

Subject: Re: Fwd: revised blades

From: Craig Conley <cconley@ligo.caltech.edu>

Date: Fri, 03 Feb 2012 22:25:32 -0800

To: Ken Mailand <kmailand@ligo.caltech.edu>, Calum Torrie <ctorrie@ligo.caltech.edu>, Norna Robertson <nroberts@ligo.caltech.edu>, Lisa Austin <laustin@ligo.caltech.edu>, Jeff Lewis <jlewis@ligo.caltech.edu>

I have updated the new TMS blade spring solid models with new curvatures to raise the tip heights per Norna's calculations. They are in the vault and ready for a first iteration of analysis. They each have two configurations: Flat and Curved. They are also ready for DXF's to be created for Mike Gerfen. At this point the upper spring's curve radius has decreased 3.4%, and the lower spring 4.6%. The part numbers are D1200116 & D1200117.

Craig

On 1/26/2012 5:44 PM, Ken Mailand wrote:

----- Original Message -----

Subject:revised blades

Date:Thu, 26 Jan 2012 15:32:51 -0800

From:Norna Robertson <nroberts@ligo.caltech.edu>

To:Calum Torrie <ctorrie@ligo.caltech.edu>, Ken Mailand <kmailand_k@ligo.caltech.edu>

CC:Dennis Coyne <coyne_d@ligo.caltech.edu>

Calum, Ken

I have looked into how to change the TMS blades to take 82 kg in final stage, as opposed to the current design value of 79.2 kg = 39.6+39.6, thus an increase in mass of 2.8 kg. I propose the easiest way to accommodate the increase is to use exactly the same size of blades in all dimensions (length, width at base and thickness) , but have them precurved to a tighter radius of curvature and hence larger initial deflection.

From the nominal spring constants of 2352 N/m (top) and 2469 N/m (bottom) for one blade of each type and an increase of mass per blade of 1.4 kg (=2.8/2) the increase in initial deflection needed is given by $dx=dF/k$, and hence

1) top blade $dx = 1.4 \times 9.81/2352 = 5.8 \text{ mm}$

2) bottom blade $dx = 1.4 \times 9.81/2469 = 5.6 \text{ mm}$.

The stress level increases slightly but should be acceptable, and this route minimises the number of changes needed to be made.

I can write this up more fully but wanted to give you a heads-up.

Cheers

Norna

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