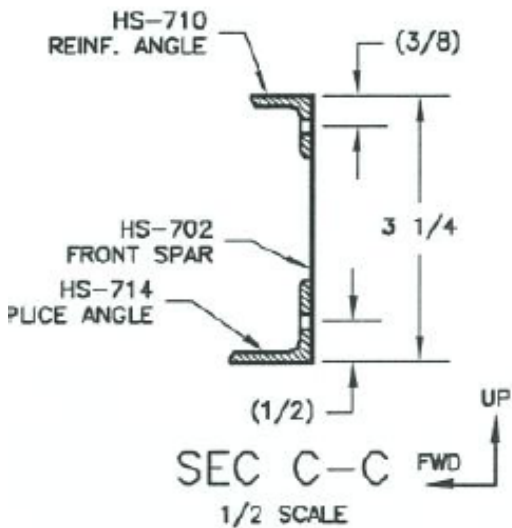
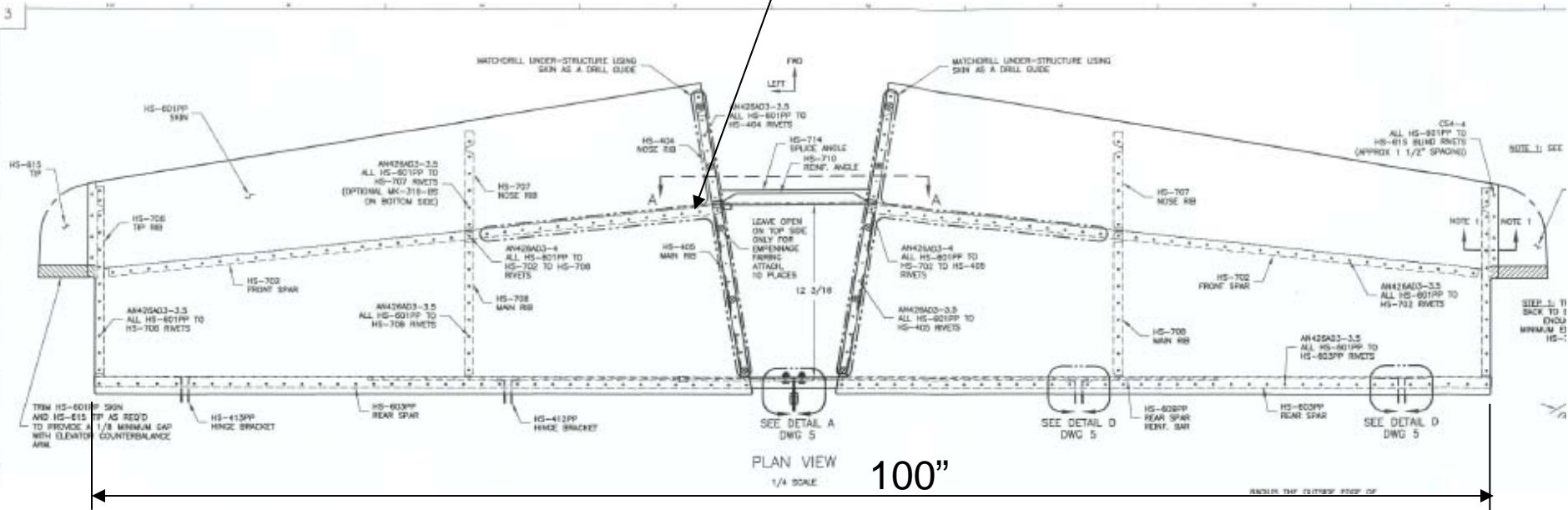


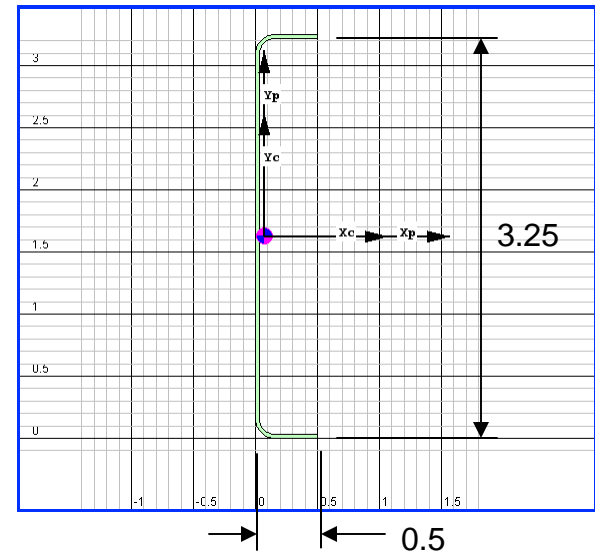
Cause: rivet gun slipped during riveting



Approximate location of the dent



Conservatively only consider the front spar channel at the dent location



Analysis:

Assuming a total of 600 lbs is uniformly applied at horizontal stabilizer. The moment will be taken by both the front and rear spars. The stiffness of rear spar is higher, so the rear spar will take more moment than the front. Assuming the front spar will take half of the total 600 lbs, the dented location will see a shear force of 150 lbs.

$$V=150 \text{ lbs}$$

$$A = 0.032 \times 3.25 = 0.104 \text{ in}^2 \text{ (ignore the flange area)}$$

$$\text{Shear stress} = 150/0.104 = 1.44 \text{ ksi}$$

Stress is very low, and the buckling shear strength is 15 ksi (see next slide), not a concern. The smoothness over the dent area is checked ok, and no initial cracks observed, fatigue is also not a concern here.

Maximum stress = 51 ksi

Ultimate tensile strength=61 ksi

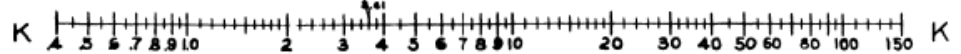
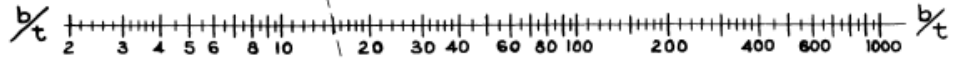
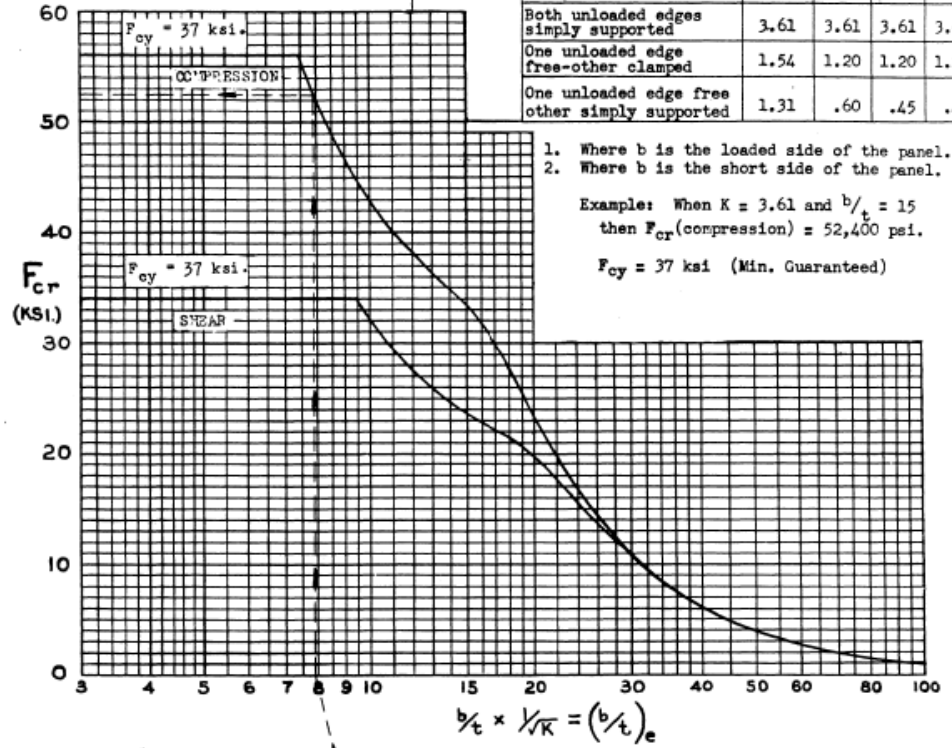
Yield tensile strength = 36 ksi

Ultimate Shear strength = 37 ksi

Yield shear strength = 25 ksi

Buckling Strength:
 For $b/t=3.25/0.032 = 101$
 $K = 21.6$
 $F_{cr} = 15 \text{ ksi}$

Type of Load	Edge Condition	K			
		a/b = 1	2	5	10
Bending ¹	All edges simply supported	23.2	21.6	21.6	21.6
Shear ²	All edges simply supported	8.45	5.78	5.06	4.84
Compression ³	Both unloaded edges clamped	6.30	6.30	6.30	6.30
	Both unloaded edges simply supported	3.61	3.61	3.61	3.61
	One unloaded edge free-other clamped	1.54	1.20	1.20	1.20
	One unloaded edge free other simply supported	1.31	.60	.45	.41



Re: Fw: RV7 HS Construction Questions

• Thu, April 28, 2011 11:48:30 AM

From: Shawn Li <shawnli2003@yahoo.com> [View Contact](#)

To: Gus Funnell <gusf@vansaircraft.com>

Thanks, Gus! The area dented by the rivet gun doesn't feel rough (no feeling of any burr or scratch) when running my finger over it, I guess I will just keep the way it is, and will check it during annual (the first annual will be at least 4 years away :-))

Shawn

From: Gus Funnell <gusf@vansaircraft.com>

To: Shawn Li <shawnli2003@yahoo.com>

Sent: Wed, April 27, 2011 4:16:51 PM

Subject: Re: Fw: RV7 HS Construction Questions

> Gus,

>

> I am not sure if email will get to you. Here it is again about my
> questions. I am sorry if these
> questions are trivial to you, but since I am a new builder, I want
> to get expert's opinion for the
> mistakes I make. Thanks for your help.

>

> Shawn

>

> ----- Forwarded Message -----

> From: Shawn Li <shawnli2003@yahoo.com>

> To: Vans Support <support@vansaircraft.com>

> Sent: Mon, April 25, 2011 9:46:24 AM

> Subject: RV7 HS Construction Questions

>

> Started riveting the HS, and made some mistakes. I have attached a
> PPT file for illustration.
> 1) Are the smiley on the HS702 ok structural wise?

I don't think they'll be a problem. You could use some scotchbrite or emery cloth to smooth any rough edges just to minimize the chance of cracks in the future.

>

> 2) Is the gap between the HS707 and HS601PP OK? I just used one pop
> rivet on the bottom side,
> for some reason (maybe I didn't push hard enough while pulling the
> rivet), there is a separation. I
> heard that drilling out a [pop rivet](#) may cause more damage than
> leaving it alone. What is yours
> opinion?