

Subject: [Aligo_sus] quad structure height
From: Larry Jones <ljones@ligo.caltech.edu>
Date: Tue, 21 Oct 2003 08:38:04 -0700
To: norna@fastloki.stanford.edu
CC: aligo_sus@ligo.caltech.edu, ljones@ligo.caltech.edu

Norna,

This message is occasioned by a meeting that I had Friday morning with Ken Mason regarding the installation of the AdLIGO SEI structure and quad into the BSC at LASTI. The two choices of quad overall height that we've been looking at are 200.5 cm and 210.5 cm, although anything within that range is a possibility as well.

I would like to make sure that you're aware of the assumptions that we are making, and the pressures that exist on this height decision.

The SEI structure overall height choice is bounded from the top by the crane hook height at the sites, along with our planned policy of installing the SEI structure with quad mounted into the BSC as a module. It is bounded from below by the height of the quad, from the optic center to the top of the quad structure, along with the height of the BSC flange and the distance from the quad optic center to the bottom of the quad structure. I arbitrarily chose for the BSC structure design requirements a maximum height (lift pin to optics table) of 91.5 cm, based upon the Tech Demo structure's height of 93.4 cm (it was close) and the fact that 91.5 cm will allow a quad overall height of 210.5 cm for module installation at the sites. Even though the Tech Demo was close, the SEI contractor will have a sizable challenge in keeping the height down to 91.5 cm while enlarging the structure laterally to fit the BSC's more widely spaced support tubes, and still meet the stiffness requirements. This 91.5 cm height (with a 210.5 quad structure plan) will cause a problem at the LASTI installation; see the next paragraph. The SEI contractor is planning on designing to a new concept, which should be more efficient than the Tech Demo; that may give us some relief.

The crane hook height at LASTI is lower than the hook heights at the sites, which causes a potential problem. If the quad overall height is 210.5 cm, there is an interference of 8.6 cm in getting the BSC dome over the mounted SEI structure, because of where the SEI structure needs to be positioned. If the quad overall height is 200.5 cm, the SEI structure is mounted 10 cm lower, and the dome will clear. Depending upon the profile of the top of the SEI structure, there is a chance that the dome can be tipped during installation sufficiently to clear with the 210.5 cm quad. Ken will be looking into the possibility for dome tipping, but the final decision will depend upon the SEI structure profile. There is also a remote chance that the SEI structure can have a removable element at the top, which would be installed after the dome is in place; this requires that the structure design permits personnel access from below, which is not a current SEI structure design requirement. Also, such a removable part would likely be prohibitively heavy, as its function would be for counterbalancing mass on the optics table.

The contract with ASI for designing the SEI structure begins in about a week. They are currently instructed to make their design to accommodate a quad overall height of 210.5 cm, capable of being reduced with a simple change to accommodate a height of 200.5 cm. We will attempt to keep the SEI height as low as practical. Our design review is scheduled for March 2, 2004. Is it possible to have the resolution of the quad height before that time? Is it possible to favor the 200.5 cm height?

Larry

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