

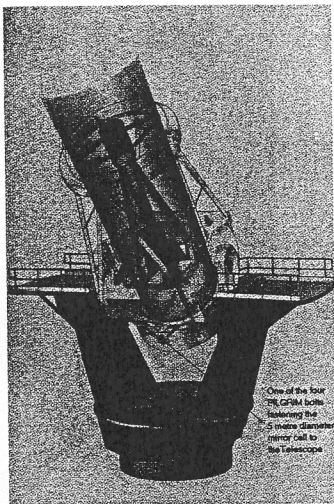
Gaze on the stars is firmly fixed

The Isaac Newton Group (ING) of telescopes forms one of the world's leading observatories on the island of La Palma. The William Herschel telescope, with its 4.2m diameter mirror, is the largest in the group and has been operational for over 16 years.

Pilgrim hydraulic bolts have recently been specified to clamp the primary mirror assembly onto the 200 tonne telescope structure because of their ability to provide a very high bolt load in bolts that are difficult to access.

Maintenance of the telescope involves the regular dismantling and remounting of the 21 tonne primary mirror cell which contains the 16 tonne mirror. Repeatability tolerances for this process are ± 20 microns.

Unfortunately, after 16 years of service and removal and re-assembly, the hydraulic bladders used to pressurise the bolts were found to be well on the way to incontinence, leading to



increased downtime and maintenance difficulties. Pilgrim International was able to design and install new hydraulic bolts which feature a minimum envelope incorporating the hydraulic head and mechanism as an integral part of the bolt. Control of the load being imposed is achieved through the calculation and application of

hydraulic pressure. The bolts are relatively small – their overall length is 377mm with a diameter of 36mm, but they are required to exert and retain a clamp load of 282kN. Also, to be capable of a maximum working pressure of 1800 bar, a special stainless steel was required to ensure that the mechanical properties were met.

The bolt consists of a hydraulic chamber, into which are assembled the seal, load ring and load locking collar, gland and plug. Tensioning is achieved by the application of hydraulic pressure to the head of the bolt. This reacts off the nut and applies the load of 282kN accurately and uniformly to each bolt. The load is then retained through the load locking collar that screws down until in contact with the head of the bolt. Removal is a simple reversal of the assembly procedure.

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