Industrial Visit

Department of ECE arranged an “Industrial Visit to SHAR” on 24-10-18 for IV ECE students.

The following is the report on the industrial visit to the SDSC, SHAR (Satish Dhawan Space Centre, Sriharikota Range), on the 24-10-18. There were a total of 47 students, 4 Staff members.

The journey commenced at around 6.15 am from NEC, Nellore. There were three buses and the students were seated comfortably. The bus stopped at Shriharikota Gate around 8.00 for breakfast. We reached SDSC SHAR at around 9.10 am and after several security checks and administrative formalities, we were taken to a central building. In this place, we were shown a video – ‘Gateway to Space’ - on the ISRO, its history, and the current facilities available. After the video, questions were fielded to the official, and they were answered with ease

After another round of security checks, we were taken to the Mission Control centre. We were seated in the visitor’s box where the VVIPs are seated during launches.

Here, we were told about the history and geographical features of SHAR. The SHAR was renamed SDSC after former ISRO chairman Prof. Satish Dhawan on the 5thof September, 2002. The range is about 175 sq. km in area and has a coastline of 60km.

LAUNCH PAD II

This is the location that we see every time a launch is broadcast on television. The rocket is assembled and brought to the launch pad. The rocket is electrically insulated from lightning by 4 lightning protection towers. These towers also house high resolution cameras at several levels to monitor the various stages of the rocket. These cameras are protected by concrete enclosures. The launch pad itself is about 70m high. This means that the protection towers are even taller. An anchor is present to hold the rocket in place until the time of blast off. Separate pipes are present to deliver cryogenic fuels, which are supplied at (-) 180 degrees Celsius. Finally, there are exhaust deflection ducts which deflect the exhaust gases through underground tunnels to a place which is a few tens of metres away. In case the flame returns to the rocket, balance will be lost and the rocket may topple. The tunnels are filled with water to reduce pressure and temperature. Also, cryogenic fuel tanks are available in separate towers. Each floor in the launch pad is 4m high. This launch pad is called ‘umbilical’ due to the presence of the pipes which feed fuel to the rocket.

LAUNCH PAD I

Unlike the ‘umbilical’ type, this is a pedestal type. The whole tower moves away from the rocket just before the blast off. As a particular ‘fuel regulation’ process was taking place at the time, entry was denied.

ASSEMBLY AND STATIC TEST AND EVALUATION COMPLEX

This was the last location visited in the range. Two buildings constitute the complex - the assembly building and the test buildings which are placed adjacent to each other. Motors which are in excess of 2m dia are present and they are fabricated in Mumbai.

Several tests are done on a launch vehicle, such as vibration test, centrifugal test, and static test. Of these, only the static test is done in SHAR. There are two kinds of static tests - ballistic test and the other is to optimize insulation. After assembly, the motors are tilted horizontally and they are integrated to floating members. The floating members are in turn connected to fixed members. The floating members are made to undergo thrust from the motors and the strain is determined from them. From a calibration curve, the strain is converted to thrust and the motor is characterized. Flexible nozzles of the strap on motors are also tested on this test bed.

The overall experience was enthralling and inspiring. It helped us appreciate the complex working and tireless effort of the scientists who work to make each launch a success. The inspiration derived was well worth the time spent.


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