Steel Structure Industry 13th Five-Year Plan and 2025 Planning Proposals (Postprint)

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Abstract

At the Seventh Member Representative Congress of the China Steel Structure Association, Yue Qingrui, President of the China Steel Structure Association, presented recommendations for the steel structure industry' s "11th Five-Year" Plan and key points of the "Steel Structure 2025" plan: to complete the transformation from a major steel structure manufacturing country to a strong steel structure manufacturing country within a 10-year period.

Full Text

Preamble

Research on Axis Generation in BIM Models Based on CAD Drawings

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Abstract: This paper presents a method for recognizing axis lines and axis labels by analyzing DXF file data exported from CAD drawings. Based on the extracted CAD information, a program automatically generates axes and annotations in BIM through secondary development of the Revit platform, significantly reducing the time required to create BIM models from CAD drawings.

Keywords: BIM; CAD; Secondary Development

Strategic Plans for China' s Steel Structure Industry: The 13th Five-Year Plan and 2025 Vision

At the seventh general meeting of the China Steel Structure Association, Chairman Yue Qingrui presented the "13th Five-Year Plan" recommendations and the "Steel Structure 2025" strategic outline for the industry. The central vision is to transform China from a large steel structure manufacturing country to a strong one within ten years.

Specifically, in terms of industry scale, the proportion of steel structures and steel-concrete composite structures in China should reach 20-30%, comparable to current advanced international levels. Regarding manufacturing efficiency, the CNC rate for key processes should exceed 50%, and the average per capita labor productivity should surpass 100 tons per year across the entire industry. In engineering technology, China' s steel structure engineering capabilities should achieve overall international advanced levels, with technical standards fully aligned with international norms and active leadership in establishing ISO steel structure standards. For market competitiveness, Chinese steel structure products should capture over 50% of the global market share, forming more than ten internationally competitive multinational corporations specializing in steel structure engineering and over ten national-level steel structure industrial cluster parks.

Steel structures, as an industry intersecting equipment manufacturing and civil construction, hold a significant position in China' s manufacturing sector. The State Council's "Guidelines on Resolving Excess Capacity Contradictions"explicitly tasks the industry with promoting steel structure applications in construction, particularly seismic-resistant light steel integrated buildings in disaster-prone areas, and steadily expanding markets for steel and aluminum products. However, compared with world-class standards, China' s steel structure manufacturing remains large but not strong, with gaps in independent innovation, resource efficiency, industrial structure, informatization levels, and quality benefits, making transformation and upgrading an urgent and challenging task.

The overall development goals for the 13th Five-Year Plan period (2016-2020) are: national steel structure consumption should double from 2014 levels to 80-100 million tons, exceeding 10% of crude steel output; steel structure exports should quadruple from 2014 levels to 10 million tons, representing over 10% of total steel structure production; and the primary steel grades should transition from the current Q345 and Q235 to Q345 and Q390. Key technologies for design, construction, and inspection should reach international advanced levels.

Priority development areas during the 13th Five-Year period include building steel structures, bridge steel structures, energy steel structures, and military steel structures. Building steel consumption should increase from approximately 10% of national building steel usage in 2014 to 15-20%, totaling over 55 million tons annually. Steel consumption in other sectors will also increase substantially.

Key technologies to be prioritized during the 13th Five-Year period include: research and application of high-performance materials for steel structures; high-performance steel and composite structural systems; industrialization technologies for steel and composite structures; key technologies for steel structure residential building industrialization; green manufacturing and informatization; and revision and improvement of steel structure building standard systems. While advancing the industry, the government should also demonstrate market cultivation through mandatory steel structure usage in township and community public buildings, pilot programs for steel structure housing in urban shantytown renovation and public rental housing projects, promotion of steel or steel-concrete composite structures in small and medium-span bridges, and application of rapid-assembly steel structures in military facilities and disaster prevention.

The "Steel Structure 2025" initiative must achieve breakthroughs in several critical areas: CNC machine tools and steel cutting and distribution centers; welding robots and intelligent production lines; integrated anti-corrosion and fire protection with automatic coating production lines; BIM (Building Information Modeling) and simulation technology applications; modular design and manufacturing technologies; high-performance structural and connection materials; alignment and integration with international standards; "Internet Plus" and financial platform applications; big data and cloud platform technologies; and remote control applications in steel structure engineering.

For large enterprise groups, the strategy is to build aircraft carrier-type international corporations. This involves: aligning with national strategy; partnering with domestic general contractors to "sail abroad on borrowed ships"; interfacing with top international contractors for certification and alignment; deeply integrating informatization and industrialization to enhance innovation capacity; and integrating internet, finance, talent, and technology resources for business model innovation.

For medium and large enterprises, the strategy is to become specialized, strong, and excellent—frigate-type companies. This requires: clarifying product direction to create regional high-quality products; seeking strategic partnerships with suitable large enterprises as specialized subcontractors; providing specialized services for general contractors or large enterprises; and avoiding blind expansion or reckless entry into overseas markets.

Note: Figure translations are in progress. See original paper for figures.