

NeoBuild Technical Notes



Report Title:

The effect of lip-cut on floor joist deflection

Discipline:

LGS

Date:

2023.05.20

Provided By:

NeoBuild Engineering

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1. Purpose

The purpose of this report is to investigate the effect of chord lip-cut on the total deflection of floor joists.

2. Material & sections

2.1. Material

The material type for the LC section is G550 and has the following specifications:

Weight and Mass		Units
Weight per Unit Volume	76972.86	N, m, C
Mass per Unit Volume	7849.0474	
Isotropic Property Data		
Modulus Of Elasticity, E	2.034E+11	
Poisson, U	0.33	
Coefficient Of Thermal Expansion, A	1.170E-05	
Shear Modulus, G	7.846E+10	
Other Properties For Cold Formed Materials		
Minimum Yield Stress, Fy	4.900E+08	
Minimum Tensile Stress, Fu	4.900E+08	

2.2. Section

Section are defined as follows:

- Full section of LC70x35x0.75
- The same section without lip

The specifications of the sections are as follows:

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C70 normal	<p>Dimensions</p> <p>Outside Height (A) <input type="text" value="70"/></p> <p>Outside Width (B) <input type="text" value="36"/></p> <p>Thickness (t) <input type="text" value="0.75"/></p> <p>Radius (R) <input type="text" value="2"/></p> <p>Lip-Depth (d) <input type="text" value="12"/></p>	<p>Section</p> 
C70 without lips	<p>Dimensions</p> <p>Outside Height (A) <input type="text" value="70"/></p> <p>Outside Width (B) <input type="text" value="36"/></p> <p>Thickness (t) <input type="text" value="0.75"/></p> <p>Radius (R) <input type="text" value="2"/></p> <p>Lip-Depth (d) <input type="text" value="0"/></p>	<p>Section</p> 

3. Floor joist specifications

The specifications of Joist are as follows:

- Joist span: 4500 mm
- Joist height: 400 mm
- Joist spacing: 450 mm
- Min web spacing: 55 mm
- Max web spacing: 500 mm
- First web: start from the top
- End web state: double web

Note1: The lip-cut is considered as the real situation. In the longer distance between web elements, full-section is considered.

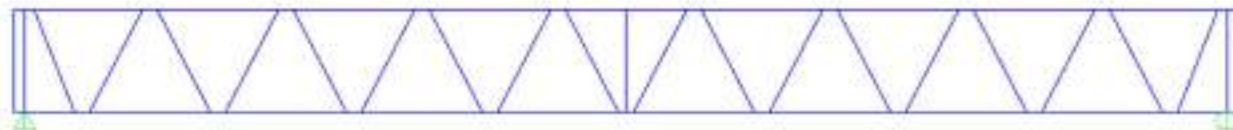


Figure 3.1. Joist schematic

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4. Loading

In order to obtain the joist deflection, a 2.0kPa load is considered on the floor. It should be noted that the quantity of the load does not matter since the aim of the study is to compare the results and the analysis procedure is considered as linear.

5. Result

The results obtained from the analysis are presented below:

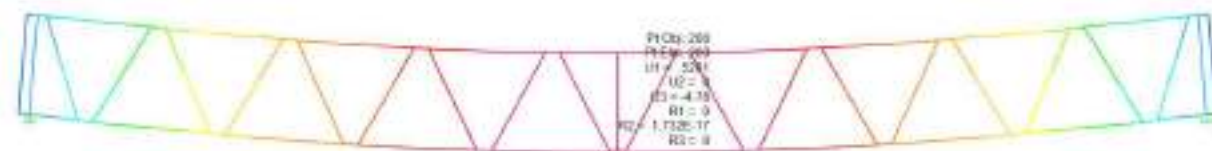


Figure 5.1. Normal joist - deflection = 4.78mm

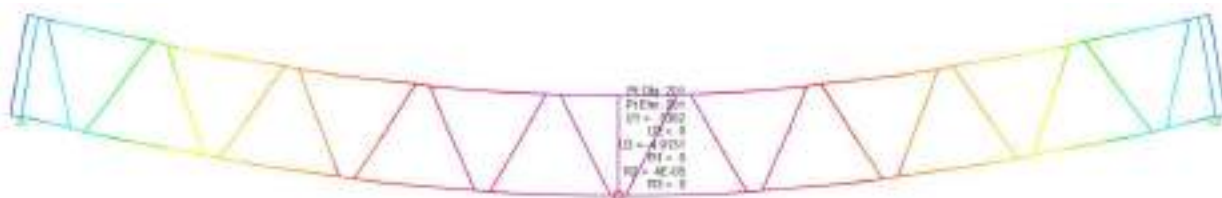


Figure 5.2. Joist including lip-cut - deflection = 4.91mm

SECTION	DEFLECTION
LC70 normal	4.78
LC70 without lips	4.91
difference	2.72%

The results show that cutting the lips of the LC-section will increase total deflection of the joist about 2.7%.