

All information, calculations, etc. from Paul J. Ford Structural Engineers, Columbus, OH.
August 2022

In order to execute the following calculations, you will need to know two pieces of information about the vehicle in question: the GVW (Gross Vehicle Weight) and the number of axles.

For vehicles with only two axles:

$$\text{Front Axle load} = (\text{GVW}) \times (0.20)$$

$$\text{Rear Axle Load} = (\text{GVW}) \times (0.80)$$

For vehicles with more than two axles:

$$\text{Front Axle Load} = (\text{GVW}) \times (0.20)$$

$$\text{Rear Axle Load} = \frac{(\text{GVW}) \times (0.80)}{(\# \text{ of Rear Axles})}$$

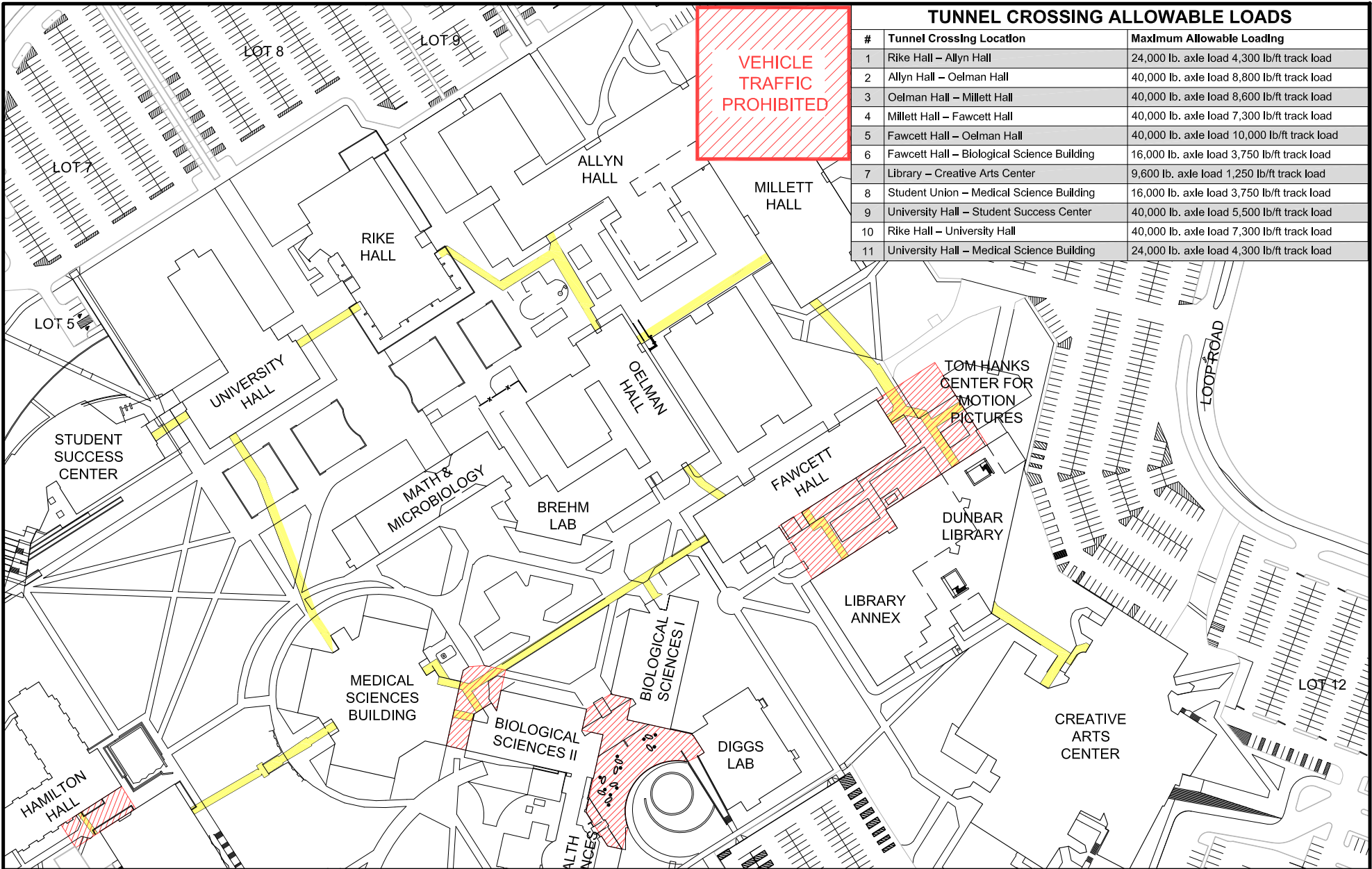
This approximation does not apply to vehicles on tracks such as dozers or certain mobile cranes. For those situations you must use the following calculation method.

For track vehicles

$$\text{Track Load} = \frac{\text{Operating Weight}}{2 \times (\text{Track Length in feet})}$$

TUNNEL CROSSING ALLOWABLE LOADS

	Tunnel Crossing Location	Maximum Allowable Loading
1	Rike Hall – Allyn Hall	24,000 lb. axle load 4,300 lb/ft track load
2	Allyn Hall – Oelman Hall	40,000 lb. axle load 8,800 lb/ft track load
3	Oelman Hall – Millett Hall	40,000 lb. axle load 8,600 lb/ft track load
4	Millett Hall – Fawcett Hall	40,000 lb. axle load 7,300 lb/ft track load
5	Fawcett Hall – Oelman Hall	40,000 lb. axle load 10,000 lb/ft track load
6	Fawcett Hall – Biological Science Building	16,000 lb. axle load 3,750 lb/ft track load
7	Library – Creative Arts Center	9,600 lb. axle load 1,250 lb/ft track load
8	Student Union – Medical Science Building	16,000 lb. axle load 3,750 lb/ft track load
9	University Hall – Student Success Center	40,000 lb. axle load 5,500 lb/ft track load
10	Rike Hall – University Hall	40,000 lb. axle load 7,300 lb/ft track load
11	University Hall – Medical Science Building	24,000 lb. axle load 4,300 lb/ft track load



VEHICLE
TRAFFIC
PROHIBITED

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7	Library – Creative Arts Center	9,600 lb. axle load 1,250 lb/ft track load
8	Library – Student Success Center Building	16,000 lb. axle load 3,750 lb/ft track load
9	University Hall – Student Success Center	40,000 lb. axle load 5,500 lb/ft track load
10	Rike Hall – University Hall	40,000 lb. axle load 7,300 lb/ft track load
11	University Hall – Medical Science Building	24,000 lb. axle load 4,300 lb/ft track load



**DAYTON TUNNEL
AXLE LOADS**



Facility Operations
937-775-4444
construction@wright.edu

August 9, 2022

Wright State University
3640 Colonel Glenn Hwy
Dayton, Ohio 45435

Attn: Mr. Rob Thompson, University Architect

Re: WSU 190003 Pedestrian Tunnel Renewal – Phase 3
Reinforcement of University/Rike Tunnel Roof
PJF Project No.: A00021-0236

Dear Mr. Thompson,

Paul J. Ford & Company (PJF) was hired in 2015 to perform a structural assessment of the tunnel system at Wright State University. That assessment found areas of concern, including cracks, leaks and spalled concrete in the roof slab of the tunnels as well as rust and deterioration of steel hangers supporting piping cable trays. Also, as part of that assessment PJF analyzed each tunnel to determine its capacity to carry the loading criteria defined by AASHTO and the Ohio Building Code.

THP Limited, Inc. was hired in 2020 to provide construction documents to correct these issues in many of the tunnels on campus. This was Phases 1 and 2 of what was named the Pedestrian Tunnel Renewal Project. PJF was hired in 2022 to complete construction documents for the third and final phase of this same project. It included addressing spalled concrete and leaks in the Dunbar to CAC tunnel. This phase also included reinforcing the roof of the tunnel between University Hall and Rike Hall. This tunnel is underneath a fire lane required by the fire department to access the interior of the campus in the event of a fire. This tunnel had been determined to only have an AASHTO load rating of H15-44 (max 24,000 lb axle load) and tracked vehicle load rating of 4,300 lb/ft per track. The largest fire department vehicles fall in the AASHTO H25-44 load rating (max 40,000 lb axle load). Phase 3 of this project addressed this deficiency by reinforcing the underside of the tunnel roof that is beneath the fire lane with carbon fiber reinforcing strips set in epoxy. This part of the project was completed and punched out in July of 2022.

Given this information, we have determined that the concrete footing, walls, and roof (reinforced with carbon fiber) construction of the University Hall to Rike Hall tunnel is able to safely support the gravity loads of the earth/pavement fill above the tunnel plus the axle live loads of a fire truck (max 40,000 lb axle load) or a tracked vehicle live load of 7,300 lb/ft track load.

If you have any further questions or need additional information, please contact us.

Sincerely,

PAUL J. FORD & COMPANY

Jeff McCutchen

Jeffrey E. McCutchen, P.E.
Project Manager

Attachment(s): None

