STRUCTURAL ENGINEERING

To: Ryan

From: Luis

Subject: Loads on truss cantilevers

Date: February 26, 2020

Hi Ryan.

I will try to clarify my comments in a simplified manner.

The effect of the concentrated loads on the truss deflection (see figure 2) tend to uplift the truss at midspan. On the other hand the uniform load (see figure 1) makes the truss to move down at mid span.

So, the greater the concentrated load at the cantilever, the smaller the deflection in the trusses. If we use the sum of the concentrated dead load, live load and snow load in the analysis we are calculating the truss deflection in the assumption that the snow load is always present, and then we are underestimating it.

Concerning the shear force on the trusses, the effect of the concentrated loads is the opposite. Using the sum of the concentrated load in the cantilever lead to a shear force that occurs only when the snow load is present.

Concerning the wind load, its only effect is to reduce the vertical load on the cantilever and so, increase the deflection of the truss and decrease the shear at the cantilever.

To avoid that I would expect to use the combinations listed on table 1 for both the concentrated loads and the uniform loads.

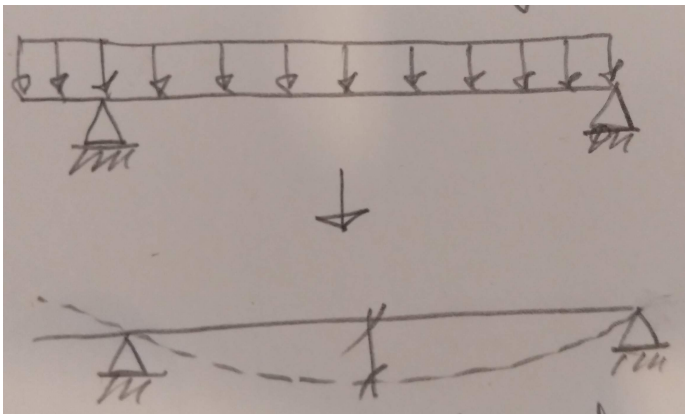

Figure 1: Deflection due to uniform loads acting on the trusses.

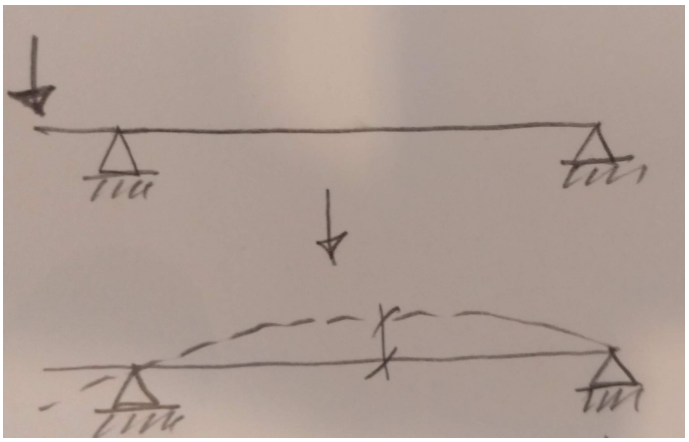

Figure 2: Deflection due to concentrated loads acting on the trusses.

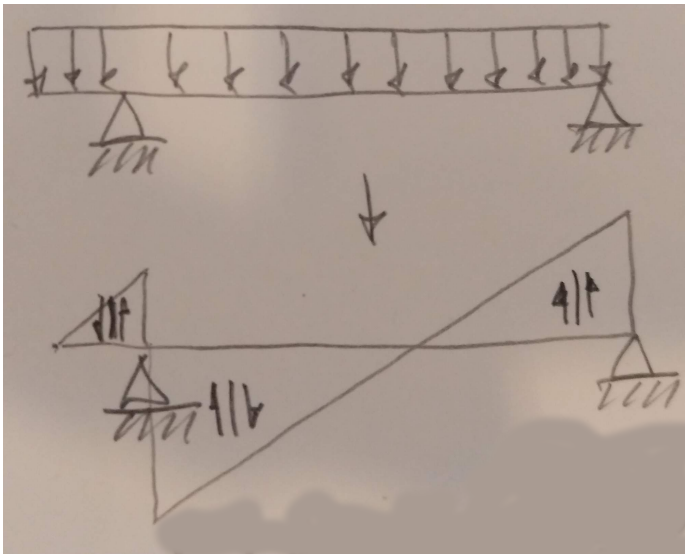

Figure 3: Shear due to uniform loads acting on the trusses.

Identifier	Load Combination
EQ1608	1.0*DL
EQ1609	1.0*DL+1.0*LL
EQ1610	1.0*DL+1.0*S
EQ1611	1.0*DL+0.75*LL+0.75*S
EQ1612	1.0*DL+0.6*W
EQ1613	1.0*DL+0.45*W+0.75*LL+0.75*S
EQ1615	0.6*DL+0.6*W
Where:	
	D: dead load
	L: live load
	S: snow load
	W: wind load

Table 1: **Load combinations**

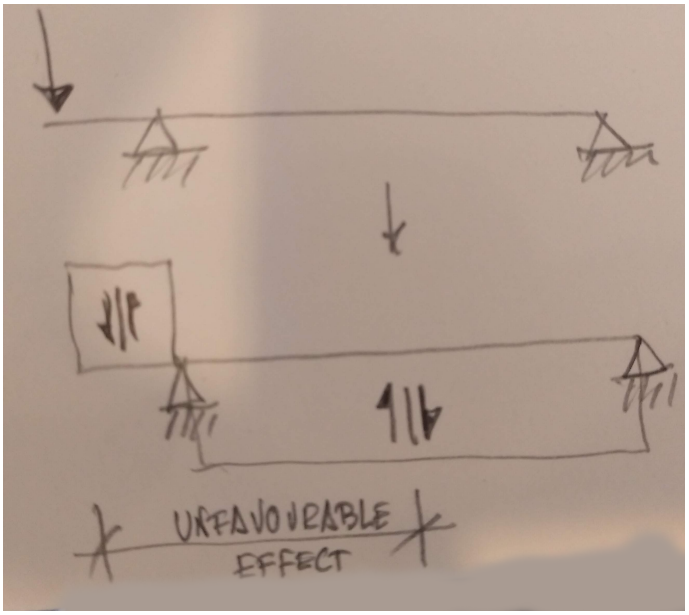

Figure 4: Shear due to concentrated loads acting on the trusses.