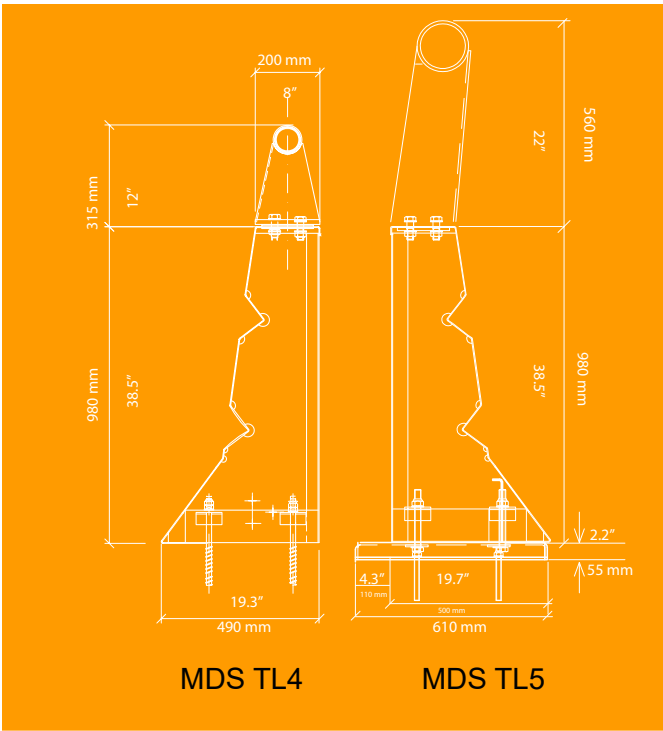




FHWA Approved



**HIGH PERFORMANCE
Road & Bridge
Steel
Safety
BARRIER**

Designed with Progressive SRS[®]
Stress Reduction System

MDS[®] TL4 & TL5

**BRIDGE DECK IMPACT
TRANSMISSION FORCES**

With Progressive Stress Reduction System[®]

MDS BARRIERS

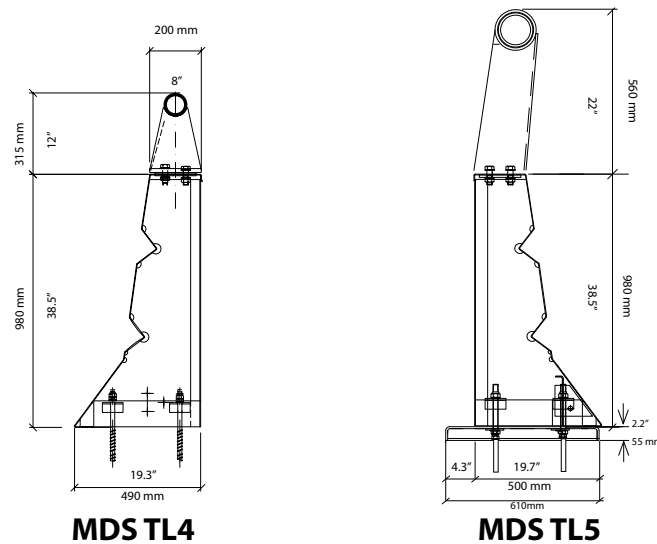
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MDS® TL4 & MDS® TL5 BRIDGE DECK IMPACT TRANSMISSION FORCES

Introduction

MDS® BARRIERS has completed crash testing specifically for bridge deck stress forces which were not known until now unless estimated by a mathematical calculation. Today MDS® BARRIERS provides real life deck stress test data values helping engineers quickly determine if the level of impact at TL4 and TL5 is well below the bridges design resistance. Utilizing a barrier that may contain a vehicle but exceed the design resistance forces of the bridge deck can create hidden structural damage further weakening the bridge deck. Rehabilitating bridges is a continuous ongoing engineering task, knowing the horizontal, vertical and moment stress force values helps solve the mysteries of estimating deck strength at any given time.

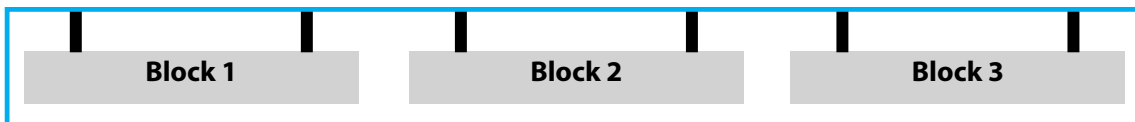


Impact transmission forces into a bridge deck

Test Deck Design

The MDS® BARRIER is anchored on an edge slab, having the length of 12 m. The edge slab is supported by 3 identical concrete cantilever slabs (block 1, block 2 and block 3), each being 4 m long.

Figure 1



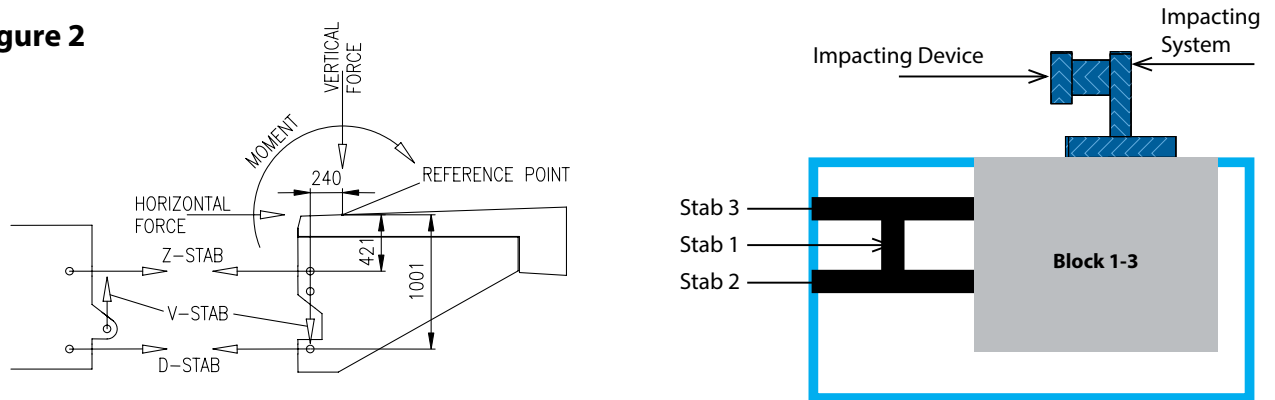
Test Data

The loads acting on bridge deck were measured by BAST, in test TB 51 for the MDS TL4 H2 barrier and in test TB 81 for the MDS TL5 H4 barrier. The measurements were taken by 18 dynamometers over a length of 12 m of the bridge deck. The forces measured by the dynamometers are indicated as Z-Stab, V-Stab and D-STAB in figure 2. From the time history of such forces, the horizontal force, the vertical force and the moment were then computed, per unit deck length, for the two tests.

NOTE

Figures 1-5 illustrate the design of the test deck and how the crash test deck loads were measured and recorded, not how they would be installed in the field.

Figure 2



Each of the test deck measuring suspension blocks includes 3 dynamometer rods:

V-STAB (Stab 1 in Figure 2) vertical;

D-STAB (Stab 2 in Figure 2) horizontal, 1001 mm below the reference point;

Z-STAB (Stab 3 in Figure 2) horizontal, 421 mm below the reference point.

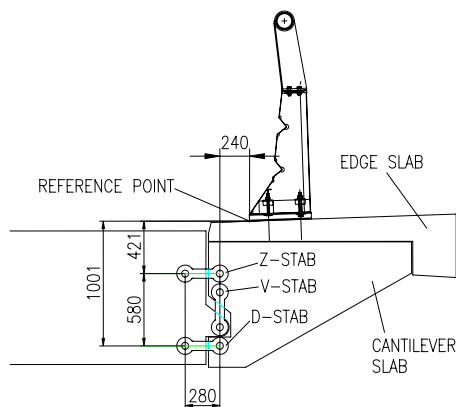


Figure 3

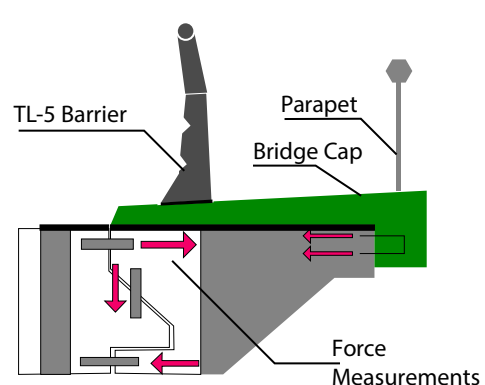


Figure 4

Figure 3 & 4 shows a cross section of the barrier installation with the location and the dimensions of the test deck measuring suspensions (2 for each cantilever slab). Figure 5 shows one concrete cantilever slab, before installation, with its two measuring suspensions.

The loads are reduced to two forces applied to the Reference Point, plus a moment about the same point. The Reference Point is located at the extreme position of the barrier on traffic side, at pavement level. The measurements from dynamometer rods are positive for rod in tension and negative for compression.



Figure 5
Reinforced concrete cantilever slab fixed on 2 measuring suspensions

Impact Force Test Results

Highest forces per unit deck length

MDS TL4 BRIDGE DECK IMPACT FORCES	
HORIZONTAL FORCE	57.1 kN/m
VERTICAL FORCE	46.8 kN/m
MOMENT	57.2 kNm/m
WEIGHT	
Lbs per foot	Kgs per meter
54	81

MDS TL5 BRIDGE DECK IMPACT FORCES	
HORIZONTAL FORCE	61.8 kN/m
VERTICAL FORCE	116.0 kN/m
MOMENT	68.1 kNm/m
WEIGHT	
Lbs per foot	Kgs per meter
88	130



For full test data report or more information, please contact us at info@mdsbarriers.com
Or call 860-289-8033

www.MDSBARRIERS.com