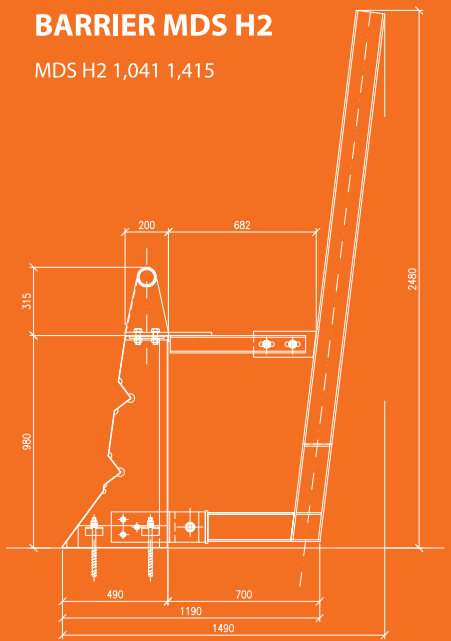
ROAD BARRIER SYSTEMS

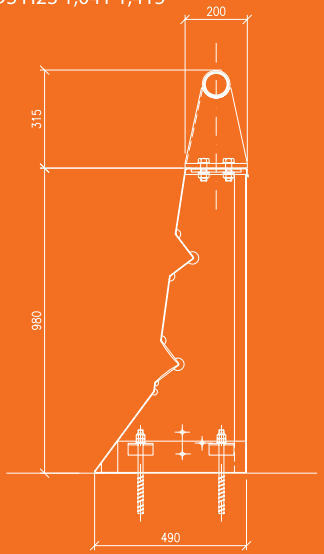
BARRIER MDS H2

MDS H2 1,041 1,415



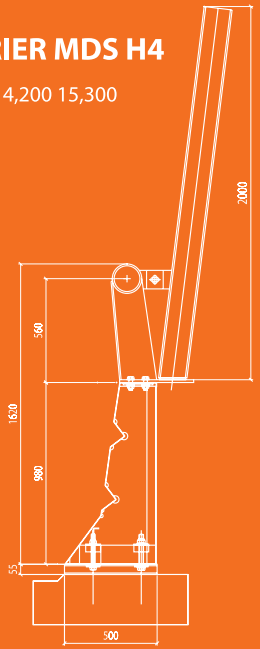
BARRIER MDS H2S

MDS H2S 1,041 1,415



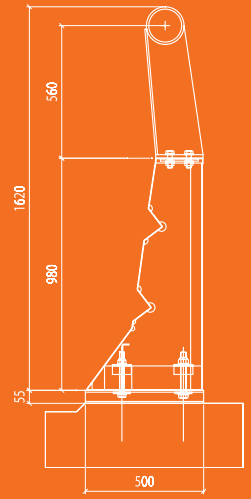
BARRIER MDS H4

MDS H4 4,200 15,300



BARRIER MDS H4S

MDS H4S 4,200 15,300



Two new bridge railing systems have been developed by MDS that incorporate both a Report 350 tested bridge railing safety system and a noise wall. Both MDS bridge railings have been tested in Europe at the equivalent of Report 350 test levels three and five. The new MDS bridge rail systems provide double protection: protection against the collision of vehicles and against noise pollution. The integration of both the safety barrier and the noise-protection barrier within a single bridge railing system provides considerable savings in terms of occupied space, supporting sub-structures and overall cost. The special backward positioning of the noise-protection barrier requires less lateral space on the bridge deck and also makes the disposal of snow easier. This dual-function system has been successfully crash tested by BASt at the TÜV test-track in Munich, Germany.

4

A small car full-scale crash test of the MDS H2 bridge railing with a noise-wall installed (i.e., the Report 350 test level three version) was performed by BASt at the TÜV test-rack in Munich, Germany according to the EN 1317 test TB11 specifications, essentially the same test as specified in Report 350 test 3-10.

The test evaluation criteria demonstrated that the impact with the small car satisfies all the safety requirements of both NCHRP Report 350 and the EN 1317 Standard. In particular, the vehicle was smoothly re-directed within the allowable limits and all the pertinent occupant risk parameters were well below the preferred design values. The bridge railing experienced minor damage and the noise-protection barrier remained intact.

A second full-scale crash test was performed on MDS H2 bridge railing with a noise-wall installed using a 29,000-lbs intercity bus at the TÜV test-field in Munich, Germany using the EN 1317 test TB51 specifications, a test not required by Report 350 but much more severe than the usual test level three tests and very similar to the old Report 230 supplemental test S19. The test demonstrated that the bridge railing can contain and safely redirect a heavy vehicle since all the evaluation parameters specified in the European EN1317 specification were satisfied. In particular, the colliding vehicle was contained by the bridge railing, the area involved in the impact was limited and the vehicle remained upright. The forces transmitted by the impact of the bus to the bridge deck were determined using an instrumented bridge deck at the TÜV test facility in Munich. The maximum lateral force on the deck was always less than 1,040 lbs/ft and the bending moment was less than 1,415 ft-kips/ft of bridge deck.

5







The MDS H2 bridge railing system has been used in the field in Europe and has been evaluated in-service under heavy snow conditions. The bridge railing allows snow to be easily removed and prevents it from accumulating on the roadway. In fact, a normal snow-plow blade is able to project the snow beyond the bridge railing where the snow then can fall between the free space provided between the noise-protection panel and the bridge railing.

H4

Another series of full-scale crash tests were performed on the MDS H4 bridge railing without a noise-wall installed. First, a small car full-scale crash test was performed by BASt at the TÜV test-track in Munich, Germany according to the EN 1317 test TB11 specifications, essentially the same test as specified in Report 350 test 5-10. The test evaluation criteria demonstrated that the impact with the small car satisfies all the safety requirements of both NCHRP Report 350 and the EN 1317 Standard. In particular, the vehicle was smoothly re-directed within the allowable limits and all the pertinent occupant risk parameters were well below the preferred design values. The bridge railing experienced minor damage.

A second full-scale crash test was performed using an 84,000-lbs articulated tractor trailer truck on the same bridge railing system at the TÜV test-field in Munich, Germany using the EN 1317 test TB81 specifications, a test very similar to Report 350 test 5-12. The test demonstrated that the bridge railing can contain and safely redirect a heavy vehicle since all the evaluation parameters specified both in Report 350 for test 5-12 and in the European EN1317 specification were satisfied. In particular, the colliding vehicle was contained by the bridge railing, the area involved in the impact was limited and the vehicle remained upright. The forces transmitted by the impact of the tractor trailer truck to the bridge deck were determined using an instrumented bridge deck at the TÜV test facility in Munich. The maximum lateral force on the deck was always less than 4,200 lbs/ft and the bending moment was less than 15,300 ft-lbs/ft of bridge deck.

9

The MDS H2 bridge railing system has been approved for use both with and without the noise-wall in Ireland, Great Britain and Hungary. It has also been approved as a safety barrier with the noise wall in Germany and Austria. European approval of the MDS H4 bridge railing has been obtained in Germany, Austria, Ireland, Great Britain and Hungary, FHWA approval of the MDS H2 bridge railing for test level three conditions and the MDS H4 bridge railing for test level five conditions has been requested and is expected shortly.

The forces transmitted by the impact in the two heavy vehicle tests were measured during the full-scale crash test experiments and are shown below.

Bridge Railing	Lateral Force lbs/ft of bridge	Bending Moment ft-lbs/ft of bridge
MDS H2	1,041	1,415
MDS H4	4,200	15,300

M.D.S. - LLC - 186 Staples Hill Road - Canton ME 04221 **-** Tel. 207 597 2771 - www.mds-bridgerails.com
E-mail: mhray@mds-bridgerails - info@mds-bridgerails - sales@mds-bridgerails - marta@mds-bridgerails