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Technical Exchange Section

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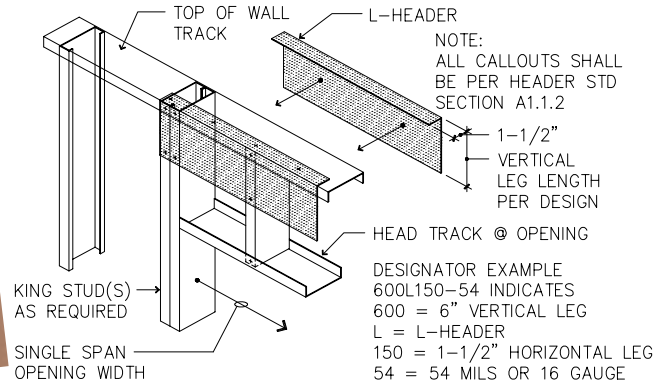
A Summary of L-Header Designs Using the AISI Header Design Standard

By Dean Peyton, PE

As residential and commercial cold-form steel projects continue to gain ground, competing with light framed timber construction, there are a number of innovative design elements that are advancing this cause. Just a year ago AISI published the "*Standard for Cold-Formed Steel Framing – Header Design"*. There are at least two significant aids in this standard that design engineers may not have picked up on yet. They are: 1) L-header design including gravity and uplift provisions and 2) increased web crippling strength for box shaped headers. The purpose of this article is to point out the benefit of using the new *AISI Standard* with respect to item #1 above. The provisions of this *Standard* can not be found any other code or standard.



Calculated Allowable loads for Double L-Headers

Size	AISI Specification		Allowable Gravity Moment Ma Per AISI L-Header Design Guide			Ma_u
	Mn	Ma	6"& 8" v-leg	10" v-leg		
			any span	spans < 8'-4"	spans ≥ 8'-4"	Uplift
	Ft-#	Ft-#	Ft-#	Ft-#	Ft-#	Ft-#
(2) 600L150-33	1350	808	808	na	na	135
(2) 800L150-33	2316	1387	1387	na	na	232
(2) 1000L150-33	2935	1757	na	1169	1299	293
(2) 600L150-43	1825	1093	1093	na	na	228
(2) 800L150-43	3112	1864	1864	na	na	311
(2) 1000L150-43	4731	2833	na	1884	2093	473
(2) 600L150-54	3483	2086	2086	na	na	435
(2) 800L150-54	5938	3556	3556	na	na	742
(2) 1000L150-54	9022	5403	na	3593	3992	902
(2) 600L150-68	4518	2705	2705	na	na	565
(2) 800L150-68	7673	4595	4595	na	na	959
(2) 1000L150-68	11623	6960	na	4629	5143	1453

L-Header design is becoming more common in engineering practice and is increasingly used for residential construction including multifamily apartments. Currently, the header standard addresses double L-headers only, but expects to address singles in the next edition. This article includes a table summarizing allowable bending moments for different L-header sections as calculated per the standard. Note that the standard has limitations listed based on limited research testing specimens. They are listed in Section A.1.1.2. L-headers may range from 33 mil to 68 mil in thickness and from 6" to 10" deep vertical legs. Within the limitations of the *Standard* the designer need not address shear or deflection.

An interesting item to note in the design table is that for same mil thickness, a 10" deep vertical leg member is only 1% stronger than 8" deep member for spans less than 8'- 4" in length. For spans longer than 8'- 4" in length the 10" deep members are approximately 11% stronger. Thus the research to date indicates that deeper L-headers are not necessarily more effective. However, additional research is being conducted by Dr. Serrette at the Santa Clara University on deeper sections which include an attachment of the bottom of the L-header to the head track below. Promising results of that research is forthcoming.

To put the use of L-header design in perspective lets compare it to a timber header equivalent. Example: For a typical 30' truss span with an 18" eave landing on a 5'-6" wide window and assuming a 40 PSF total roof loading this would yield 660 PLF of uniform load on the header. A #2 Hemfir 4x8 beam is required for a timber framed solution (maximum allowable load = 700 PLF). An L-header solution would require (2) 800L150-54 (maximum allowable load = 940 PLF). The L-header beam material will be less costly but the real saving comes in the labor. The timber beams need to be framed below the plate line within the wall cavity and include bearing and king studs. The L-header need only be framed over the plates and cripple studs as seen in the detail above.

L-Headers appear to be a very cost effective approach to lightly loaded header design.