Design Loads
Live Loads
Example 2

For the crane with the following parameters determine the forces for parts a through c:
- Bridge Weight = 10,000 lbs
- Bracket Weight = 150 lbs
- Crane Rail = 400 lbs
- Hoist Weight = 300 lbs
- Hook Weight = 100 lbs
- Runway Beam = 1500 lbs
- Trolley = 1100 lbs
- Crane Capacity = 10 Tons
- Crane is Radio Operated

Determine the following Forces:
a) Max Wheel Load
b) Vertical Impact Force
c) Lateral Force
d) Longitudinal Force

CRANE LOADS → SECTION 4.7

a) MAX WHEEL LOAD → SECTION 4.9.2

$$WL = \frac{RC + HT + CW(0.5)}{\#WHEELS/SIDE} \longrightarrow$$

RC = RATED CAPACITY
HT = HOIST & TROLLEY & HOOK
CW = BRIDGE WEIGHT

$$= \frac{10\ TONS\left(2000\ lbs/TON\right) + \left(300\ lbs + 1100\ lbs + 100\ lbs\right) + 10000\ lbs\left(0.5\right)}{4\ WHEELS/2\ SIDES}$$

$$= 13250\ lbs$$

$\boxed{WL = 13250\ lbs}$

b) VERTICAL IMPACT FORCE → 4.9.3

$$VI = 1.25\left(13250\ lbs\right)$$
$$= 16562.5\ lbs$$

$\boxed{VI = 16562.5\ lbs}$

c) LATERAL FORCE → 4.9.4

$$LAT = \frac{0.2(RC + HT)}{\#WHEELS} = \frac{0.2\left(10T\left(2000\ lbs/T\right) + \left(300\ lbs + 1100\ lbs + 100\ lbs\right)\right)}{4}$$

$$= 1075\ lbs$$

$\boxed{LAT = 1075\ lbs}$

d) LONGITUDINAL FORCE → 4.9.5

LONG = 0.1 WL

$\quad$ = 0.1 (13250 lbs)

$\quad$ = 1325 lbs

LONG. = 1325 lbs

1075#

13250#

1325#

1075#

13250#

1325#

13250#

1325#

13250#

1075#

13250#

1075#

1325#

1325#