulic transmission system like fluid couplings, brakes etc and different attachment related to JCB.

He explained about that the backhoe segments are connected by three joints, comparable to your wrist, elbow and shoulder. The backhoe moves in pretty much the same way as your arm.

Mr. Colonel then explained about the **Stabilizer Legs** and **Hydraulic multiplication**

Because the second piston has a larger diameter than the first piston, the second piston moves a shorter distance but pushes up with greater force. The basic concept at work is a trade between distance and force. The work you do in pressing down on the piston on the left has two components -- the amount of force you apply and how far you push the piston.

At the end of the visit he solved many queries of the end.

And to the surprise of the student at Amin Equipments JCB, they have arrange a Short Exam to determine what students have learned during visit and to identify that students were paying their full attention.

Some glimpses of JCB are as under –





CONCLUSION

The visit ended at 4:00 pm, the faculties and students return their home. The overall response of the students was positive – below are listed feedbacks of few of the students

1. Many of their concepts of Automobile Engines were cleared during visit.
2. Practical exposure was very good.
3. Seen new technology apart from our syllabus.
4. Excellent!!!! Explanation was awesome.
5. Special Purpose Vehicles like JCB was very interesting.

ACKNOWLEDGEMENT

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