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Source: METAL BUILDING SYSTEMS

CHAPTER 15
SPECIFYING CRANE BUILDINGS

15.1 INTRODUCTION

Two out of every five metal building systems are constructed for manufacturing facilities where cranes are frequently needed for material handling. A building crane is a complex structural system that consists of the actual crane with trolley and hoist, crane rails with their fastenings, crane runway beams, structural supports, stops, and bumpers. A motorized crane would also include electrical and mechanical components that are not discussed here. Our discussion is further limited to interior building cranes.

The main focus of this chapter is on proper integration of the crane and the metal building into one coordinated and interconnected system. Any attempts to add a heavy crane to the already designed and constructed pre-engineered building are likely to be fraught with frustration, high costs, and inefficiencies. If the required planning is done beforehand, however, a cost-effective solution is much more likely. We are also interested in a relationship among the three main parties with design responsibilities—architect-engineer, metal building manufacturer, and crane supplier. Occasionally, disputes arise when the contract documents do not clearly delineate their respective roles in the project.

15.2 BUILDING CRANES: TYPES AND SERVICE CLASSIFICATIONS

Several types of cranes are suitable for industrial metal building systems, the most common being bridge cranes (either top-running or underhung), monorail, and jib cranes. Occasionally, stacker and gantry cranes may be required for unique warehousing and manufacturing needs. Jib, monorail, and bridge cranes are examined here in this sequence—in order of increasing structural demands imposed on a pre-engineered structure. Constraints of space prevent us from discussing gantry and stacker cranes, as well as conveyors and similar material handling systems.

Within each type, the cranes are classified by the frequency and severity of use. Each crane must conform to one of six service classifications established by the Crane Manufacturers Association of America (CMAA). The six classes are: A (standby or infrequent service), B (light), C (moderate), D (heavy), E (severe), and F (continuous severe).

Guidance for assigning a service classification is contained in CMAA standards 70[1] and 74[2] and in the MBMA *Manual*.[3] The *Manual*'s Design Practices apply only to the cranes with service classifications A to D. Information on cranes with service classification E or F, including design loads and impact factors, is given in *AISE Technical Report 13*.[4]

Another way to classify the cranes is by kind of movement—hand-geared or electric. Hand-geared cranes are physically pulled along the rail by the operator and are less expensive, but slower,

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