RENOLIT
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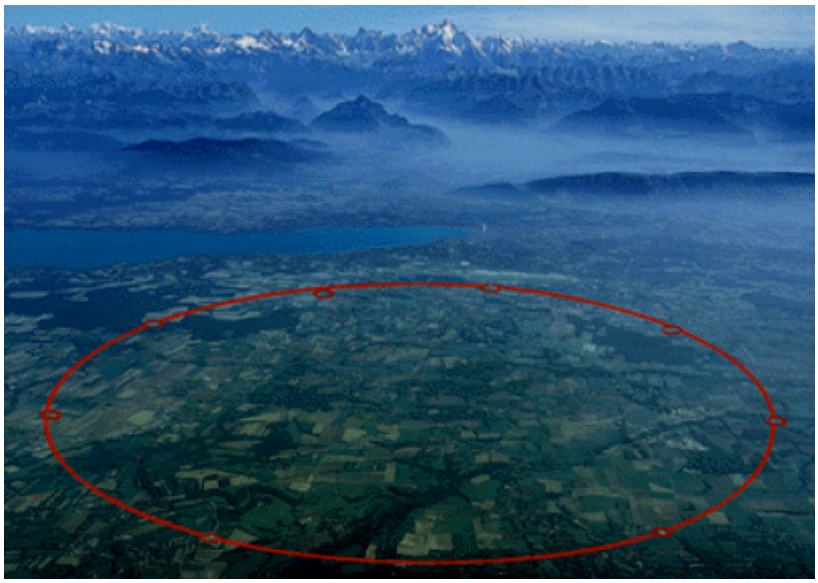
LHC Project

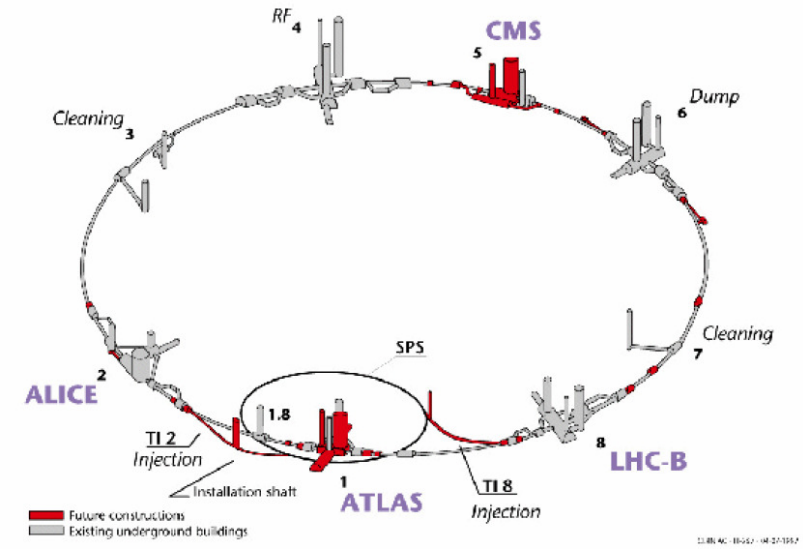
The LARGE HARDON COLIDER



Place: Vicinities of Geneva (Switzerland) and France
Completion Date: 2000
Executive Companies: Dragados (Spain) - SELI (Italy)

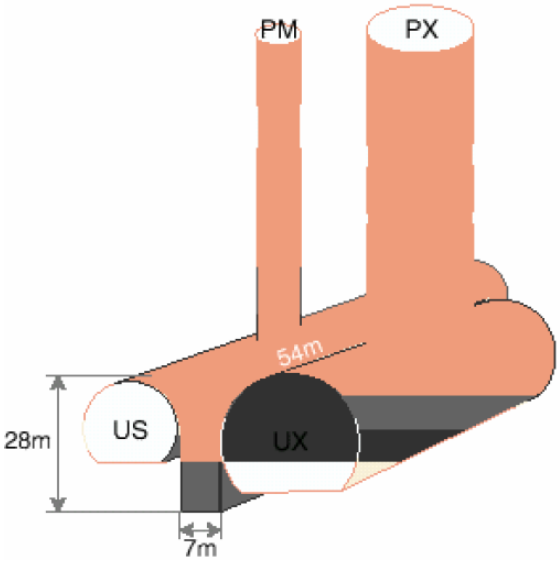
With the idea of continuing the studies into the origin of matter, the European Organisation for Nuclear Research (CERN), has developed a program to modernise the Large Electron Positron collider installation (LEP). This project consists of modifying the LEP by installing a new, more powerful accelerator Large Hadron Collider (LHC - B), toroidal accelerator (ATLAS), collimator of ions (ALICE) and a Compact Muon Solenoid (CMS).

Layout of the LEP tunnel including future LHC infrastructures.



Main Data

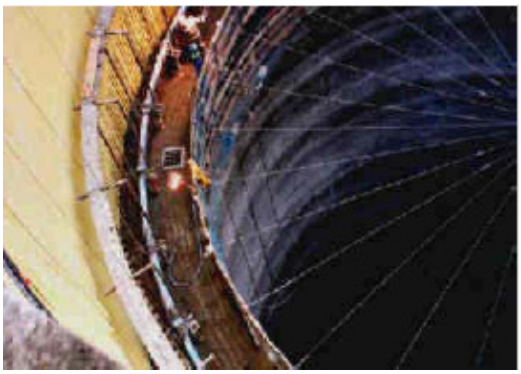
The job consists of carrying out the waterproofing with Alkorplan membranes of the module destined to house the CMS before the final concreting. The whole collection is to be found at a depth of 100m under a glacier construction terrain. It has two accesses through two vertical conducts (PM and PX), that are 14.5m and 20.5m in diameter and have a depth of 74m. The CMS will be located in two caverns (UX and US), of 26.5 and 10m in diameter, 35m high and 54m in length, separated by a wall 7m wide, 30m high and 54m long.



The work requires painstaking care given the conditions of the terrain, because in fact the underground circulation of very abundant waters is being modified.

Waterproofing system:

- The laying of a drain sheet which protects the excavated support, once made regular, through a geotextile fixed with metal nails, which are equipped with PVC washers.
- **Installing the PVC ALKORPLAN T (354041) sheet in all the surfaces** before being concreted. The Alkorplan sheet has been welded to these washers, thereafter proceeding the welding of the wall. The system used has been of double cord through hot air, without the use of material, leaving an intermediate channel between the two cords. This system allows checking out the motionless state of the welded cords through injecting pressured air through the aforesaid channel.



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The characteristics of the ALKORPLAN SHEET T (354041):

- Opaque PVC membrane, 1.5mm in density, without having been pieced together and which consists of two layers. The visible layer is a different colour so that mechanical damages can be detected more easily during their installation.
- High adaptation level to the irregularities of the support.
- Highly resistant to punctures, which guarantees that the tunnel will be dry by avoiding water filtration.
- Resistant to roots according to DIN 4061, PART 1.
- In accordance with BMFWA and SIA 280.

For further information:

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