

ATLAS Tile Calorimeter Support Structure

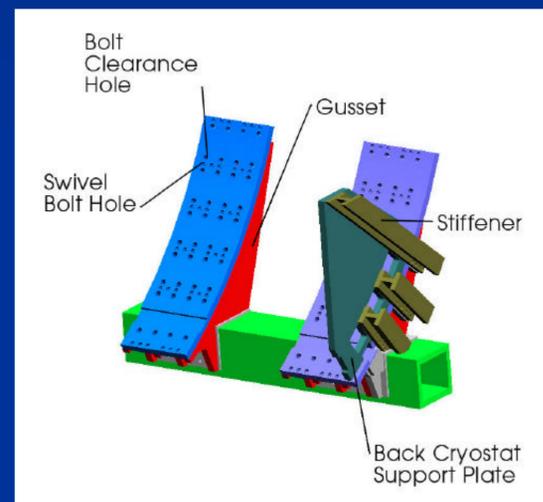
High Energy Physics Division, Argonne National Laboratory



Argonne's High Energy Physics Division is collaborating on the LHC ATLAS experiment and was responsible for construction of a large fraction of the Extended Barrel Tile Hadron Calorimeter. HEPD is making a unique contribution to the experiment in terms of providing engineering design and analysis of much of the support structure of the calorimeter; the "saddles" on which the cylinders rest and the link plates which connect modules together. The resulting structure is entirely self-supporting.



A full pre-assembly of each cylinder will be carried out prior to final assembly in the ATLAS cavern. The first of these is shown here. The assembled cylinder is itself over 8m high, weighs 640 tons and sits on 2 pairs of blocks below each of the saddle beams.



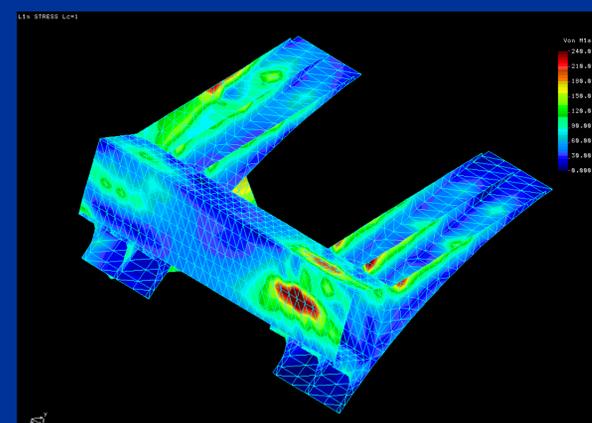
This schematic shows the main elements of the saddle. One pair of these is used to support each Extended Barrel cylinder, which is approximately 2.7m in length and 2 pairs of saddles are used to support the Barrel cylinder, which is 6m in length.



33mm diameter pins in the connecting plates between modules carry the tension load below the saddles which resists the moment from the modules above the saddles



Modules in the region of the saddles simply rest on swivel bolts which are mounted in the holes shown.



Finite element analysis calculations were made for all connections in the structure. This figure shows the stress concentration in the saddles themselves. The stress concentration seen at the bottom of the beam results from the local load of the endcap calorimeter, which is itself supported from the tile calorimeter.



A special module for which the connecting plate is a single piece has a key which sits in the slots shown in the saddle. The key carries the vertical shear load in the cylinder which is transferred through the saddle to the ATLAS support rails.

FURTHER INFORMATION: Argonne ATLAS Projects: gate.hep.anl.gov/lprice/atlas/atlas.htm
ATLAS Experiment: atlas.web.cern.ch/Atlas/Welcome.html

TileCal COLLABORATORS

Argonne National Laboratory plus institutions from Armenia, Brazil, Belarus, Czech Republic, France, Greece, Italy, Portugal, Romania, Russia, Spain, Sweden, Slovak Republic, and the United States.