CRANE-SUPPORTING STEEL STRUCTURES - DESIGN GUIDE

3RD EDITION

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In order to address cranes with guide rollers, for which the usual North American practice for calculating horizontal forces transverse to the crane rails is not well suited, the following text will be added at the end of Section 2.3.3 in future editions:

Certain industries, notably mining, use overhead travelling cranes that do not have flanged wheels, instead using guide rollers that engage the sides of the crane rails. The designer of the supporting structure may have little or no information with which to proceed, pending certified crane manufacturer's data. In the case of existing installations needing attention or upgrade, very little information is available and none from North American standards such as CMAA.

For cranes with guide rollers, the considerations are:

- Recognition that guide rollers represent a different mechanism for crane guidance compared to flanged wheels. Separate guide rollers provided adjacent to each side of the rail head and flat crane wheels are typically used.
- Load combinations, impact factors, load factors and distribution of lateral forces to each rail will be significantly different from the criteria used in North American practice. The application of the skewing force may be limited to only the rail and its accessories. It is not uncommon for guide roller systems to be positioned on only one side of the bridge, with all lateral guidance forces then imparted to only one side of the crane runway system.
- These guide rollers commonly do not align with the crane wheels, and therefore, lateral forces are imparted to the rail head at a different location than the vertical wheel force. This potentially can create overturning forces on the rail that are not counterbalanced by crane vertical wheel forces, and crane rail attachment may become a concern.
- Because the guide rollers engage the side of the rail and are generally of a much smaller diameter than crane wheels, rail discontinuities at splices can have much greater significance than for cranes with flanged wheels.
- Guide rollers are commonly positioned tighter to the rail than normal rail float provided by flanged wheels. Consequently, guide rollers are more sensitive to rail misalignment and variations in rail gauge. This may result in a crane constantly skewing and binding, with increased damage to the crane runway system.
- The shape of the rail head becomes very important due to the necessity of vertical surfaces of sufficient depth to engage the rollers.
- The height of the rail becomes a consideration for forces on the rail clips.

For these cranes, the usual North American practice for calculating horizontal forces transverse to the crane rails will yield results that do not correspond well to forces calculated using the standards to which these cranes are usually designed. At this time, it is recommended that:

- Forces transmitted to the rails should be obtained from the crane manufacturer.
- If this is not possible, forces should be calculated according to an appropriate standard such as DIN EN 1501.