Students' Placement Office

Students' Placement Office, IIT Kanpur

Project Verification Form

Title of the Project	Internship Training
Commencement Date	10th MAY 2018
Completion Date	10th JULY 2018
Project Supervisor	Mr. Santhosh Kumar U
Organization/Institution where the Project was accomplished	ETA TECHNOLOGY PVT. LTD. - BANGALORE

Project Description (You can use extra A4 sheets in case you run out of space however the extra sheets should also have the seal & signature of the Project Supervisor or the relevant authority)

Design of a hydrostatic bearing which can withstand a radial force of over 6 ton. Initial study was conducted. Read technical documents on design of hydrostatic bearing.

Designed various components such as Conveyor Belts for picking up the jobs in a desired way, Runout checking mechanism, Grooving mechanism, Spindle, Belt Drive, etc. for the Friction Welding Machine.

Did failure analysis of a chamfering tool which was broken. Involved in fixing the tool, so that it can chamfer valve stem edge.

Conducted Study on setting and optimizing parameters (Temperature, Stroke, Velocity, Force) on a metal gathering machine to get a desired profile for the valves.

Visited 2 more companies IPA and DUCOM and learnt the manufacturing of Load Cells and about tribometry.

By appending your signatures to this form you acknowledge and agree that:

- This form along with the certificate would serve as the official document between the project supervisor and Students Placement Office, IIT Kanpur regarding verification of the student's project work
- The student will provide additional information and documentation relevant to his/her project upon request by the Students' Placement Office
- The student has clearly defined his/her individual role in projects done in cooperation with other students, faculty, groups or company personnel.
- Incorrectly over-stating the reach, impact and/or quantitative/qualitative results of a project is unethical.
- In case of violation of any of the above rules, Students' Placement Office, IIT Kanpur reserves the right to take necessary action including de-registering the student from the placement season and reporting the misconduct to the Institute Authorities.

Submitted by:-	**Project Supervisor Details:-**
Name: Tarun Sharma	Name: Mr. Santhosh Kumar U
Roll No: 150764	Designation: Director
Signature:	Signature: ETA TECHNOLOGY PVT. LTD. BANGALORE-58

Hydrostatic Bearing

- Calculated the pressure drops, orifice sizes and used 32 cst oil for the bearing.
- Can withstand a radial force of more than 60000 kgf.
- Provides an almost zero resistance in axial direction to the shafts (can be pushed just by your finger!!!)
- Used lathe, drill, CMM, VMC machines for manufacturing of various parts of the bearing.
- Used in Friction Welding Machine, Electro Hydraulic Servo Actuator, Central Grinding Machine.
- Has a huge stiffness due to which can be used for grinding up to the accuracy of 20 microns (further improvements are still possible).
- Used in the place of ball bearings which were either way too expensive or were unable to withstand such a large radial load.

Four Square Test Rig

- Designed to simulate realistic loading and articulation conditions to test the performance and endurance of test elements, they have been designed for.
- Capable of testing four components parallelly.
- Devised for testing the transmission elements.
- Used power recirculation and only a single loading/torqueing actuator thereby consuming very less power.

Friction Welding Machine

- Designed various components such as Conveyor Belts for picking up the jobs in a desired way, Runout checking mechanism, Grooving mechanism, Spindle, Belt Drive, etc.
- Used four bar mechanism to design safety doors for the machine.
- Deployed Solidworks and Autocad for designing various components.

Electro Hydro Static Actuator

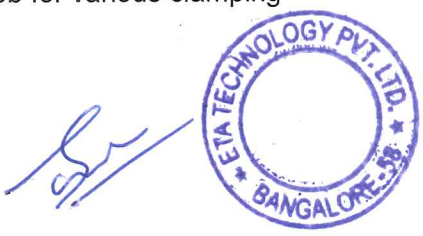
- Compact actuator for excitation
- No power pack, reservoir, filter, servo valve.
- Oil quantity reduced from 250 ltrs. to just 2 ltrs.
- Improved power efficiency.
- Heat and noise reduced considerably.
- Used as actuators with Position and Force Control, in Moulding Machines, Hexapods/ Motion Simulators, Friction Welders.

Chamfering Tool

- Did failure analysis of the tool which was broken.
- Replaced the triangular insert with a square insert.
- Maintained a rake angle of -5 degree and flank angle of 5 degrees.
- Used two inserts instead of one for touching the job at diametrically opposite ends.

Electrical Upsetting and Metal Gathering Machine

- Learnt the process of electrical upsetting and how engine valves are made.
- Optimized the parameters (Temperature, Stroke, Velocity, Force) to get a desired profile for the valves.
- Learnt to operate the machine and checked the profile of the job for various clamping distances.



Industrial Visits

- **IPA** (are into making customized **load cells**). Got to learn about load cells and how they function and the various designs of the load cells, one of which was a binocular type load cell. They used cornering to get the same load with an accuracy of 1% irrespective of where you place the load on the platform.
- **DUCOM** (are into **tribology**). DUCOM makes test instruments for evaluation of all types of mechanical and tribological properties of materials and are the leading supplier of tribometers to industry and academia for wear, friction and lubrication studies for research and quality assessment. We learnt a great deal from this company about the failure in turbines and various other parts.

Summers ‘18 at ETA Technologies

ETA technologies is a small manufacturing company located in Peenya, Bengaluru. And believe me, the word “small” stands only for the number of employees. The company, despite of its limited resources and low number of employees, does a mind-boggling R&D and has worked in a variety of areas. The company is a global supplier of machines to a wide spectrum of Industries- IC Engine Valves, Axle Housings, Bimetal cable lugs, Hydraulic cylinders, Pumps, Propeller shafts, Drills, Flow meters, Hose pipes, X-ray tubes, Dry cells, Steering gears, Steering columns, Ball joints, Space frames etc. ETA also manufactures a wide range of Hi-tech special purpose machines, Assembly machines and Test rigs for auto components.

I, along with 4 of my batchmates, was fortunate enough to get a chance to work in the R&D wing of the company. We would like to give our sincere regards to Prof. Mohit Law from whom we got to know about this company. This company is a very remarkable place for youngsters who are very serious about their careers and have a deep passion in engineering. Bengaluru, with its awesome weather for a smooth and relaxing work environment, acts as a plus point for the company.

We learnt many things, not only academics but also variety of other things, during this short stay of two months. Though the intern was in the R&D department, but we worked on almost every aspect of the project which involved design, manufacturing, assembly, etc. As listing down everything is not possible so the major projects which I worked upon are listed below.

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Apart from the projects, we were also taken to visit some nearby companies who were themselves doing marvelous engineering. We went to IPA who were into making customized **load cells** and got to learn about load cells and how they function and the various designs of the load cells, one of which was a binocular type load cell. They used cornering to get the same load with an accuracy of 1% irrespective of where you place the load on the platform. So, we learnt greatly from them. Another such visit was to DUCOM who are into **tribology**. DUCOM makes test instruments for evaluation of all types of mechanical and tribological properties of materials and are the leading supplier of tribometers to industry and academia for wear, friction and lubrication studies for research and quality assessment. We learnt a great deal from this company about the failure in turbines and various other parts.

I would like to acknowledge Mr. Santhosh and Mr. Harendra, Directors of ETA Technologies who helped us in the smooth flow of the internship. Last but not the least would like to give a huge huge thanks to Mr. Nair, Chairman of ETA Technologies who spent a great deal of his precious time with us and taught a variety of things which I will, most probably, remember for a lifetime.