

Research on Influence of New Structural Design Regulations on General Design of Steel Towers

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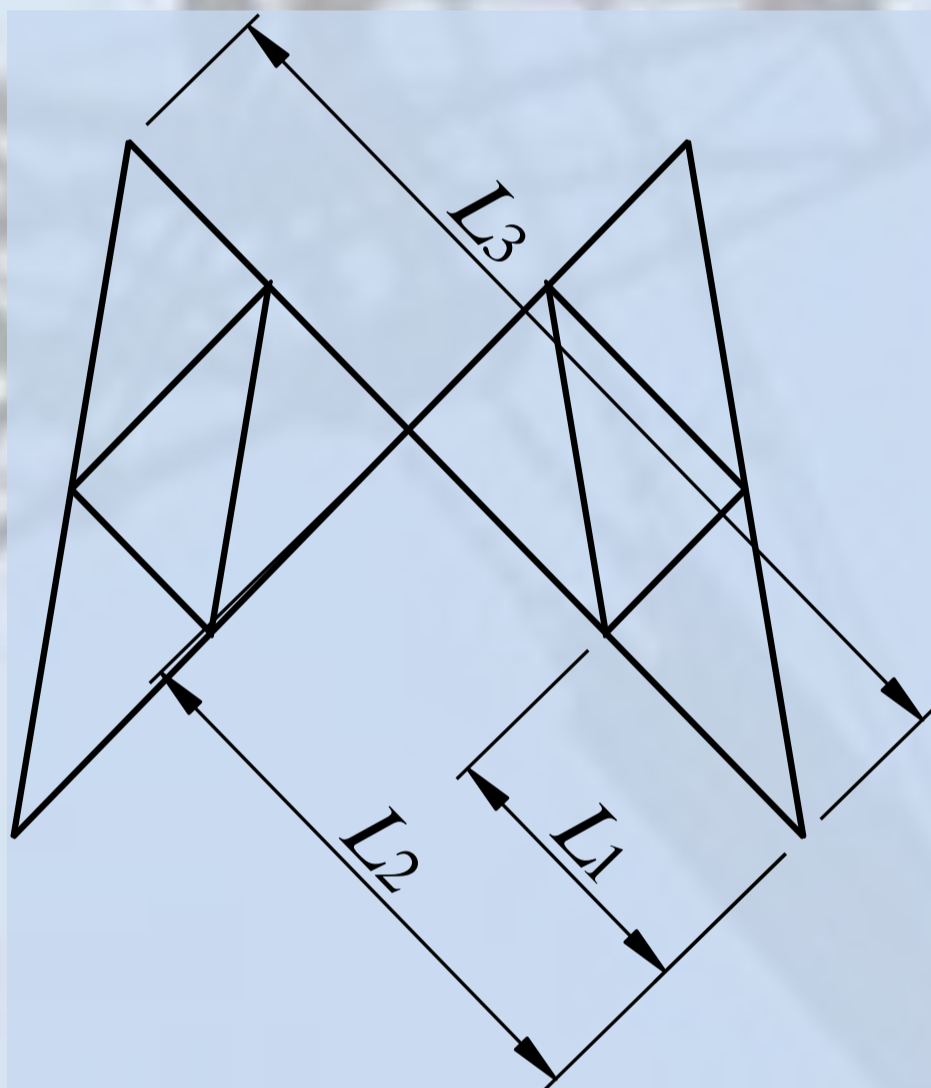
Abstract:

This work describes the main revision content of the power industry standard (DL/T 5486-2020) (Technical specification for the design of steel supporting structures of overhead transmission line). And the effects of the new revision standard (DL/T 5154-2012) Technical code for the design of tower and pole structures of overhead transmission line (DL/T 5154-2012), on the general design of 35kV~750kV steel towers are analyzed in depth. Subsequently, the optimization suggestions of general design of the steel tower are proposed.

Comparison of calculation formulas of strength bearing capacity

Specification(DL/T 5486-2020)	Code(DL/T 5154-2012)
Gross section	$\frac{N}{A_n} \leq \eta f$
Net section	

Schematic Diagram of Tower Cross skew



Strength Reduction factor of tensile members

Member category	Reduction factor	
	Specification	Code
Angle steel member with double-leg connection	1.0	1.0
Angle steel member with single-leg connection(connected with one bolt)	0.5	0.7 (leg width >40 mm)
		0.55 (leg width ≤40 mm)
Angle steel member with single-leg connection(connected with two or more bolts)	0.7	0.55

- The change of material strength index causes the stress ratio of the primary members of tower body and tower leg to increase by 1%~2%, the specification is basically unchanged, and there is little impact on tower weight.
- For steel towers with double composite angle steel, the calculated slenderness ratio and the stress ratio of composite angle steel primary members are reduced in the Specification.
- The modification of the strength reduction factor of members in the Specification has a greater impact on tension members connected with a single bolt and with a leg width greater than 40 mm and tension members connected with multiple bolts and with a leg width equal to 40 mm.