



Prediction of Stresses in the Vicinity of Holes in the Launch Pedestal

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Abstract

The Launch Pedestal, which was built for launching PSLV rocket is also being used for launching the GSLV rocket. The rocket is supported by the Launch Pedestal till lift-off. The Launch Pedestal is a steel structure of size 10 m x 10 m in plan and is 7.627 m high. It has got four legs of 2 m height, fixed to the foundation; it is made up of a box girder of 3 m depth and the working platform is at 5 m level; a central tapered annular ring of 2.8 m inner diameter and 3.2 m outer diameter and 2.267 m height is welded over the working platform. On the top of this ring, the rocket is supported.

The PSLV is supported at eight locations using support blocks on the top of Launch Pedestal. The GSLV is supported on twelve locations using support blocks. The locations of support blocks of GSLV are different from that of PSLV, and hence provision is made to fix altogether twenty support blocks on the top of the Launch Pedestal. Each support block has got at least six holes while some of the support blocks have more than six holes. In addition to this, there are holes drilled for fixing the heat resistant refractory cement etc. to protect the Launch Pedestal from the severe thermal conditions during launch. In all, more than 200 of holes of size 10 mm and above are drilled on the 30 mm thick top plate of the Launch Pedestal. On this plate, either the 2800 kN weight of PSLV or 4100 kN of GSLV is transferred depending on the launch.

The Launch Pedestal is analysed and designed for the above loads initially without considering holes. Since the number of holes drilled are more, there was a need to assess the stresses around the holes. To predict the stresses in the vicinity of holes Finite Element Analysis of the top plate was carried out with and without holes and the results are presented.