

FIGURE 15.9 Top-running bridge cranes: (a) single-girder; (b) double-girder. (FKI Industries, Inc.)

15.6.2 Forces Acting on Top-Running Crane Runways

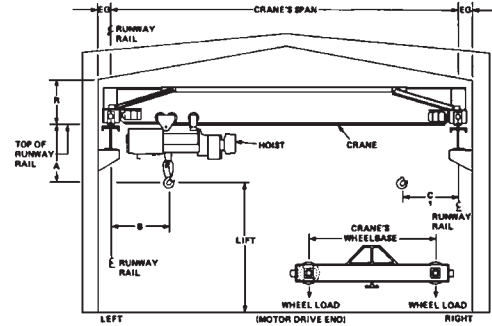
Runway beams supporting top-running cranes are generally made of standard structural sections; a combination of wide-flange beam and capping channel is typical. Because wheels of these cranes travel on top of the rails and not on the actual beams, hardened proprietary tracks are not necessary.

The crane wheels exert the same three kinds of reactions on the runway beam as described in Sec. 15.4.2, but applied at the top flange (Fig. 15.12). The AISC Specification and the IBC assign equal factors for vertical impact, lateral, and longitudinal forces regardless of capacity. Other sources recommend a sliding-scale approach, designing heavier-duty cranes for proportionally larger loads. For example, Weaver¹³ suggests adjusting the load values according to the CMAA service classification of the crane. The cranes of CMAA class A would be designed for a vertical impact of 10 percent, lateral load of 10 percent, and longitudinal load of 5 percent of the wheel loads, while the cranes of class F would be designed for 25 to 50 percent, 15 to 20 percent, and 20 to 30 percent, respectively. For the majority of CMAA service classifications, this approach results in higher design loading than required by AISC.

Single girder top running crane

Top running cranes operate on runway rails and are excellent installations where the runway rails can be supported from building columns.

The main advantage of top running cranes is that it can be added to existing structures with relative ease through the use of additional columns to support the runway rail.



Capacity in Tons	Crane Max. Span in feet	Top of Rail to Upper Hook Position in inches A	Min. Hook Approach in inches B	Min. Hook Approach in inches C	Min. Side Clearance of Crane in inches EG (a)	Min. Overhead Clearance of Crane in inches R (a)	Wheel Base in feet WB	Crane Product Number	Crane Wt. in lbs.	Wheel Load Per Pair in lbs. WL (b)
1	20	24-5/8	30	31	7	14	5'-0"	5360020	1,880#	1,860#
	30	23-5/8	30	31	7	21	5'-0"	5360040	2,930#	2,150#
	40	25-5/8	30	31	7	21-1/4	5'-0"	5360070	4,560#	2,600#
	50	25-5/8	29	32	7-3/4	25-1/4	8'-4"	5360100	7,130#	3,300#
	60	28-3/8	29	32	7-3/4	28-1/2	8'-4"	5360120	10,300#	4,180#
2	20	25-3/8	31	38	7	16	5'-0"	5360140	2,090#	3,080#
	30	25-3/8	31	38	7	16-1/4	5'-0"	5360170	2,970#	3,330#
	40	25-3/8	31	38	7	21-1/4	5'-0"	5360190	4,560#	3,760#
	50	25-3/8	32	40	7-3/4	25-1/4	8'-4"	5360220	7,430#	4,550#
	60	28-1/8	32	40	7-3/4	28-1/2	8'-4"	5360240	10,300#	5,340#
3	20	26-1/2	41	33	7	21	5'-0"	5360270	2,410#	4,710#
	30	28-1/2	45	33	7	16-1/4	5'-0"	5360290	2,970#	4,860#
	40	28-1/2	49	33	7	21-1/4	5'-0"	5360310	4,560#	5,300#
	50	28-1/2	57	33	7-3/4	25-1/4	8'-4"	5360340	7,430#	6,090#
	60	31-1/2	61	33	7-3/4	28-1/2	8'-4"	5360360	11,370#	7,170#
5	20	28-1/2	41	33	7	21	5'-0"	5360500	2,600#	7,100#
	30	26-1/2	45	33	7	21-1/4	5'-0"	5360520	3,570#	7,370#
	40	28-1/2	49	33	7	21-1/4	5'-0"	5360540	4,790#	7,710#
	50	28-1/2	57	33	7-3/4	25-1/2	8'-4"	5360580	8,150#	8,630#
	60	31-1/2	61	33	7-3/4	28-1/2	8'-4"	5360600	11,370#	9,510#
7-1/2	20	34-1/8	35	33	7-1/2	18-3/4	5'-0"	5360760	3,120#	10,600#
	30	31-5/8	39	33	7-1/2	23-1/4	5'-0"	5360780	4,030#	10,850#
	40	31-5/8	43	33	7-1/2	27-1/2	5'-0"	5360810	6,150#	11,430#
	50	32-1/8	51	33	8-1/2	27-1/2	8'-4"	5360840	9,990#	12,490#
	60	34-5/8	55	33	8-1/2	30-1/2	8'-4"	5360860	12,350#	13,140#
10	20	34-1/8	35	33	7-1/2	18-3/4	5'-0"	5360890	2,790#	13,380#
	30	31-5/8	39	33	7-1/2	23-1/4	5'-0"	5360920	4,130#	13,750#
	40	31-5/8	43	33	7-1/2	27-1/2	5'-0"	5360940	6,170#	14,310#
	50	31-5/8	51	33	8-1/2	30-1/2	8'-4"	5360970	9,770#	15,300#
	60	34-5/8	55	33	8-1/2	30-1/2	8'-4"	5360990	12,350#	16,010#

- (a) This dimension includes OSHA minimum 2 inch lateral clearance and 3 inch vertical clearance.
- (b) Wheel load includes allowance of 15% impact with a maximum hoist speed of 30 FPM standard industrial service. Refer to Acco Structural Beam Guide for other requirements.

Hoists for Single Girder Cranes

Capacity in Tons	Hoist Product #	Bridge Speed (FPM)	Hoist Speed (FPM)	Trolley Speed (FPM)	Hoist Lift in Feet	Hoist Wt.
1	2214600	70	16	65	20	350#
2	2215180	70	15	65	20	380#
3	3250360	70	15	65	23	1,080#
5	3250420	70	15	65	23	1,160#
7-1/2	3373950	70	15	65	25	2,030#
10	3374010	70	12	65	25	2,030#

NOTE: Hoists are single speed with single speed trolley. The 1 and 2 ton hoists are single reeved units. Hook approaches B & C are approximate. Hook moves lateral from high to low hook position. If necessary contact Acco representative for actual dimensions. The 3, 5, 7-1/2 and 10 ton hoists are double reeved units.

FIGURE 15.10 Dimensional and loading data for single-girder, top-running cranes. (FKI Industries, Inc.)