MINISTRY OF REGIONAL AFFAIRS AND

AND PUBLIC WORKS

Regulation No RD-02-20-1 of 1 April 2024
on the terms and conditions for the use of road restraint systems and requirements to them
(Published in State Gazette No 33 of 12 April 2024, corr., No 35 of 2024, corr., No 63 of 2024)

Chapter One
GENERAL PROVISIONS

Article 1. (1) This Regulation lays down:

1. the terms, conditions and requirements for the preparation of a project for the implementation of road restraint systems (RRS);

2. the types and varieties of RRS;

3. the performance classes, technical requirements and essential characteristics of the elements of the RRS;

4. the selection criteria and implementing rules for the RRS.

(2) The Regulation shall apply to roads open to public use within the meaning of the Road Traffic Law (RTL).

(3) The Regulation shall apply to the design for securing hazards related to:

1. construction of new roads;

2. reconstruction, overhaul and maintenance of existing roads;

3. replacement of existing RRS which do not meet the requirements of standards BDS EN 1317 “Road restraint systems” (BDS EN 1317) and this Regulation;

4. securing places or sections on existing roads with a concentration of traffic accidents (TA).

(4) The Regulation shall not apply to RRSs in tunnels, as well as to existing facilities protecting the road from falling stones and landmass.

(5) Damaged RRSs shall be rebuilt according to the approved project.

Article 2. The purpose of the Regulation is to improve the safety of road infrastructure by:

1. preventing a motor vehicle (MV) from entering into a road lane or carriageway for oncoming traffic;

2. preventing a MV from leaving the carriageway;

3. reducing the number and severity of traffic accidents;

4. securing hazardous locations and sections;

5. protection of third parties not involved in the traffic, located in sites and facilities aside from the road carriageway.

Article 3. (1) Road restraint systems shall comply with the requirements of standards BDS EN 1317.

(2) When designing the RRS, construction products that meet the requirements of Regulation (EU) No 305/2011 of the European Parliament and of the Council of 9 March 2011 laying down harmonised conditions for the marketing of construction products and repealing Council Directive 89/106/EEC (OJ L 88/04.04.2011) and Regulation No RD-02-20-1 of 5 February 2015 on the conditions and procedure for the use of construction products in the construction structures of the Republic of Bulgaria, shall be provided and used during construction.

(3) The declaration on performance indicators accompanying the RRS shall contain information on the levels and classes of performance of the essential characteristics, as well as an assessment of durability, including the technical characteristics of the materials and protective coatings used.

(4) When constructing the RRS, the manufacturer's installation instructions shall be followed.

(5) For the implementation of the RRS, a project shall be elaborated, either independently or as part of the investment project, which shall be prepared by persons with full design capacity within the meaning of Article 230 of the Spatial Planning Act for the project parts: "Transport Planning and Design", "Traffic Organisation and Safety" and "Temporary Traffic Organisation and Safety".

(6) The project referred to in paragraph 5 shall contain at least:

1. An explanatory note containing the reasons for the selection of the relevant RRS;

2. A situation, with the exact location of all road elements plotted, which are categorised as a hazard under Article 74 of Regulation No RD-02-20-2 of 2018 on road design (Regulation No RD-02-20-2 of 2018). The RRS' shall be plotted on the same drawing, indicating their performance – degree of restraint, degree of impact force, class according to the degrees of the normed area of operation, length, type and class (where applicable) of the start and end elements, transition areas, etc.;

3. A standard cross-section of the road showing the location of the RRS in relation to the edge of the pavement and the main performance indicators of the RRS;

4. Bill of quantities.

Chapter Two

TYPES OF ROAD RESTRAINT SYSTEMS. ELEMENTS. TECHNICAL REQUIREMENTS. PERFORMANCE CLASSES

Section I

Types of road restraint systems and their elements

Article 4. (1) The main components of the RRS are: safety barrier, starting and end element, transitional elements, shock absorbing buffer, motorcyclist protection elements, combined guardrail for cars and pedestrians and pedestrian parapets.

(2) Light reflectors C14.1 shall be mounted on safety barriers in accordance with requirements of the Regulation laying down the terms and procedures for the use of the traffic signs, as it is referred to in Article 14(1) of the RTL, and which shall not affect the proper functioning of the RRS.

Article 5. (1) The types of RRS shall include vehicle restraint systems and pedestrian restraint systems.

(2) Depending on installation, the types of RRSs are:

1. Permanent road restraint systems which are permanently mounted sideways or in the median dividing strip along the road and may be deformable or non-deformable;

2. Temporary road restraint systems which are temporarily installed on the carriageway, to the side or in the dividing strip of the road, and may be deformable or non-deformable.

(3) The types of RRS as per BDS EN 1317, depending on the material they are made of, shall be:

1. steel restraint systems;-

2. concrete and reinforced concrete restraint systems;

3. compound restraint systems.

(4) The types of RRS depending on the intended use according to BDS EN 1317-2 “Road restraint systems. Part 2: Performance classes, impact test acceptance criteria and test methods for safety barriers including vehicle parapets” (BDS EN 1317-2), are:

1. for low-angle impact application, such as a temporary RRS in cases of temporary traffic organisation and safety, types T1, T2, T3;

2. with a normal degree of restraint, types N1, N2;

3. with increased degree of restraint, types H1, L1,H2, L2, H3, L3;

4. with a very high degree of restraint, types H4a, H4b, L4a, L4b;

5. to protect motorcyclists in the event of falling into a curve;

6. to secure against impact with point obstructions.

Article 6. 1) The road safety barriers shall be constructed within the range of the banquet, side-walk or median dividing strip along the road and shall comply with the requirements of BDS EN 1317-2.

(2) All metal elements of the RRS shall be treated anti-corrosively by hot-dip galvanizing in accordance with Table 3 of BDS EN ISO 1461 “Hot dip galvanized coatings on fabricated iron and steel articles. Specifications and test methods”. The repair of damaged elements shall be carried out in accordance with item 6.3 of BDS EN ISO 1461.

(3) Fasteners for RRS shall be treated anti-corrosively by hot-dip galvanising in accordance with the requirements of Table 4 of BDS EN ISO 1461.

(4) The use of fasteners for safety barriers treated by electrochemical means shall not be permitted.

(5) No operations such as welding, cutting, etc. shall be carried out after application of the corrosion protection coating on the elements referred to in paragraphs 2 and 3, except in the cases regulated in BDS EN ISO 1461:2023 under item 6.3 “Restoration”.

Article 7. (1) The start and end of the RRS to the right in the direction of traffic or in the dividing strip shall be formed by start and end elements which are: buffers, terminals, long or short zeroing.

(2) The requirements for the implementation of start and end elements of the RRS shall be in accordance with Annex No 1.

(3) No interruption of the RRS in the area of the expansion joints of the facilities shall be allowed. Expansion elements shall be used.

Article 8. The transitional elements shall be applied for the connection between two safety barriers having different structure and/or different characteristics, except in the case of a connection between two safety barriers of the same cross-section and material used and with a difference in the areas of operation of not more than one class.

Article 9. (1) Motorcyclist protection elements for motorcyclists are strips, bars or rails mounted to the RRS at hazardous locations with the potential risk of motorcyclists slipping, and serve to reduce the impact of a fallen motorcyclist colliding with the vehicle restraint system.

(2) The protection referred to in paragraph 1 may be executed as a separate RRS with enhanced protection, with no sharp edges or corners, and consecutively connected RRSs, preventing the motorcyclist from sliding under the barrier. The elements shall meet the requirements of SD CEN/TS 17342:2019 “Road restraint systems”, “Road restraint systems for motorcycles that reduce the impact force in cases of collisions of motorcyclists with safety barriers” (SR CEN/TS 17342:2019).

Article 10. (1) The shock absorbing buffers shall be used in the separation of traffic flows and in case of an obstruction within the safety area.

(2) The shock absorbing buffers, depending on their intended use, shall be diverting (R) and non-diverting (NR). The shock absorbing buffers shall comply with the requirements of BDS EN 1317-3 “Road restraint systems. Part 3: Performance classes, impact test acceptance criteria and test methods for crash cushions”.

(3) Instead of non-deflective (NR) shock absorbing buffers, elements for the start and end terminals can be used.

Article 11. (1) Combined vehicle and pedestrian guardrail shall be used where the RRS serves as a safety barrier for vehicles and as a pedestrian parapet, as the test under BDS EN 1317-2 shall be with higher priority over the test under SD CEN/TR 16949:2016 “Road restraint systems. Pedestrian restraint systems. Pedestrian railings” (SD CEN/TR 16949:2016).

(2) Pedestrian parapets are structures that are built to the outer edge of road facilities, pedestrian bridges, retaining walls and in locations, where it is necessary to restrict pedestrian access to the carriageway. Pedestrian railings shall meet the requirements of SD CEN/TR 16949:2016.

Section II
Performance classes of road restraint systems

Article 12. (1) The RRS performance classes shall be determined in accordance with the results of an impact test according to BDS EN 1317-2, as a combination of the following test results obtained: retention rate, degree of impact force, and deformation, expressed as area of operation and zone of normed encroaching of the vehicle into an unprotected area. The impact test criteria shall be according to the indicators in Table 1.

Table 1.

Test	Impact speed km/h	Impact angle Degrees	Gross vehicle mass kg	Type of vehicle
TB 11	100	20	900	Car
TB 21	80	8	1,300	Car
TB 22	80	15	1,300	Car
TB 31	80	20	1,500	Car
TB 32	110	20	1,500	Car
TB 41	70	8	10,000	Freight vehicle without trailer
TB 42	70	15	10,000	
TB 51	70	20	13,000	Freight vehicle without trailer
TB 61	80	20	16,000	
TB 71	65	20	30,000	Bus
TB 81	65	20	38,000	Freight vehicle without trailer
				Freight vehicle without trailer
				Auto train – TIR

(2) When tested against the criteria set out in Table 1 of paragraph 1, the retention rates for safety barriers and railings for vehicles (T, N, H and L) shall meet the requirements specified in Table 2.

Table 2.

Retention rates				Acceptance test
Small-angle impact retention	**T1**			TB 21
	T2			TB 22
	T3			TB 41 and TB 21
Normal retention rate	**N1**			TB 31
	N2			TB 32 and TB 11
Increased retention rates	**H1**			TB 42 and TB 11
	L1			TB 42 and TB 32 and TB 11
	H2			TB 51 and TB 11
	L2			TB 51 and TB 32 and TB 11
	H3			TB 61 and TB 11
	L3			TB 42 and TB 32 and TB 11
Very high retention rate	**H4a** **H4b**			TB 71 and TB 11 TB 81 and TB 11
	L4a **L4b**			TB 71 and TB 32 and TB 11 TB 81 and TB 32 and TB 11

(3) The temporary safety barriers shall have a T3 retention rate and permanent safety barriers shall have a retention rate of at least N2.

(4) The degrees of impact force shall be: A, B and C, whereas degree A provides the highest level of protection for passengers. The corresponding values shall be as indicated in Table 3.

Table 3.

Degree of impact force	**Values of coefficients**		
A	ASI ≤ 1.0	and	THIV (Theoretical Head Impact Velocity) ≤ 33 km/h
B	ASI ≤ 1.4		
C	ASI ≤ 1.9		

(5) The area of operation (W) is an indicator defined by the normed area of operation (W_N), depending on of the maximum lateral displacement of the vehicle and of the safety barrier from the zero-line in case of impact, according to the indicators in Table 4.

Table 4.

Classes according to the degrees of normed area of operation	Degrees of normed area of operation, m
W1	$W_N \leq 0.6$
W2	$W_N \leq 0.8$
W3	$W_N \leq 1.0$
W4	$W_N \leq 1.3$
W5	$W_N \leq 1.7$
W6	$W_N \leq 2.1$
W7	$W_N \leq 2.5$
W8	$W_N \leq 3.5$

(6) The zone of normed encroaching of the vehicle into an unprotected area (*VI)* is an indicator that is determined by the normed encroaching of the vehicle *(VI_N)* as a function of the maximum lateral entry of a heavy goods vehicle (Тт) on the non-impacted side of the safety barrier, according to the indicators in Table 5.

Table 5.

Classes according to the degrees of normed encroachment of the vehicle	Degrees of normed encroachment of the vehicle, M
VI1	$VI_N \leq 0.6$
VI2	$VI_N \leq 0.8$
VI3	$VI_N \leq 1.0$
VI4	$VI_N \leq 1.3$
VI5	$VI_N \leq 1.7$
VI6	$VI_N \leq 2.1$
VI7	$VI_N \leq 2.5$
VI8	$VI_N \leq 3.5$
VI9	$VI_N > 3.5$

(7) The area of operation (W), the zone of normed encroaching of the vehicle into an unprotected area (VI), the dynamic deformation of the barrier (D) and the width of the barrier before impact (B) shall be according to Figure 1.

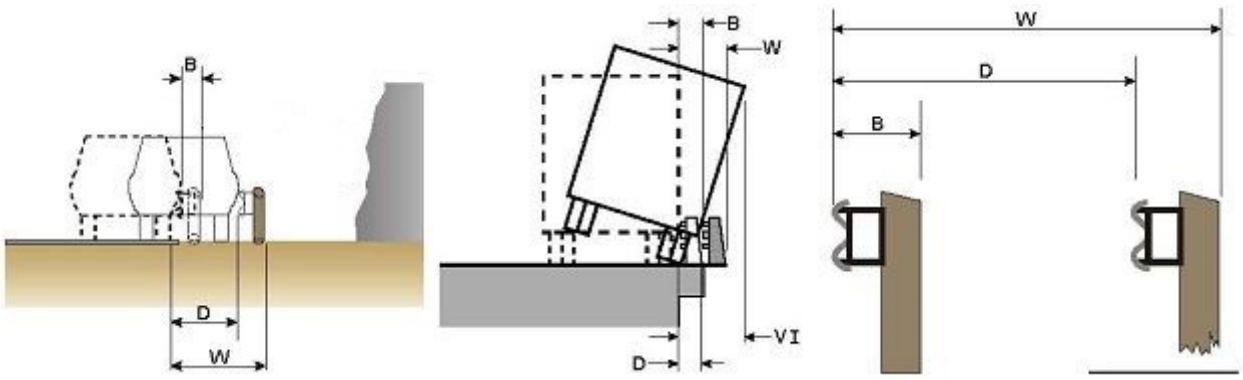


Figure 1. Area of operation (W), zone of normed encroaching of the vehicle into an unprotected area (VI), dynamic deformation of the barrier (D) and width of the barrier before impact (B)

Article 13. (1) The performance classes of the elements for the start and end terminals, depending on the speed, shall be as indicated in Table 6.

Table 6.

Performance class	Speed (km/h)
P4	110
P3	100
P2	80
P1	50

(2) The classes (degrees) of impact force of the elements for the start and end shall be Class A and Class B, as class A provides a higher degree of security for the passengers inside the vehicle.

(3) The classes of permanent lateral displacement of the elements for start and end for X - D_a and the ricochet zone for Y - D_d shall be according to the indicators in Table 7.

Table 7.

Class code		Displacement [m]	
X	1	D_a	0.5
	2		1.5
	3		3.0
Y	1	D_d	1.0
	2		2.0
	3		3.5
	4		>3,5

(4) At $V_{permissible} \leq 80$ km/h, the performance class P of the start terminal under BDS EN 1317–4 shall be P2 or greater. At $V_{permissible} = 80 - 100$ km/h it shall be P3 or greater, and at $V_{permissible} > 100$ km/h, it shall be P4. These requirements shall also apply to securing against impact of MV in single obstructions.

Article 14. (1) The performance classes for the transitional zone shall be as indicated in Table 8, in accordance with BDS EN 1317-2 and shall depend on the retention rate of the separate safety barriers which they connect.

Table 8.

to safety barriers with degree of restraint: / of safety barriers with degree of restraint**:**	**N2**	**H1**	**H2**	**H4b**
N2	N2	N2	H1	H2
H1	N2	H1	H1	H2
H2	H1	H1	H2	H2
H4b	H2	H2	H2	H4b

(2) The area of operation of the transitional zone shall not be greater than the larger area of operation of the two safety barriers connected by the element, with the exception of manually disassembled sections.

Article 15. (1) The criteria for acceptance of the shock absorbing buffers and possible applications, the degrees of operation of shock absorbing buffers, degrees of vehicle impact force, classes for shock absorbing buffers presented on the vehicle ricochet zones and dimensions of the deviation zone, as well as the zones of permanent lateral displacement shall be defined according to Tables 9 to 13.

Table 9.

Test type	Impact location	Mass of the MV (kg)	Speed (km/h)	Annex
TC 1.1.50	Frontal, in the centre	900	50	(R)(NR)
TC 1.1.80		900	80	(R)(NR)
TC 2.1.100		900	100	(R)(NR)
TC 1.2.80		1300	80	(R)(NR)
TC 1.2.100			100	(R)(NR)
TC 1.3.110		1500	110	(R)(NR)
TC 2.1.80	Frontal, ¼ of the vehicle is displaced	900[b)]	80	(R)(NR)
TC 2.1.100			100	(R)(NR)
TC 3.2.80	Frontal (in the centre)	1300	80	(R)(NR)
TC 3.2.100		1300	100	(R)(NR)
TC 3.3.110		1500	110	(R)(NR)
TC 4.2.50	Side impact at 15°	1300	50	(R)
TC 4.2.80		1300	80	(R)
TC 4.2.100		1300	100	(R)
TC 4.3.110		1500	110	(R)
TC 5.2.80	Side impact at 165°	1300	80	(R)
TC 5.2.100		1300	100	(R)
TC 5.3.110		1500	110	(R)

Table 10.

Degree	Acceptance test					
50	TC 1.1.50	-	-	-	TC 4.2.50[a)]	-
80/1	-	TC 1.2.80	TC 2.1.80	-	TC 4.2.80[a)]	-
80	TC 1.1.80	TC 1.2.80	TC 2.1.80	TC 3.2.80	TC 4.2.80[a)]	TC 5.2.80[a)]
100	TC 2.1.100	TC 1.2.100	TC 2.1.100	TC 3.2.100	TC 4.2.100[a)]	TC 5.2.100[a)]
110	TC 2.1.100	TC 1.3.110	TC 2.1.100	TC 3.3.110	TC 4.3.110[a)]	TC 5.3.110[a)]

Table 11.

Degrees of impact force	Values of coefficients		
A	ASI ≤ 1.0	and	THIV ≤ 44 km/h for tests 1, 2 and 3 THIV ≤ 33 km/h for tests 4 and 5
B	1.0 < ASI ≤ 1.4		THIV ≤ 44 km/h for tests 1, 2 and 3 THIV ≤ 33 km/h for tests 4 and 5

Table 12.

Shock absorbing buffer classes Z	Side of the impact	Side of the ricochet
	Za (m)	Zd (m)
Z1	4	4
Z2	6	6
Z3	4	≥ 4 a)
Z4	6	≥ 6 a)

Nota bene: A) For impact in the centre of the frontal side at an angle of 15°.

Table 13.

Zones of permanent lateral displacement	Displacement	
	Da (m)	Dd (m)
D1	0.5	0.5
D2	1.0	1.0
D3	2.0	2.0
D4	3.0	3.0
D5	0.5	≥ 0.5a)
D6	1.0	≥ 1.0a)
D7	2.0	≥ 2.0a)
D8	3.0	≥ 3.0a)

(2) The criteria for testing of representatives of shock absorbing buffer families shall be according to Annex 2.

Article 16. (1) The surrounding environment shall encompass the outer edge of the carriageway and the safety barrier, including its area of operation, and shall not restrict the functionality of the RRS.

(2) In a locality, the provision of paragraph 1 shall apply to roads with more than one traffic lane, with the presence of a median dividing strip and in the case of adjacent transport, water supply or communication facilities at or below the level of the road and locations with a constant flow of pedestrians.-

(3) At $\mathbf{V_{permissible}}$ exceeding 50 km/h, between the carriageway and the RRS, the construction of kerbs with a height difference greater than 8.0 cm is not permitted. The area in front of and behind the RRS shall be implemented with a degree of compaction of not less than 95 % so as to carry loads from a passenger car.

(4) Outside a locality, the provision of paragraph 1 shall apply to roads with two or more traffic lanes, with or without a median dividing strip, and a $\mathbf{V_{permissible}}$ exceeding 50 km/h, whereby no kerbs with a difference in height greater than 8.0 cm shall be built between the carriageway and the RRS. The area in front of and behind the RRS shall be implemented with a degree of compaction of not less than 95 % so as to carry loads from a passenger car.

(5) No hazards pursuant to Article 74, paragraphs 1-6 of Regulation No RD-02-20-2 of 28 August 2018 on the design of roads that would impede their functionality shall be permitted within the area of operation of the RRS under paragraphs 3 and 4.

(6) There shall be no difference in the pavement levels of the carriageway and the base of the anti-impact deflection buffer.

(7) Where it is not possible to comply with the requirements of paragraphs 3 and 4 and the kerb is greater than 8.0 cm in height, the face of the barrier and the face of the kerb shall be in planes not more than 20 cm apart.

Article 17. Additional equipment (noise protection screens, anti-glare equipment, poles for traffic signs and signposts, road equipment, etc.) shall be allowed to be fitted to the RRS in case the RRS with the additional fitted equipment is tested and classified according to BDS EN 1317.

Chapter Three
CRITERIA ON THE TERMS AND CONDITIONS FOR THE USE OF ROAD RESTRAINT SYSTEMS AND REQUIREMENTS TO THEM

Section I
Selection of road restraint systems for roads outside settlements

Article 18. (1) Prior to the selection of the RRS, the possibility to protect the hazardous location shall be verified by:

1. ensuring the safety area around the hazardous location;

2. removal of the obstruction;

3. moving away from the obstacle;

4. implementation of elements to avoid or divert from hazardous sites;

5. provision of support structures for road equipment in accordance with BDS EN 12767 “Passive safety of support structures for road equipment. Requirements and test methods” with regard to their passive safety;

6. implementation of lined gutters, rigolas and ditches of safe shape and size instead of trenches;

7. execution of gentle slopes, smooth slopes and smooth curves.

(2) No new hazardous locations shall be created in the road safety area without provision for their safety by means of a RRS.

Article 19. The need to build the RRS shall be assessed depending on the likelihood of diversion from the road. There is an increased likelihood of diversion from the road on road sections where there are:

1. radii whose ratios are outside the good range as per Figures 1 and 2 of Article 31 of Regulation No RD-02-20-2 of 2018;

2. consecutive curves with radii less than 1,5 times the minimum permissible radius according to Figures 1 and 2 of Article 31 of Regulation No RD-02-20-2 of 2018;

3. sections with unusually large changes in direction of movement, such as opposing horizontal curves;

4. sections in operation defined as ‘sections with a concentration of traffic accidents (TA)’ or where the most common accident is “carriageway departure”;

5. hazard to third parties in the vicinity of the road or to vehicle occupants.

Article 20. (1) The type of RRS outside localities shall be determined in accordance with Articles 12 to 15, Figure 2, the algorithm set out in Figure 3, and according to the specific situation and setting related to the presence and type of hazards to be secured.

(2) The areas of operation (W) of the RRS – Figure 2, shall be determined in accordance with Article 12, paragraph 5, Table 4. For RRSs located next to steep slopes and obstructions and in locations close to buildings, the zone of normed encroaching shall also be assessed, in accordance with Article 12, paragraph 6, Table 5. The distance between the front of the RRS and the edge of the road surface shall be at least 0.5 m. By way of exception, this value may be reduced to 0.3 m in cases where, in a particular situation, there is a risk of MV encroaching the unprotected area.

(3) Road restraint systems may also be placed at a distance of 0.5 m to 1.5 m or at greater distances from the edge of the road surface, depending on the minimum zones of vision, on situations necessitated by the spatial distribution or by the road situation, such as low-class roads without separate pedestrian and bicycle lanes. In these cases, the lateral spaces shall be shaped and compacted so as to ensure the operation of the protective equipment.

(4) Hazardous locations can be secured with the next higher class RRS without adversely affecting the safety objectives and if the specific situation allows it.

(5) Road restraint systems with a area of operation greater than the distance between their front side and the front edge of the hazardous location may be used at linear sites. For point obstructions this is not applicable. In any case, the higher degree of impact force shall be selected in accordance with Article 12(4).

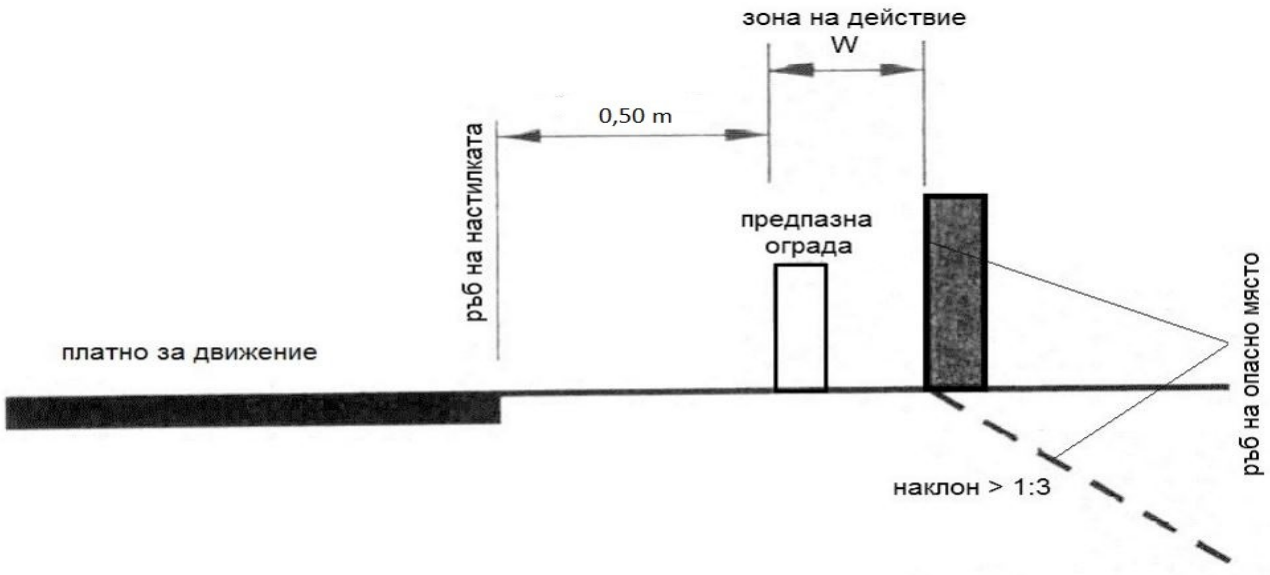


Figure 2. Area of operation of a road restraint system and distance to the carriageway

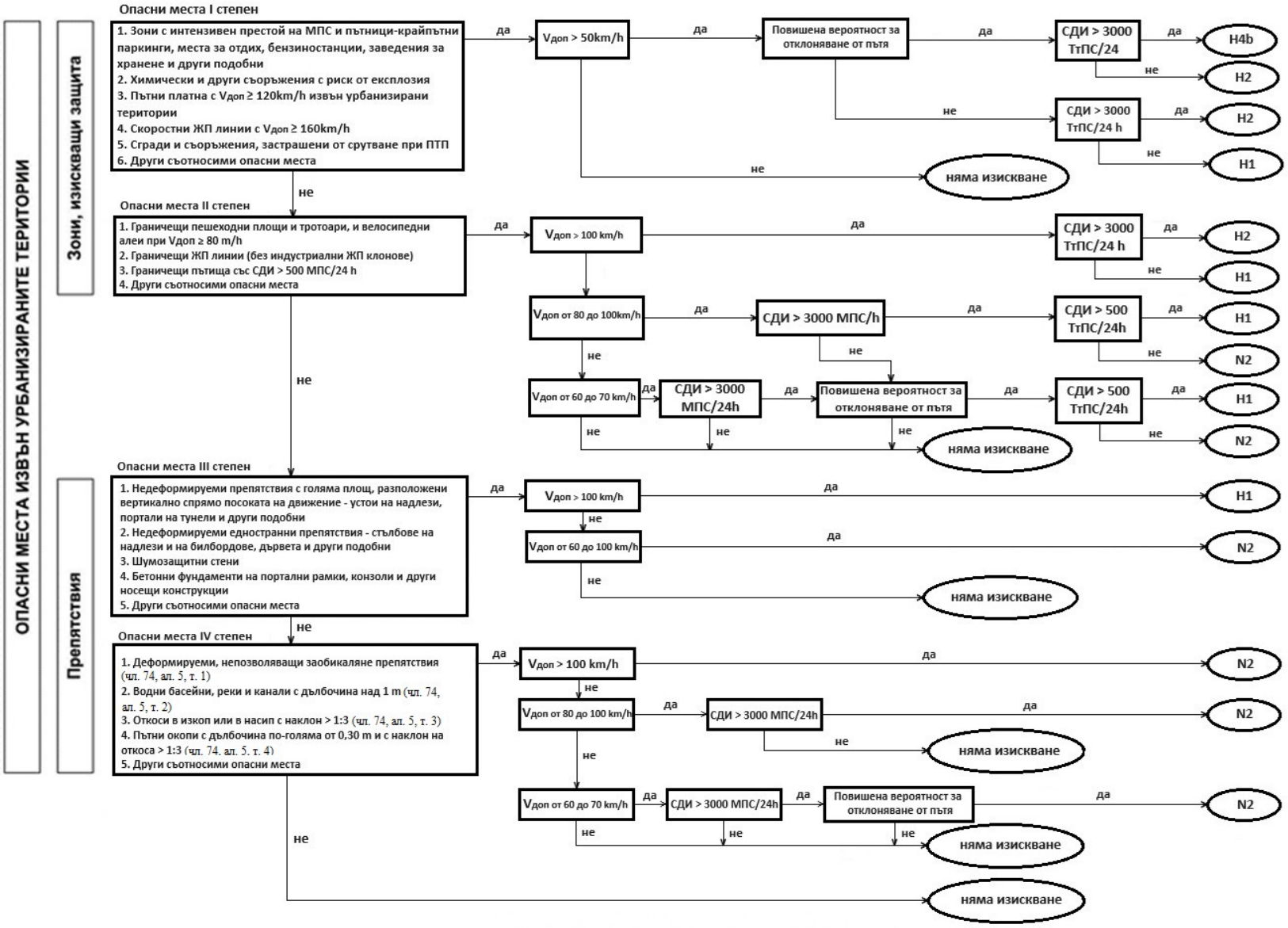


Figure 3: Algorithm for determining the retention rate of a restraint system for roads outside the urban areas

Section II

Determination of the length of the safety barrier

Article 21. (1) The minimum effective length L_1 shall be determined in the test report for each system according to BDS EN 1317-2.

(2) The length of the safety barrier L shall include: the length of hazardous location and the minimum length of RRS to prevent sliding in forward or reverse direction, before and after the hazardous location (L_2).

(3) The length of the safety barrier L shall not be less than the minimum effective length L_1. Exceptions shall be allowed where it is not possible to install a barrier having the minimum effective length and another means of protection is used.

(4) On motorways and express-ways with $V_{permissible} \geq 100$ km/h the safety barrier in the median dividing strip and on the right of the banquet shall be executed continuously along the entire route, except at entrance and exit links, junctions and roadside sites. Where the safety barrier is interrupted, at its starting point, terminals shall be installed according to BDS EN 1317-3 “Road restraint systems. Part 3: Performance classes, impact test acceptance criteria and test methods for shock absorbing buffer” (BDS EN 1317-3) or BDS EN 1317-4 “Road restraint systems. Part 4. Performance classes, impact test acceptance criteria and test methods for terminals and transitions of safety barriers”, and at the end a long zeroing shall be executed bevelled towards the ground and outwards from the edge of the pavement (BDS EN 1317-4).

(5) For roads without a median dividing strip and for speed higher than 50 km/h, at the break of the safety barrier at both ends, terminals shall be installed according to BDS EN 1317-3 or BDS EN 1317-4.

(6) For roads with a median dividing strip and speed higher than 50 km/h, at the break of the safety barrier at the beginning, terminals according to BDS EN 1317-3 or BDS ENV 1317-4 shall be installed, and at the end a long zeroing shall be performed, bevelled towards the ground and outwards from the edge of the pavement.

Article 22. (1) The variants of RRS lengths when securing obstructions, on the right in the direction of movement, shall be according to Figures 4 to 7.

(2) On a carriageway with two-way traffic before and after the hazardous location, the lengths L_2 shall be the same. In the zone of the hazardous location and at a distance $0.5L_2$ before and after it, the retention rate shall be the highest. Before and after the distance $0.5L_2$ a change is allowed – a reduction in the retention rate by one degree within the limit of distance L_2, according to Figure 4.

(3) In a carriageway with one-way traffic, distance L_2 after the hazardous location shall be 30 m. In the zone of the hazardous location including $0.5L_2$ before and 15 m after the said location, the retention rate shall be the highest. At a distance of $0.5L_2$ before and 15 m after the hazardous location, the retention rate may be changed by one degree, e.g. from H1 to H2 and back to H1, according to

Figure 5.

(4) In a carriageway with two-way traffic and in a situation where it is not possible to install elements for start and end terminals, the safety barrier shall be shaped with two-sided approaches with zeroing elements bevelled at 1:20 (where the surrounding area is limited, as an exception, at 1:12) laterally and outwards. The barrier shall be parallel to the carriageway for a length equal to the length of the hazardous location, with 10 m added before and after it, after which the bevelling shall start. The distance L_2 is equal to the length of the zeroing elements augmented by 10 m. In the case of a longer bevel zone, a change in the degree of restraint is allowed, as shown in Figure 6.

(5) In a carriageway with one-way traffic and in a situation where it is not possible to install elements for beginning and end – terminals, the safety barrier shall be shaped with one-sided approach with zeroing element bevelled at 1:20 (where the surrounding area is limited, as an exception, at 1:12) laterally and outwards. The barrier shall be parallel to the carriageway for a length equal to the length of the hazardous location, with 15 m added before and 30 m added after it. The distance L_2 is equal to the length of the zeroing element augmented by 15 m. In the case of a longer bevelling zone, a change in the degree of restraint is allowed, as shown in Figure 7.

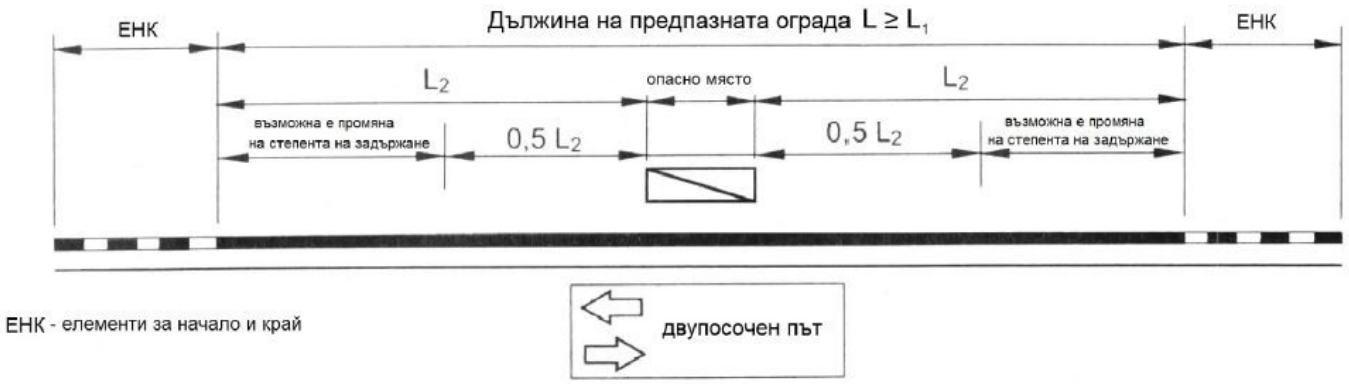


Figure 4. Minimum length of a road restraint system on a two-way road

Where:

***L** is the length of the restraint system,*

***L₁** is the minimum effective length of a road restraint system, determined according to BDS EN 1317-2 and reflected in the test report*

***L₂** is the minimum length of a road restraint system to prevent sliding in the forward or reverse direction of travel, before and after the hazardous location;*

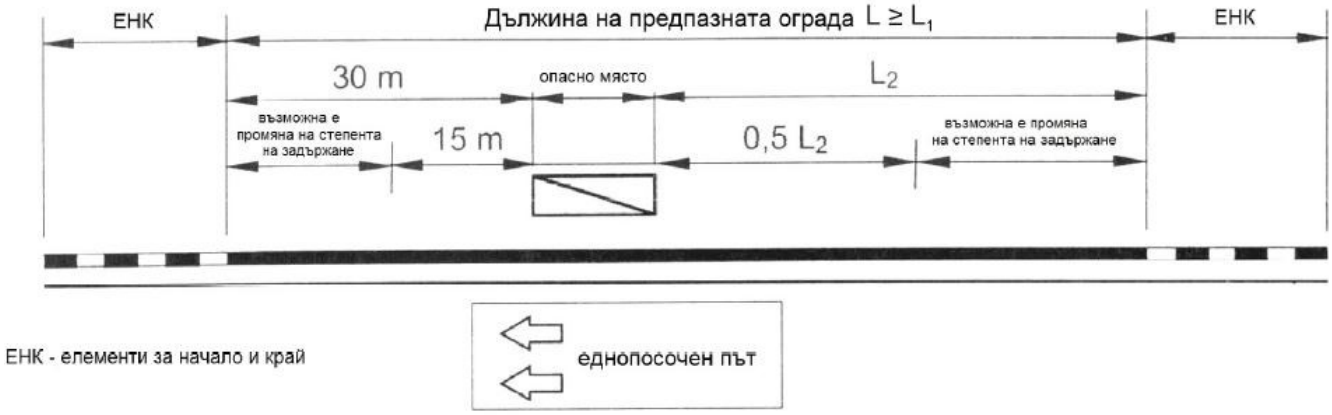


Figure 5. Minimum length of a road restraint system on a one-way road

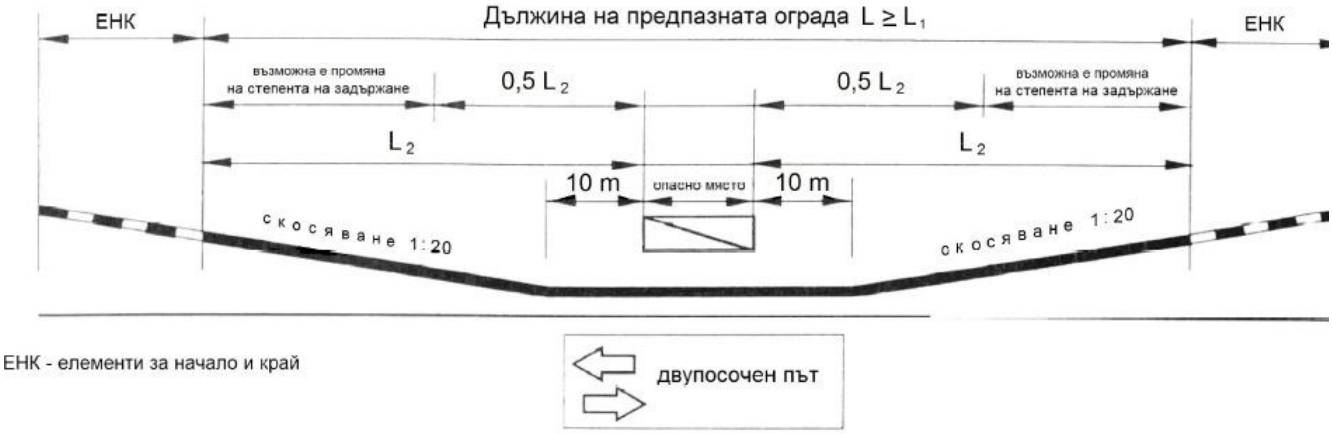


Figure 6. Minimum length of a road restraint system executed by two-sided bevelling before and after a hazardous location on a two-way road

Figure 7. Minimum length of the safety barrier in case of one-sided bevelling before a hazardous location on a one-way road

Article 23. Where a RRS is implemented for securing a point obstruction and $V_{permissible} \geq 100$ km/h, the distance L_2 shall be defined according to Table 14. In the case of one-way roads and inability to slide in the direction opposite to the direction of travel (steep slope or wall) and where no criteria

according to Table 14 shall apply, the length L_2 after the hazardous location shall be 40 m. In the area of 40 m after the hazardous location, no reduction of the degree of restraint shall be permitted.

Required length L2 against sliding in forward and reverse direction

Table 14.

Criterion	Type of road	Position of the safety barrier	
		parallel to the road	laterally, oblique
Sliding where the hazardous location is ≤ 1.5 m behind the rear edge of the safety barrier	one-way	L_2 = 40 m	no requirement
	two-way	L_2 = 60 m	no requirement
Sliding in the reverse direction	one-way	L_2 = 40 m	L_2 = 40 m
	two-way	L_2 = 60 m	L_2 = 60 m

Article 24. (1) In the case of a transition from one type or class of RRS to another, the requirements for the performance classes of the transitional zone as referred to in Article 14(1), Table 8, as well as those for L_1, determined according to BDS EN 1317-2 and reflected in the test report, shall be complied with.

(2) Where it is not possible to comply with the length L_2 against sliding in the forward and reverse direction, the necessary security shall be achieved by energy absorbing elements.

(3) it is not possible to install energy absorbing elements at the start and the end, the mounting of zeroing elements shall be permitted as part of the minimum effective length "**L**" at which the system has been tested.

Section III

Rules for the determination of interruptions of a road restraint system

Article 25. (1) No interruptions shall be allowed between two neighbouring RRS on roads outside urban areas with a length of less than 100 m.

(2) Interruptions to the RRS shall be made by exception and shall be as short as possible. Interruptions shall not be permitted in sections with small radii of curves, and in these zones approaches to inclusion roads shall be designed at locations where a RRS is not required. Lateral inclusions shall not impair the integrity of the safety barrier and, where this cannot be avoided, the approach shall be parallel to the axis of the road and the safety barrier shall be duplicated with another as shown in Figure 8.

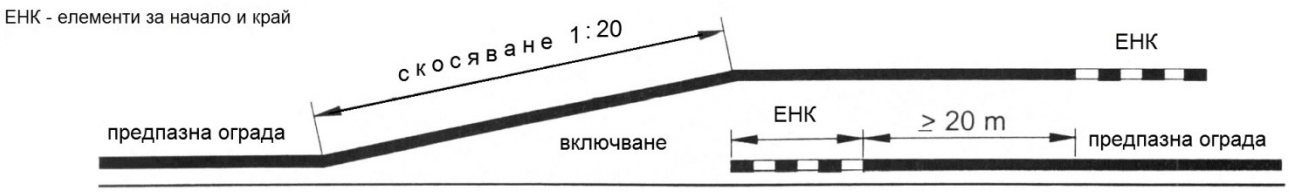


Figure 8. Interruption of a road restraint system at parallel inclusions

(3) Interruptions of the RRS with one or two carriageways, at reversal locations, shall be executed in accordance with Figures 9a to 9d.

(4) Where there is no risk of falling to a lower level in the interruption area, the safety barrier shall be tilted and bevelled outwards at 1:12 in the approach by the zeroing elements set out in Figure 9a and by the elements for beginning and end (terminals), indicated on Figure 9b.

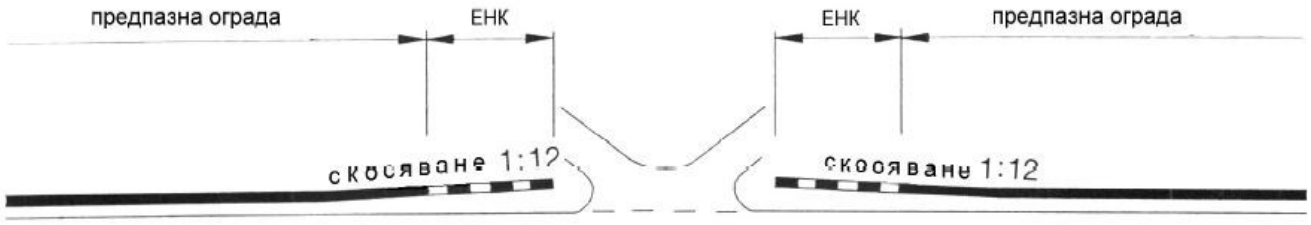


Figure 9a Interruption of a road restraint system bevelled outwards at 1:12 and with zeroing elements

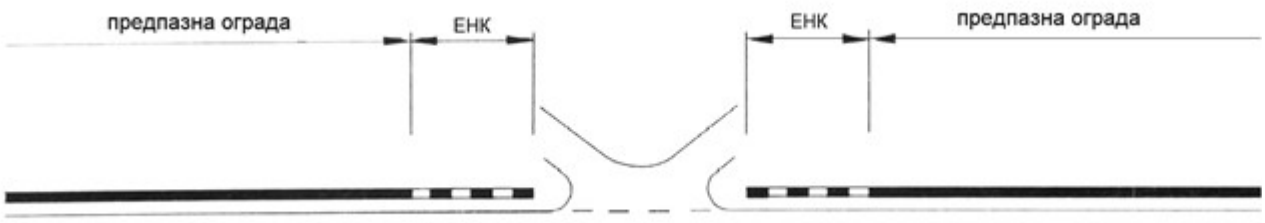


Figure 9b Interruption of a road restraint system with elements for start and end (terminals)

(5) In order to prevent the MV from entering a nearby hazardous location within the interruption area, a suitable round-off shall be implemented that is as large in radius as possible as indicated in Figures 9c and 9d. Outward bevelling at 1:12 of the safety barrier before the round-off shall be carried out as shown in Figure 9c. The round-off of the safety barrier shall be connected to the start and the end elements either to another RRS or by appropriate transition elements.

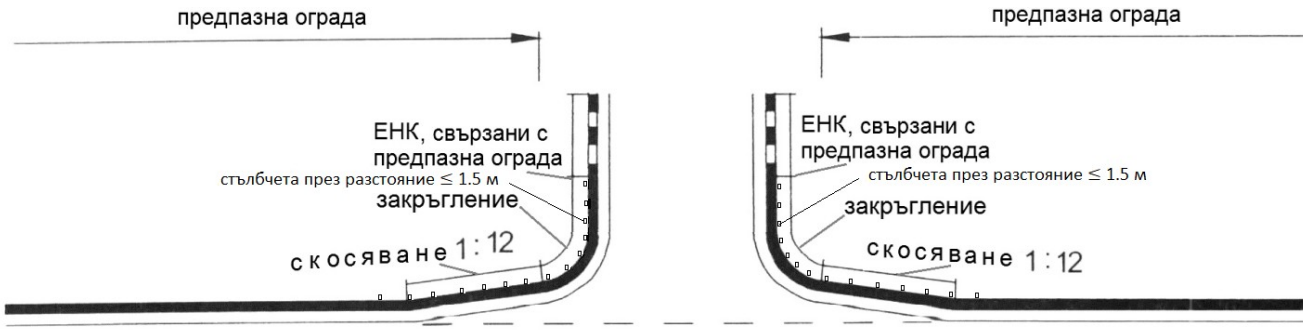


Figure 9c Interruption of a safety barrier bevelled outwards at 1:12, round-ups and ESE

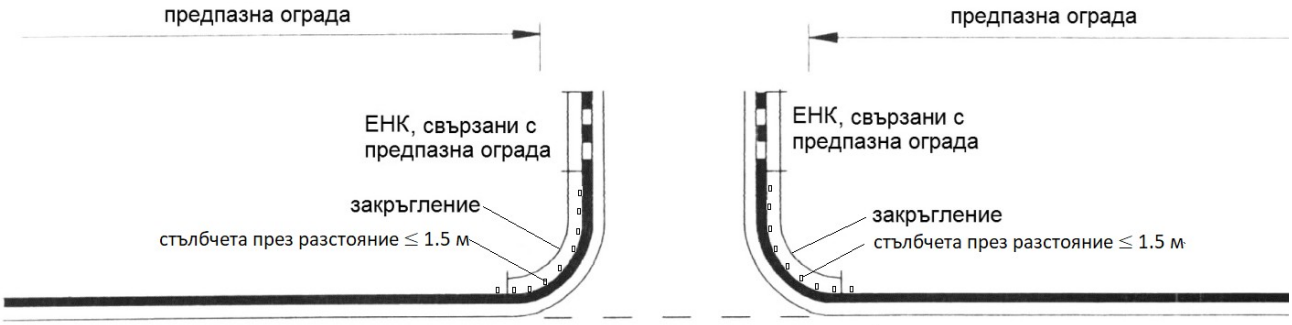


Figure 9d Interruption of a safety barrier with round-ups and ESE

Section IV

Rules for determining the start and end of road restraint systems

Article 26. (1) For the start and end of the RRS, long or short zeroing elements, terminals according to BDS EN 1317-4 and shock absorbing buffers according to BDS EN 1317-3 shall be used, depending on the daily average annual intensity (DAAI) of the motor traffic. The implementation of the start and end elements of the road restraint systems shall be in accordance with Annex No. 1.

(2) In the case of DAAI < 3000 MVs 24/h, for the start of the RRS, long zeroing shall be used, while for the end short zeroing shall be used, according to Figure 10. In populated areas, it is permissible to use short zeroing for the start of the RRS. In case of insufficient length L_2 for long zeroing, the start shall be executed with a single terminal, depending on the permissible speed, according to Figure 11.

(3) The long zeroing shall not be less than 12 m and the short zeroing shall not be less than 4 m. All zeroing elements shall be below ground level and bevelled outward from the longitudinal line of the RRS, to the right in the direction of traffic. In the case of long zeroing, the bevelling shall not be less than 50 cm, and in the case of short zeroing, the bevelling shall not be less than 20 cm.

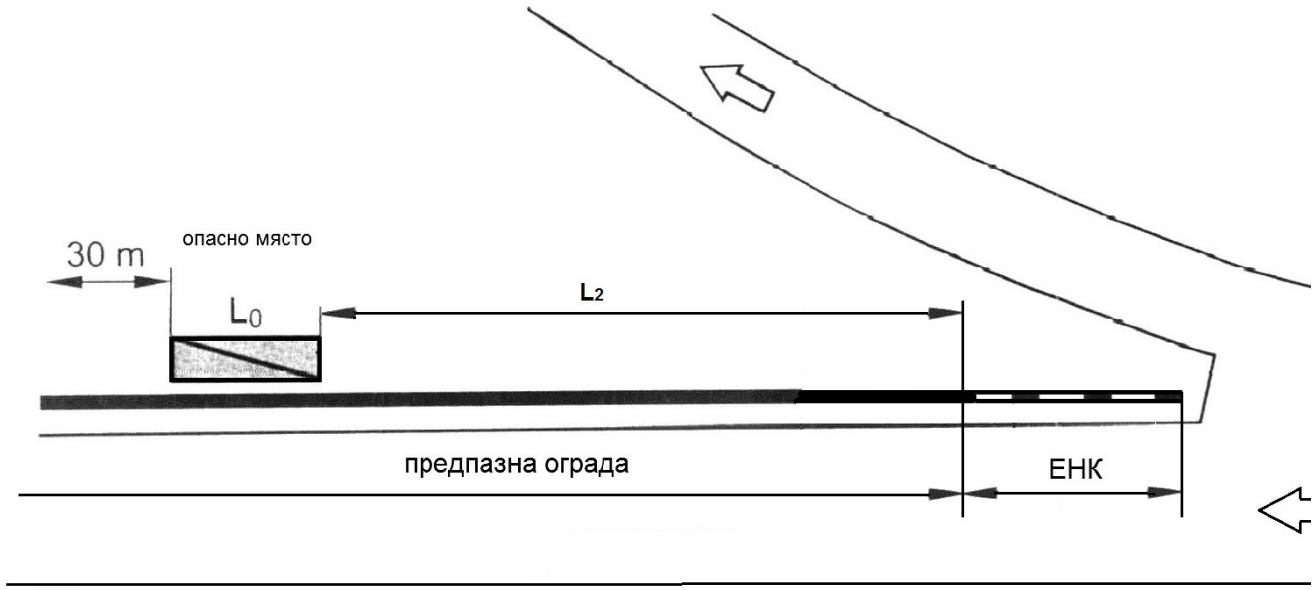


Figure 10. Road restraint systems with start elements – zeroing at L_2 required, including in the case of splitting of flows

Figure 11. Road restraint system with start elements – single terminal at insufficient L_2, including in the case of splitting of flows

(4) In the case of DAAI > 3000 MVs 24/h, a single or double terminal or shock absorbing buffer shall be used to start the RRS.

(5) Where traffic flows are diverted, a double terminal shall be applied, depending on the permissible speed, according to Figure 12.

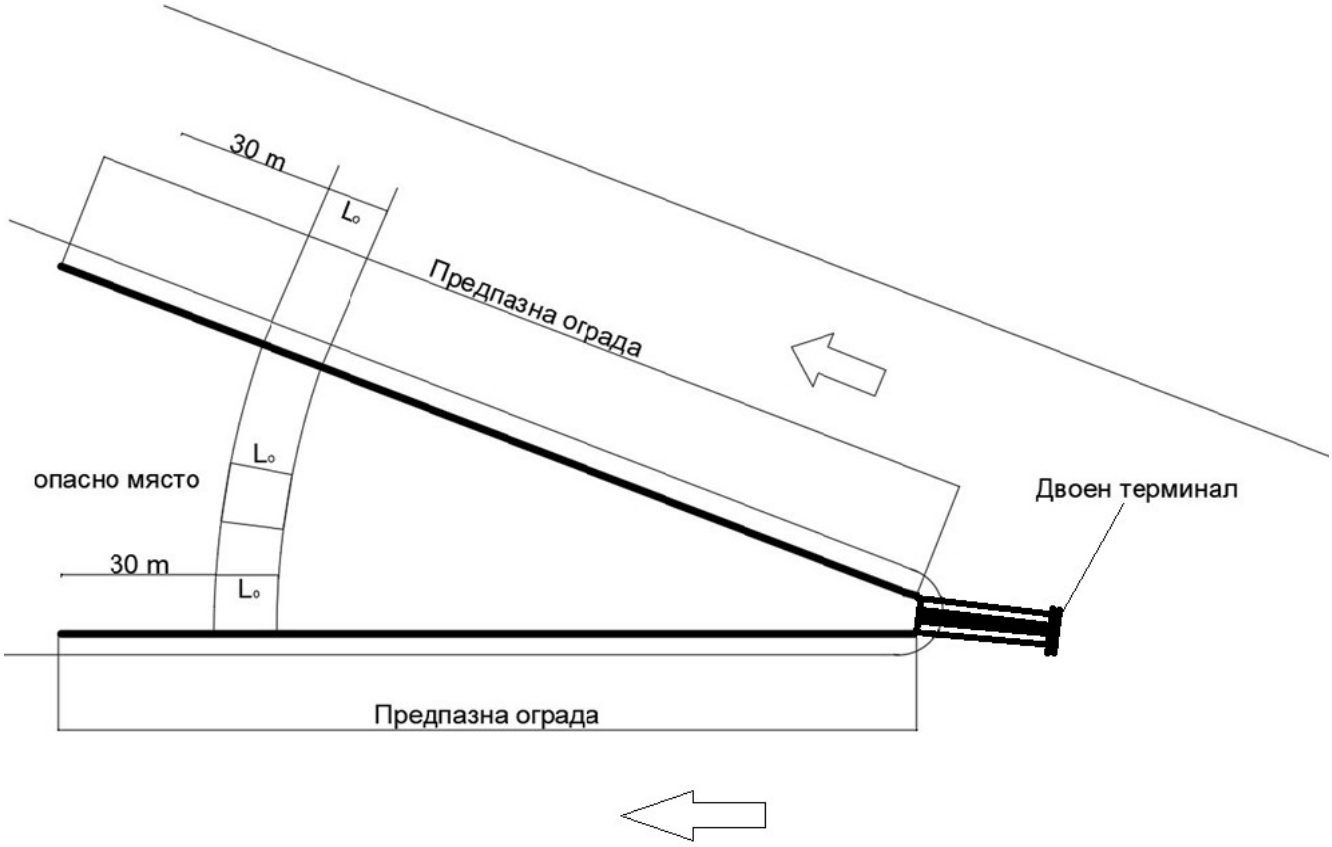


Figure 12. Top of a dividing island with safety barriers in both directions and elements to start a double terminal

(6) A shock absorbing buffer shall be applied when diverting traffic flows on motorways and express-ways as shown in Figure 13.

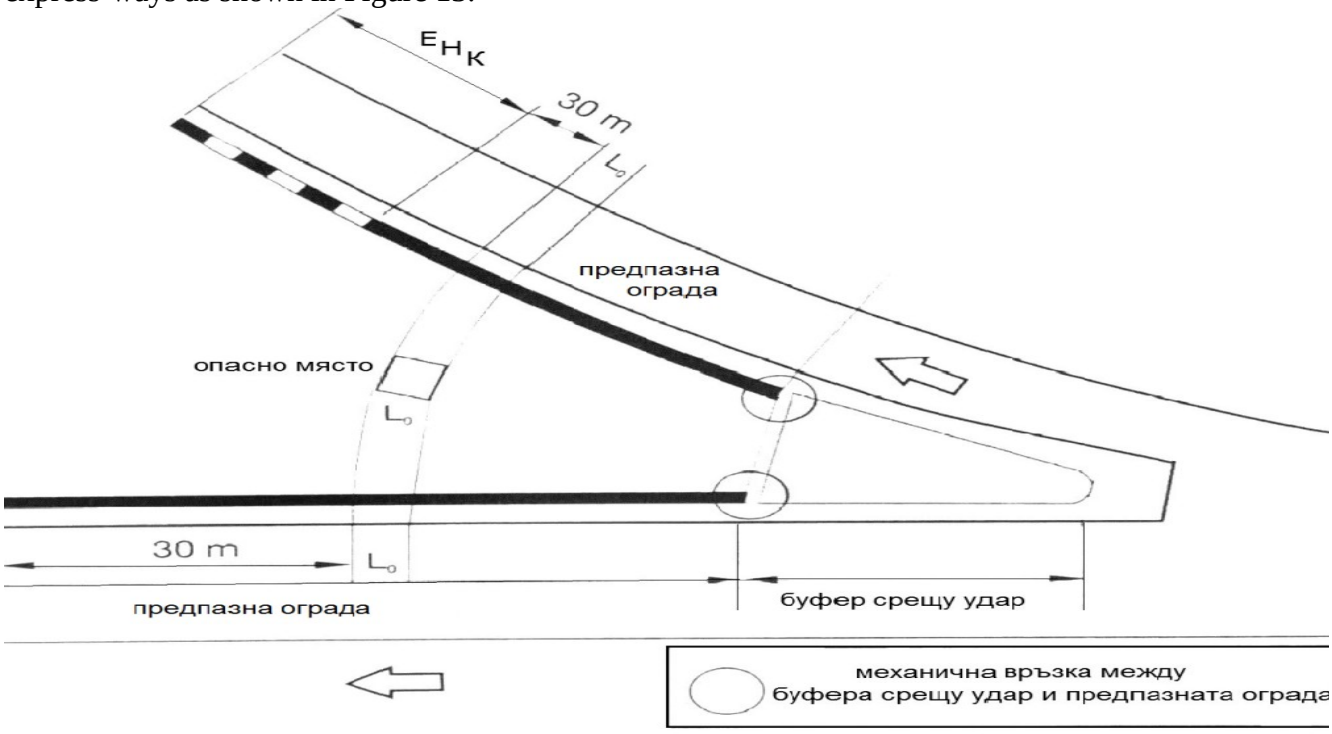


Figure 13. Shock absorbing buffer at the top of a dividing island in front of a hazardous location when splitting large traffic flows

(7) Double terminals and shock absorbing buffers shall be installed in position so that their ends are connected to the RRS behind them bilaterally.

Article 27. Where the hazardous location is within the width of the safety zone or where the required lengths L2 cannot be met, energy absorbing elements shall be fitted.

Section V

Protection of motorcyclists

Article 28. (1) The protection of motorcyclists shall be implemented on roads with a permissible speed greater than 50 km/h and shall comply with the requirements of SD CEN/TS 17342:2019, subject to at least one of the following conditions:

1. the proportion of motorcyclists in the estimated daily average intensity (DAI) on the road section for the period June to September is equal to or greater than 2 %;

2. the number of road accidents involving motorcycles on the road section in the last five years is greater than five;

3. the presence of horizontal curves with a radius not exceeding the values given in Table 15.

Table 15.

$\mathbf{V_{permissible}/V_{85}}$ km/h	< 60	60	70	80	≥ 90
R ≤	80 m	90 m	135 m	180 m	200 m

(2) The protection of motorcyclists shall be placed along the entire length of the horizontal curve or to the end of the MV safety barrier.

(3) The protection of motorcyclists shall be executed by installing an additional rail below the rail of the safety barrier. The distance between the bottom edge of the additional rail and the ground shall not be more than 5 cm.

Section VI
Selection of road restraint systems for roads in urban areas

Article 29. Road restraint systems to the outer edge of the carriageway shall be safety barriers, combination safety barriers and pedestrian parapets. They shall be constructed in case of hazardous locations in the safety zones:

1. on road facilities – RRS combined with a pedestrian parapet – at a driving speed of 50 km/h or more;

2. on road facilities – pedestrian parapets – at a driving speed of 50 km/h or less;

3. at public passenger transport stops, safety restraint bars of metal or concrete with a height of at least 0.45 m and not more than 0.80 m, at a distance of 0.50 m from the edge of the curb and a distance between them not greater than 1.50 m;

4. in the case of adjacent free zones for recreation and play of children – RRS with a retention rate of not lower than H2 and a parapet for pedestrians — at speeds higher than 50 km/h.

Article 30. (1) On the streets of the primary street network, in the presence of adjacent free zones for recreation and play for children and a driving speed equal to or less than 50 km/h, a RRS with a retention rate of not lower than H1 and a pedestrian parapet shall be built. The restraint system may also be combined with a pedestrian parapet.

(2) The retention rate of the RRS in urban areas shall be determined according to Figure 14.

(3) The areas of operation of the RRS in urban areas shall be determined in accordance with Article 12(5).

(4) The degree of the impact force shall be determined in accordance with Article 12(4), choosing the most favourable degree possible.

(5) The length of the RRS in urban areas shall not be less than the minimum effective length. Exceptions shall be allowed in the case of a combination with another safety element. Determining the length of the RRS is according to Articles 21 and 22.

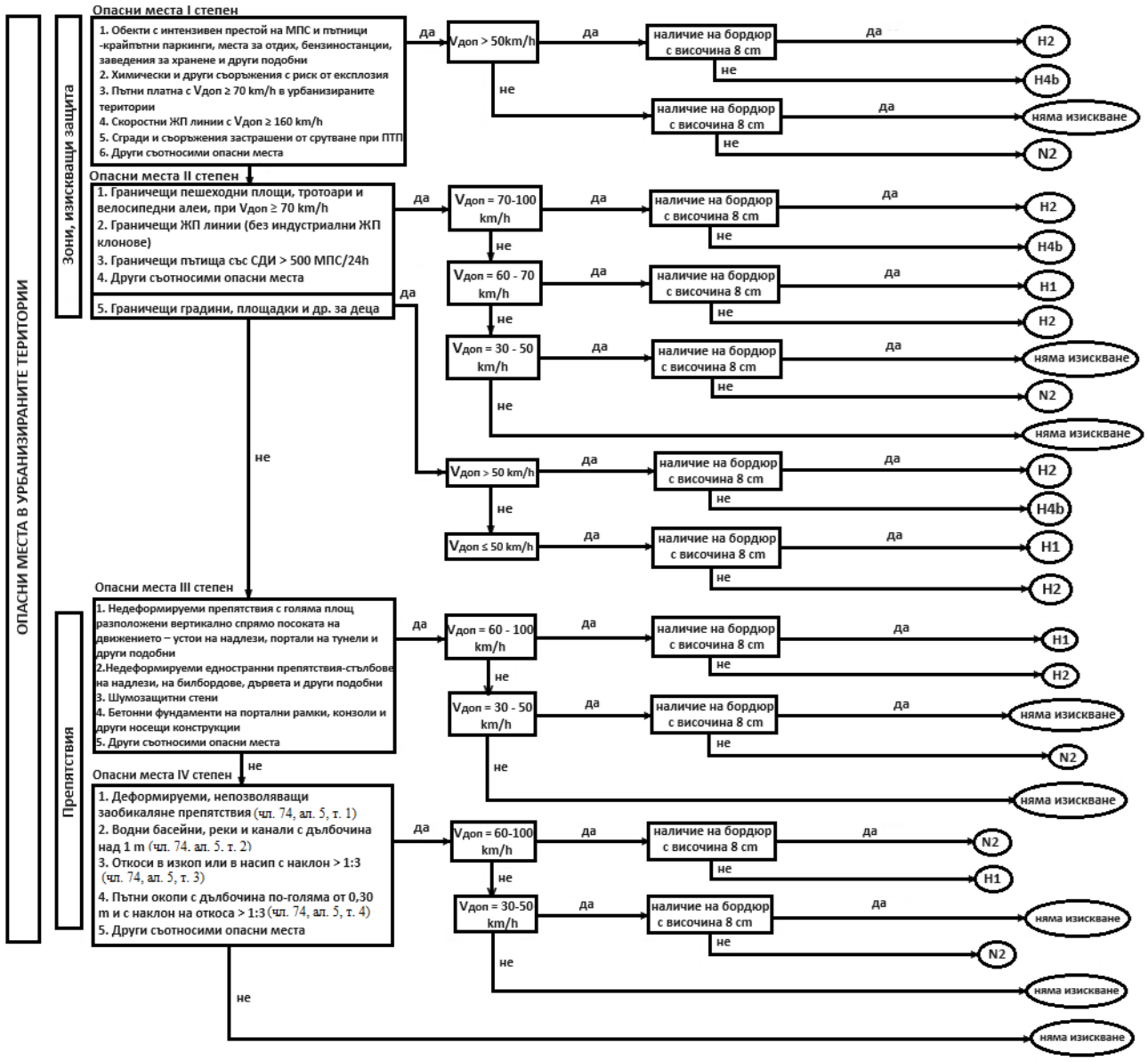


Figure 14. Algorithm for determining the retention rate of a restraint system for roads in urban areas

(6) Interruptions to the safety barrier shall be made in accordance with the requirements of Article 25.

(7) The elements for the start and the end of the RRS shall meet the requirements of Article 26.

(8) Shock absorbing buffers or bilateral terminals at speeds higher than 50 km/h shall be used in settlements where traffic flows are separated. The energy absorbing elements shall meet the requirements of Article 27.

(9) In settlements, the retention rate of the RRS shall be: for temporary system - T3, for permanent one it shall be determined by the algorithm shown in Fig. 14, and at facilities with Vpermissible $<$ 50 km/h, it shall not be lower than H1 and for Vpermissible > 50 km/h it shall not be lower than H2.

Section VII

Selection of a road restraint system in the dividing strip

Article 31. (1) In the axis of the median dividing strip of roads with two or more carriageways and **Vpermissible ≥ 50 km/h**, a continuous RRS shall be built. They shall be constructed of one-sided or two-sided safety barriers located in the dividing strip in one of the methods indicated in Figures 15 to 18.

(2) In the absence of obstacles or other restrictions in the axis and width of the strip ≤ 2.20 m, the requirements of Figure 15 shall apply.

Figure 15. Two-sided road restraint system located in the axis of the dividing strip

(3) If it is necessary to provide visibility space in a curve, the requirements from figure 16 shall be applied.

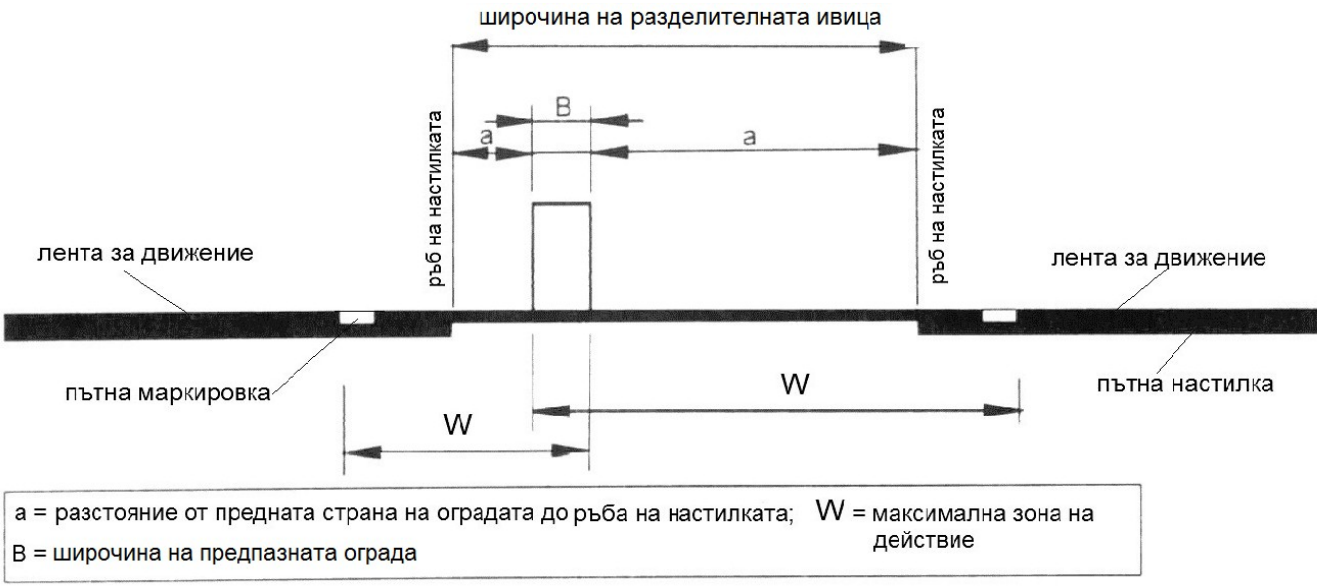


Figure 16. Two-sided road restraint system located on the sides of the dividing line axis

(4) In the case of drainage, electrical or other equipment in the axis, the requirements of Figures 17 and 18 shall apply.

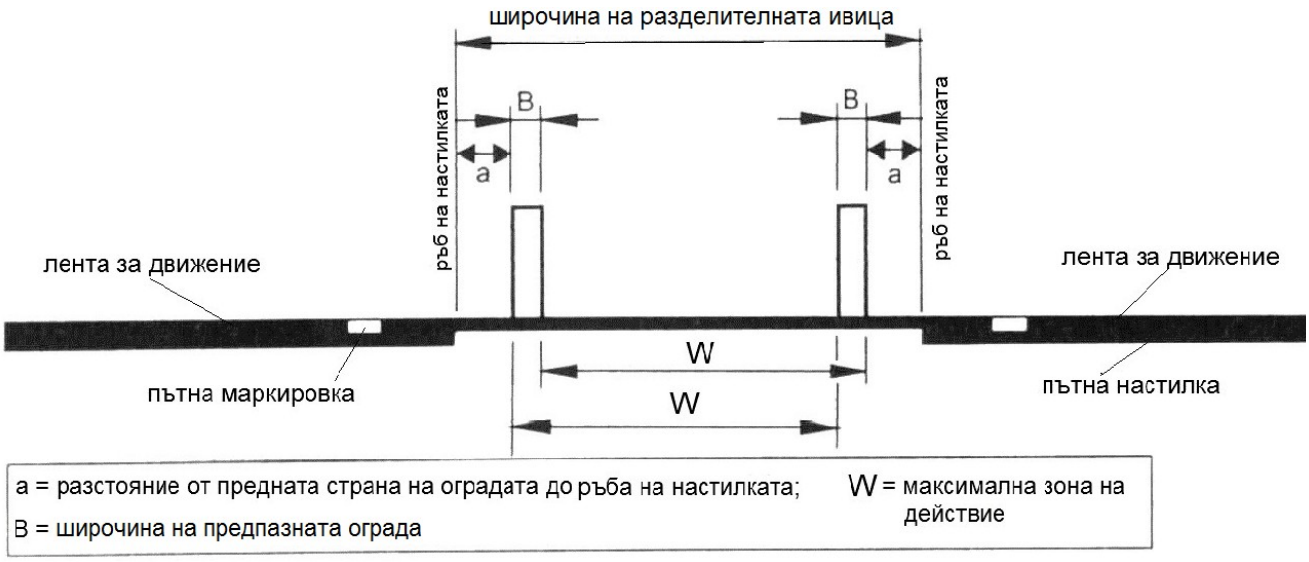


Figure 17. One-sided road restraint system for split-action roads located to the edge of the pavement

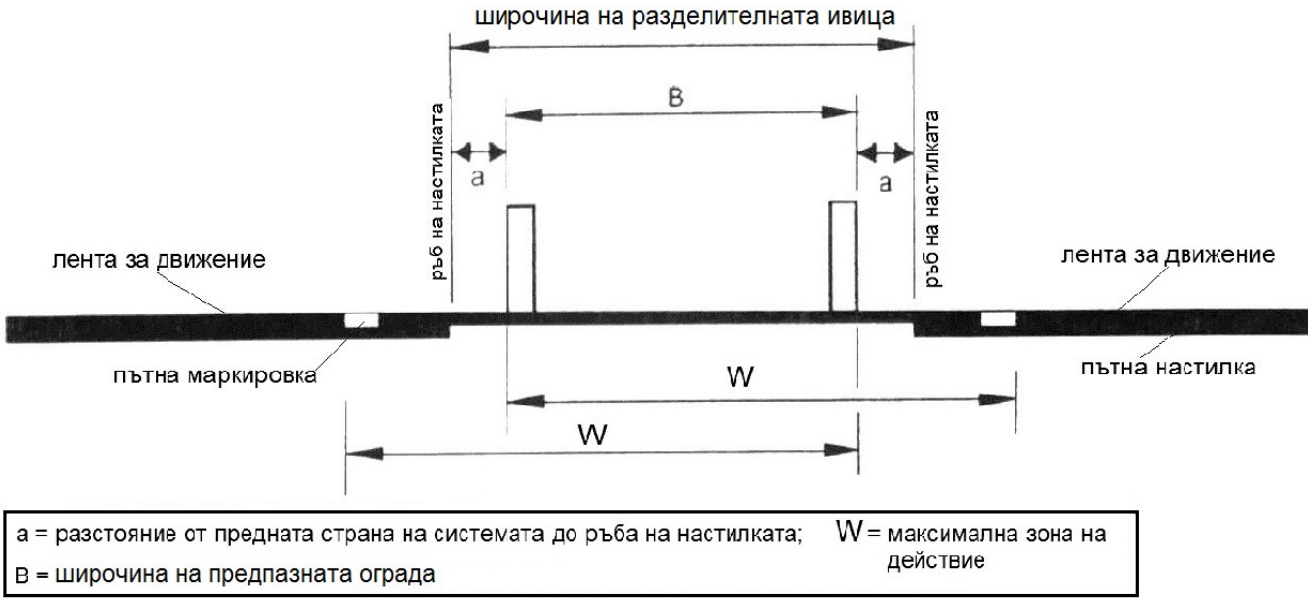


Figure 18. One-sided road restraint system for general purpose roads located at the pavement edge

(5) In the presence of a transverse inclination of the dividing strip in ratio ≥ 1:10, two one-sided safety barriers shall be constructed.

(6) In the event of interruption of the separation strip, a manually dismantled RRS or other facilities with a retention rate of not lower than the retention rate of the RRS before and after the execution of the interruption.

(7) A manually demountable RRS shall be executed with the rails and stiles bolted together and the stiles mounted in sleeves embedded in the flooring.

Article 32. (1) The hazards in the axis or to the edge of the carriageway in the median dividing strip shall be secured by a unilateral RRS with a split action as shown in Figure 17.

(2) In the case of a bilateral RRS located in the dividing strip, before a hazardous location on the

axis of the strip, the barrier becomes unilateral by bevelling at ratio 1:20, as per Figure 19.

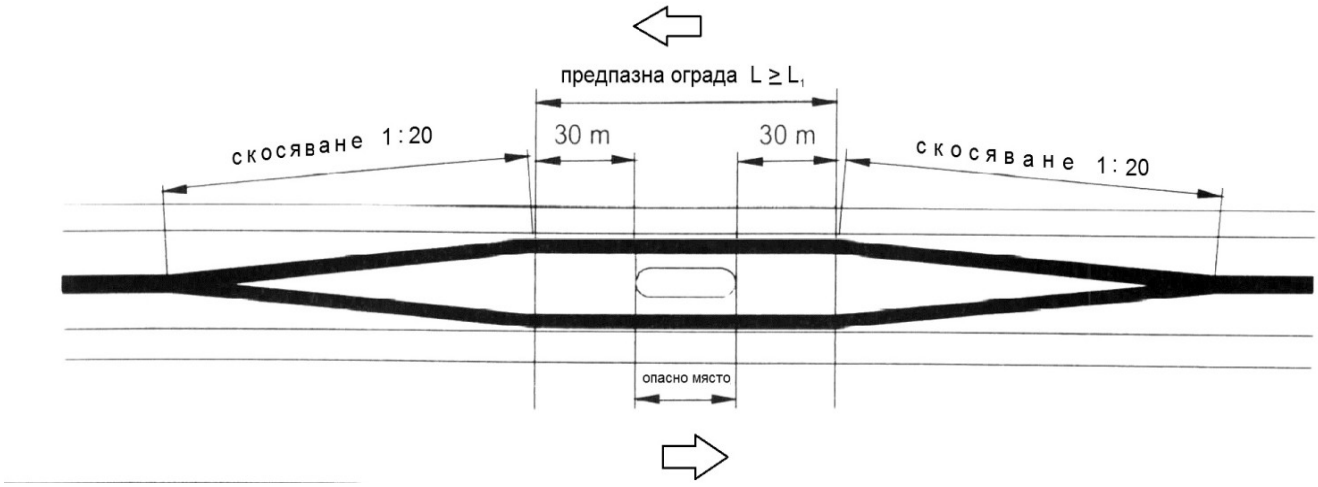


Figure 19. Formation of a road restraint system at a hazardous location in a median dividing strip

Article 33. For sections with DAAI > 5000 ТтMVs/24h of vehicles with a permissible maximum mass exceeding 12 tonnes, a RRS with retention rate H4b shall be applied in the dividing strip.

Article 34. (1) For the area of operation in the case of roads without hazardous locations in the median dividing strip or to the edge of the pavement, the maximum area of operation (**W)** shall be determined by the width of the median dividing strip and the width of the safety barrier. The safety barrier may be envisaged – bilaterally on the axis or two unilateral to the edge with split or common action, and located in the axis or displaced in relation to it, according to Figures 15 to 18.

(2) The area of operation (**W)** in the case of a bilateral and unilateral RRS with common action shall not cross the inner edge of the road marking. The distance from the front of the safety barrier to the edge of the pavement shall be at least 0.50 m, according to Figure 2. Where it is not reasonably practicable to maintain the distance of 0.50 m, it may be reduced to 0.30 m. This distance shall be increased to ensure the required visibility zone.

(3) In the presence of hazardous locations in the separation strip, the area of operation **W** shall be determined in accordance with paragraph 1.

(4) When two single-sided safety barriers are deployed with a split action, the two shall have the same area of operation. Where there is no other technical solution and the two zones need to be different, then their actions should not overlap.

Article 35. The start of the RRS in the dividing strip shall be executed with a bilateral terminal or with a shock absorbing buffer type R or type NR with a class that depends on $V_{permissible}$ for the road section. The implementation of the start of the RRS by shock absorbing buffer shall be according to Figure 20, in applying single terminals – according to Figure 21, and in applying double terminal – according to Figure 22.

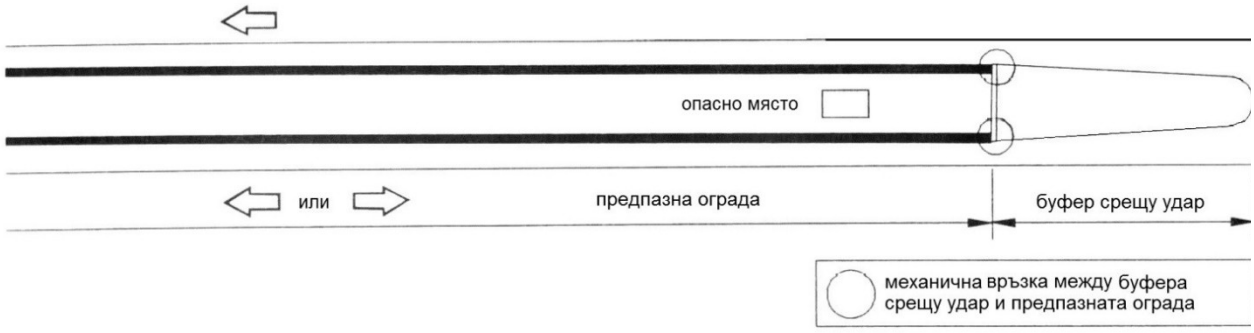


Figure 20. Restraint system built bilaterally in the median dividing strip of one-sided road restraint system with shock absorbing buffer for a start

Figure 21. Restraint system built bilaterally in a median dividing strip of one-sided road restraint system with single terminals as a start

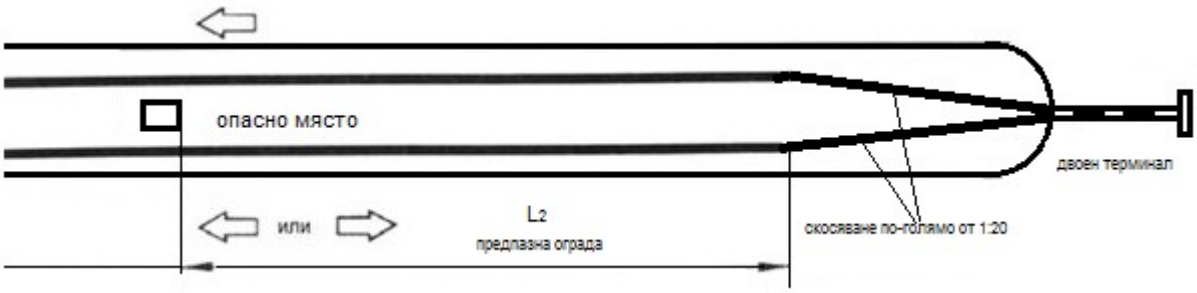


Figure 22. Restraint system built bilaterally in a median dividing strip of one-sided road restraint system with two-sided terminal as a start

Article 36. (1) Interruptions of the RRS in the road separation strip shall not be allowed, except for junctions or justified traffic organisation.

(2) If it is necessary to determine the distance L_2, the rules referred to in Article 22 shall apply. Where this distance is not sufficient, including interruptions of the barrier, and the distance from Table 14 to the hazardous location cannot be maintained, and where $V_{permissible} > 60$ km/h, a shock absorbing buffer according to Figure 20 or a double terminal according to Figure 22 shall be applied.

Article 37. (1) At places where the mechanical connection of safety barriers of different types and/or with a different performance class is required, transitional zones having the performance classes defined in Article 14 shall be installed.

(2) The installation of anti-glare elements in the dividing strip as additional facilities to the RRS shall be permitted, subject to the requirements of Article 17.

(3) In the area of commercial roadside establishments and places of recreation, safety nets or other structures shall be constructed in the dividing strip to prevent pedestrians from crossing, with a height of not less than 1.90 m.

Section VIII

Road restraint systems onbridges and retaining walls

Article 38. (1) On bridges and on retaining walls at a distance ≤ 0.50 m from the edge of the pavement block to the leading edge of the guide rail, subject to observance of the dynamic gauge of the road, RRSs with a retention rate H1 to H4b shall be constructed. The place of the RRS built on a pavement block shall be according to Figure 23.

(2) The requirements of paragraph 1 shall apply to bridges and retaining walls with a possible drop height greater than 1.0 m. In other cases, the requirements of Articles 12 to 14 shall apply.

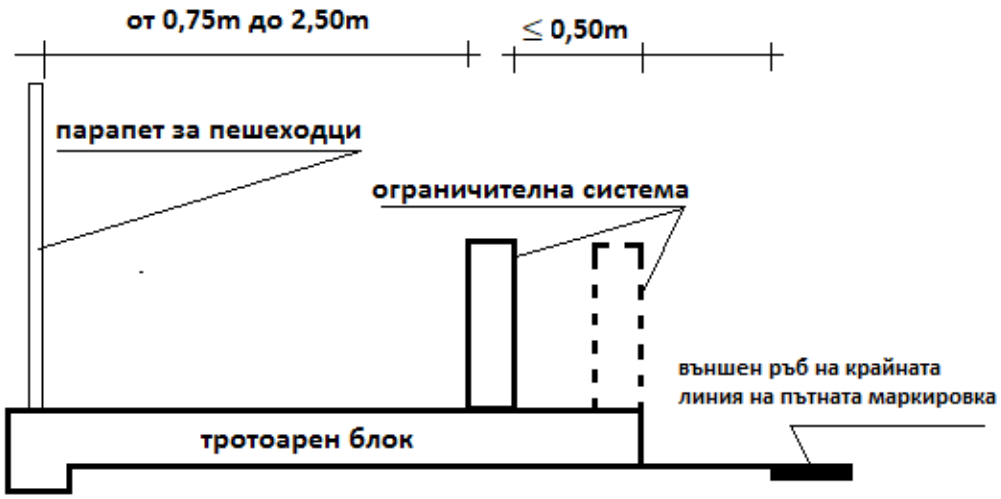


Figure 23. Location of a restraint system on a side-walk block of facility

(3) In case of a side-walk block width ≤ 1.0 m, the installation of the RRS for equipment combined with a safety parapet shall be exceptionally allowed along the outer edge of the side-walk block, according to Figure 24.

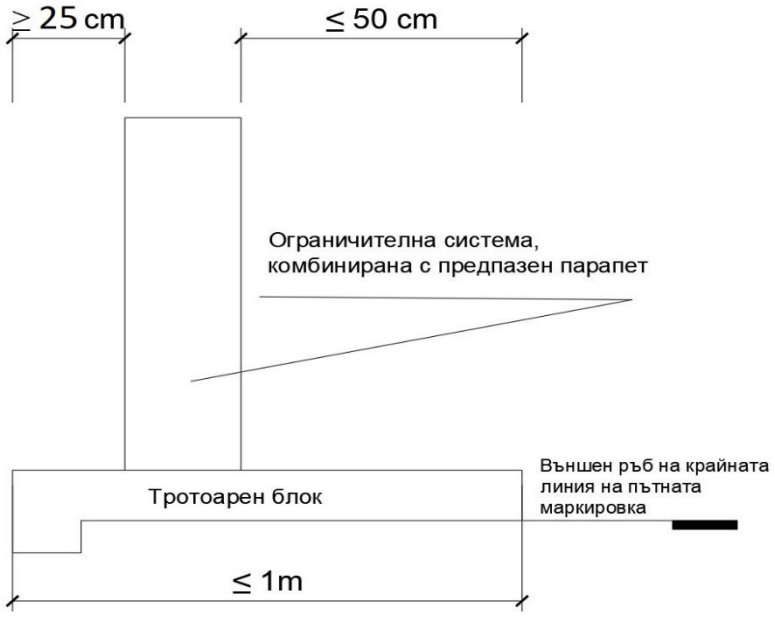


Figure 24. Location of a restraint system combined with a safety parapet on a side-walk block

(4) The retention rate of the restraint system for bridges and retaining walls depends on the permissible speed and the intensity of the road traffic according to Table 16.

Table 16

Required retention rates for bridges and retaining walls

Hazardous area under a bridge, or under a retaining wall	Permissible driving speed and DAI			
	Vpermissible > 100 km/h and motorways and similar roads wth	Vpermissible ≤ 100 km/h and DAI > 500 TтMVs/24h	Vpermissible ≤ 100 km/h and DAI ≤ 500 TтMVs/24h	Vpermissible ≤ 50 km/h
First degree hazard	H4b	H2	H2	H1
Second to forth degree hazard	H2	H2	H1	Safety parapet

Article 39. The RRS area of operation for a bridge and a retaining wall shall take into account the type of hazardous position below the facility and the forces transmitted to the bridge structure by the safety barrier in case of impact of a vehicle into it, as the smaller area of operation transmits greater force to the bridge structure than the larger area of operation.

Article 40. The lengths of the RRS for bridges and retaining walls shall be determined in accordance with Articles 23 and 24, as the lengths L_2 shall be provided. The start/end site and the operation of the safety barrier shall be designed in such a way as to prevent a fall from the bridge/supporting wall according to Figure 25, as in case “a”. The safety barrier continues before and after the ends of the bridge/transition zone wall. The transitional zone is equal to or one degree lower

than that of the bridge, according to Figure 25, as in case “b”.

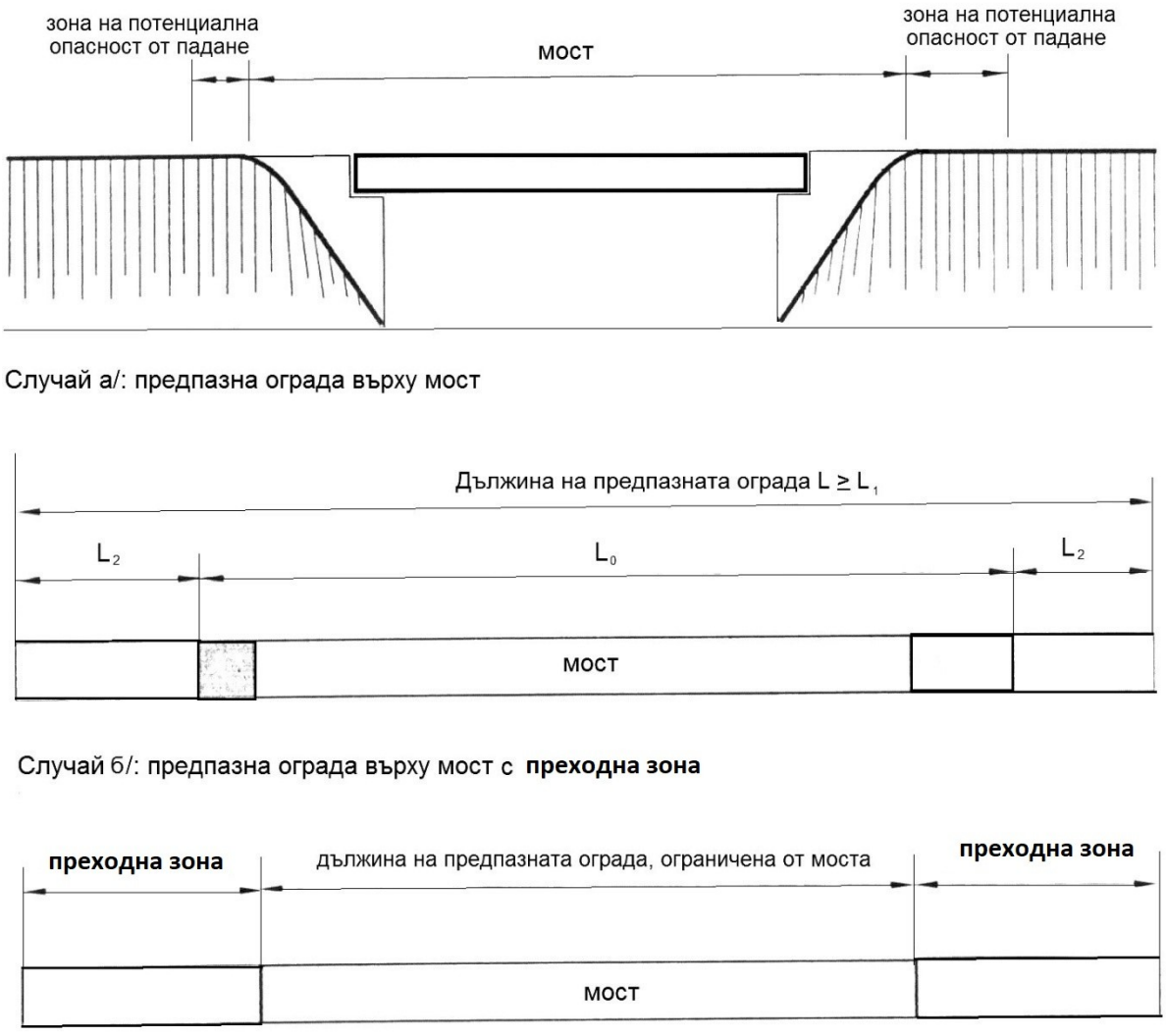


Figure 25. Lengths of the safety barrier on a bridge and on a bridge with a transitional zone

Article 41. (1) In the areas of expansion joints of bridge facilities, safety barriers shall be constructed with expansion elements.

(2) Shock absorbing buffers for bridge structures shall be constructed in accordance with Figure 26.

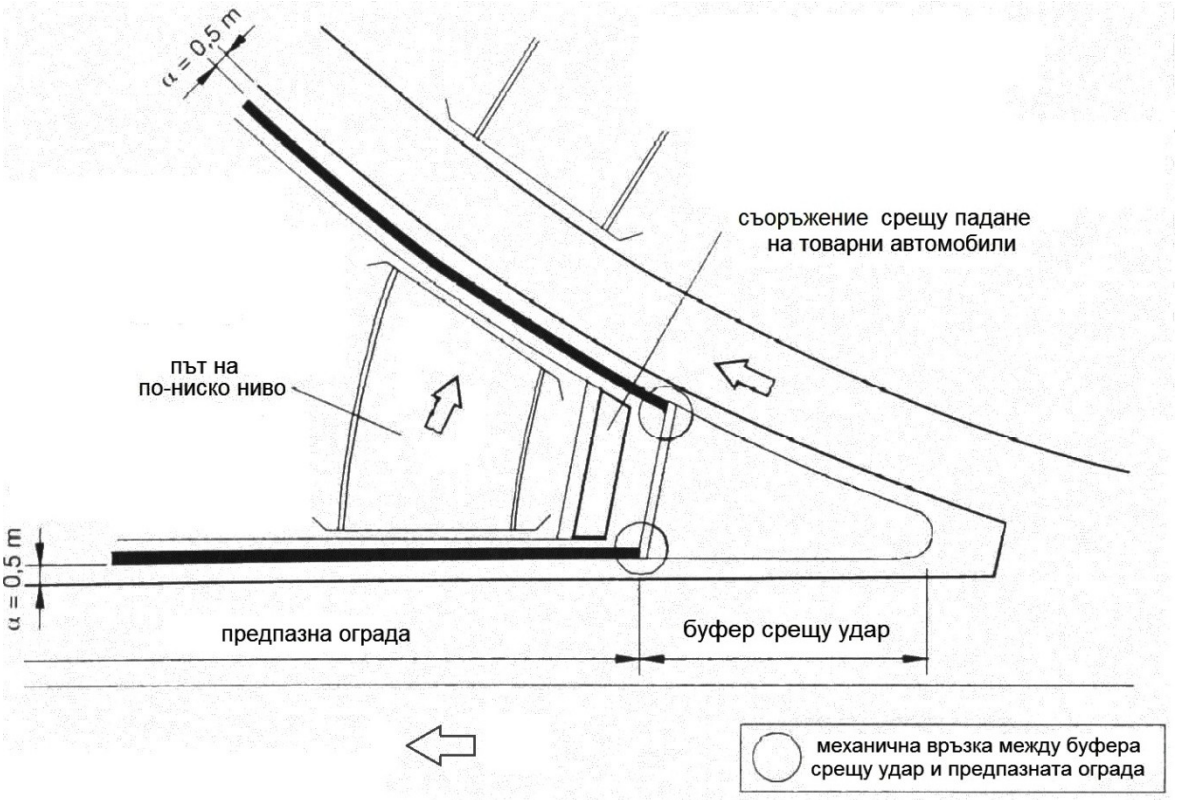


Figure 26. Shock absorbing buffer against impact on the tip of a dividing island on a bridge

Article 42. (1) Road restraint systems in the separation strip of bridge facilities shall be constructed as extensions of the restraining systems on the road, without interruptions and with transitional elements.

(2) The retention rate of the RRS in the median strip of bridges with separated top constructions, with a difference in lane heights of less than 1.5 m and a clear opening between lanes of less than 1.5 m, and for bridges with a common superstructure shall be determined in accordance with Article 31 and Figure 17.

(3) For the retention rate of the RRS in the middle strip of bridges with separated top structures, with a difference in carriageway heights greater than 1.5 m and a bright opening between the carriageways greater than 1.5 m, the two bridge structures shall be considered as separate structures.

(4) For the RRS area of operation for bridges with individual overhead structures with a difference in carriageway heights of less than 0.1 m and a luminous opening between the carriageways of less than 0.1 m, as well as for bridges of common top construction, the requirements for Article 31 and Figure 17 shall apply.

(5) For the area of operation for bridges with individual overhead structures with a difference in carriageway heights greater than 0.1 m and/or a light opening between carriageways more than 0.1 m, the two bridge structures shall be treated separately as separate structures.

(6) Elements or parts of the top structure with a height greater than 0.1 m shall be a hazardous

location that can restrict the area of operation of the safety barrier.

Article 43. (1) A third-degree hazardous location that is a non-deformable obstruction with a large area and that stands vertically in the direction of travel, such as the start of a retaining wall, a portal support, a projection greater than 0.1 m, and the end of a recess or pocket greater than 4 m in length, shall be secured in accordance with the requirements of Articles (20) to (27).

(2) The requirements of Articles (20) to (27) shall not apply where the area at the hazardous location is shaped in such a way that an impact on it shall be safe for the occupants of the MV or the hazardous location shall be secured with energy absorbing elements.

Article 44. (1) The link between the RRS and the start of a tunnel shall be formed according to Figure 27.

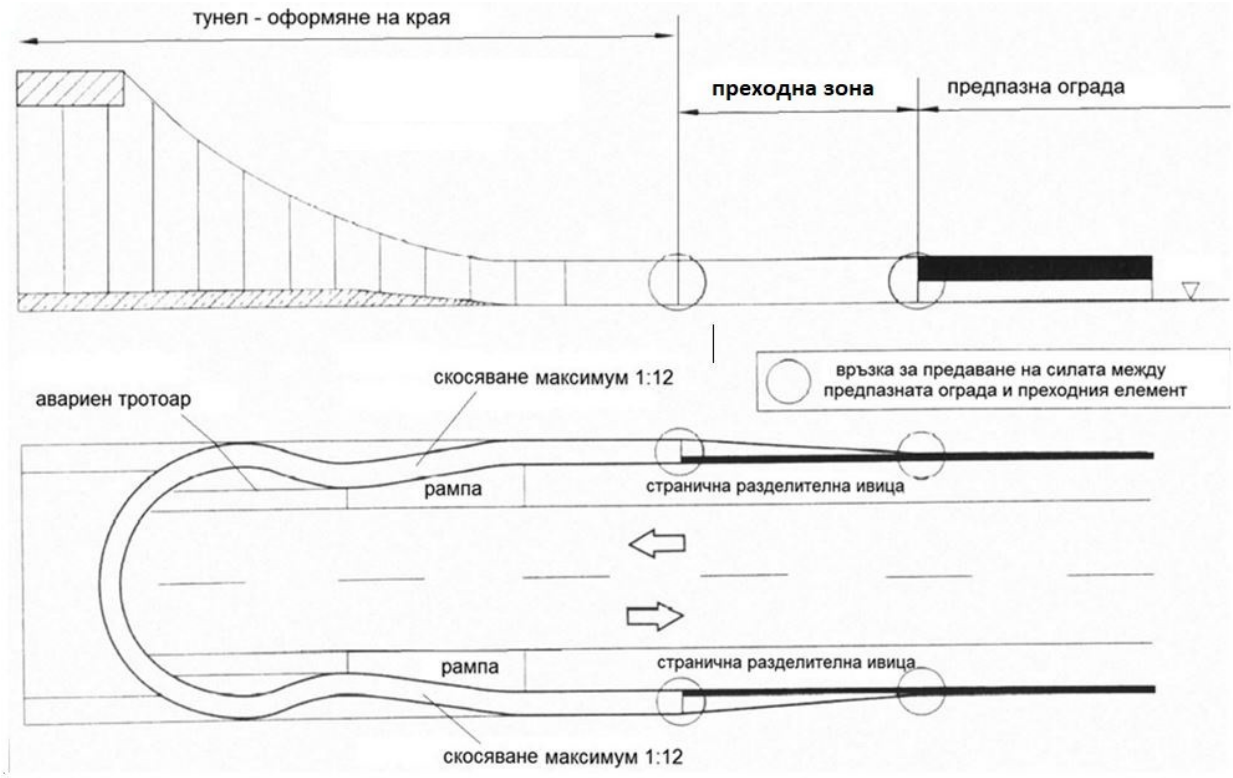


Figure 27. Forming a connection between a road restraint system and the start of a tunnel

(2) The link between the RRS in a road part and a wall at the entrance of a tunnel or at a retaining wall shall be made by means of a transitional element. The transitional element shall be executed the end of the system by anchoring it to the wall after its start at a height of 75 cm for a two-wave rail and of 90 cm for a three-wave rail.

Additional provisions

Article 1. For the purposes of this Regulation:

1. “Shock absorbing buffer” shall mean a MV energy absorption device that is built in front of a solid object to reduce the impact force, stop, or divert the MV in a head-on collision.

2. “Temporary road restraint system” shall mean a road restraint system which can be easily removed and is used in road works, emergency or similar situations and in the temporary organisation of traffic for the diversion of traffic flows.

3. “Deformable road restraint system” shall mean a road restraint system which, when impacted by a vehicle, is deformed and may remain permanently deformed.

4. “Bilateral road restraint system” shall mean a road restraint system designed for impact on both sides.

5. “Unilateral road restraint system” shall mean a road restraint system designed for impact on one side only.

6. “Combined parapet for road vehicles and pedestrians” shall mean a road restraint system which is constructed at the end of a bridge or on a retaining wall or similar structure on which there is sudden lowering of the terrain and which may contain additional protective and restraining facilities for pedestrians and/or cyclists, riders and animals.

7. “End element in the direction of the traffic” shall mean the finishing part at the end of the safety barrier in the direction of the traffic flow.

8. “Start element in the direction of the traffic” shall mean the finishing part at the beginning of the safety barrier against the traffic flow.

9. “Start and end elements” shall be the elements for the safe shaping of the beginning and end of the safety barrier.

10. “Non-deformable road restraint system” shall mean a road restraint system which, when impacted by a vehicle, undergoes minor deformation.

11. “Non-diverting buffer” shall mean a buffer designed to restrain and stop a road vehicle.

12. “Road restraint system” shall mean a system built on the road to ensure that a MV deviated from the carriageway is restrained within a defined range, as well as to restrict and protect pedestrian traffic.

13. “Hazardous location” shall mean a single obstruction, road element and accessory, a facility, an object, and the like, located on the side of the carriageway, which poses a hazard to the road users or to third parties when the MV exits the carriageway.

14. “Diverting buffer” shall mean a buffer which is designed to restrain and divert a vehicle being struck.

15. “Permanent road restraint system” shall mean a road restraint system which is permanently built on the road.-

16. “Transitional element” shall mean the relationship between two safety barriers of different construction and/or different characteristics and make the connection between two restraint systems of different types or of different construction or characteristics.

17. “Transitional zone” shall mean the place where different road restraint systems are connected.

18. “Family of shock absorbing buffers” shall mean a multifunctional product that can be mounted in the form of different models from the same set of components until different shapes and performances are obtained, with the same operating mechanism for the system and its components.

19. “Impact force rate” is a factor that assesses the impact force for the occupants of the vehicle and is a function of the ASI and THIV coefficients (theoretical head impact speed) for passenger cars.

20. “Compound restraint systems made of steel and wood” shall be systems which are installed at the discretion of the contracting authority mainly on roads in protected areas, part of the European ecological network “NATURA 2000” and in protected areas. All steel materials shall be anti-corrosively treated by hot-dip galvanising in accordance with BDS EN ISO 1461:2023. The wood must be treated so as to achieve the prescribed durability.

21. “Terminal” shall mean an energy-absorbing initial or final element for a road restraint system.

22. “Motor vehicles” – MVs

23. “Average daily annual traffic intensity” – DAI

24. “Heavy-duty vehicles” – TтVs

Article 2. The Regulation has passed the procedure for the exchange of information in the field of technical regulations under Council of Ministers Decree No 165 of 2004 on the organisation and coordination of the exchange of information on technical regulations and rules on information society services and establishing and operating a Product Contact Point, which introduced the provisions of Directive 98/34/EC of the European Parliament and of the Council of 22 June 1998, now replaced by Directive (EU) 2015/1535 of the European Parliament and of the Council of 9 September 2015 laying down a procedure for the provision of information in the field of technical regulations and of rules on Information Society services.

TRANSITIONAL AND FINAL PROVISIONS

Article 3. The administration managing the road or the road owner shall keep and maintain information on the RRS set, including the place of installation, the materials, the type, the quantities, the condition of checks and other necessary data, as well as the data on the locations with an established

concentration of road traffic accidents on the basis of which decisions on the installation of the RRS have been taken.

Article 4. Existing road restraint systems that meet the requirements of the Technical Rules for the Application of Road Restraint Systems on the Republican Road Network of the Road Infrastructure Agency (RRA) from 2010 may be replaced during major repairs and/or restoration of damaged ones.

Article 5. (1) Within one year from the date of entry into force of the Regulation, the Road Administration or the Road Owner shall adopt a long-term programme to secure the safety area on existing roads by removing, moving, modifying and securing hazards with appropriate road restraint systems, the maximum duration of implementation of this programme being:

1. for republican roads – 10 years;

2. for municipal roads – 15 years;

3. for urban locations – 15 years.

(2) The programme referred to in paragraph 1 shall also include the replacement of existing RRSs which do not comply with the requirements of the Regulation.

(3) The programme referred to in paragraph 1 shall be updated annually.

§ 6. Regulation No RD-02-20-2 of 2018 on road design shall be amended as follows:

1. In Article 7(3), the words “Regulation No RD-02-20-14 of 2011 on the scope and content of the road safety impact assessment and road safety audit, the conditions and procedures for their performance and for the acquisition and recognition of the professional qualification of road safety auditor” shall be replaced by “Regulation on road infrastructure safety management procedures”.

2. “Articles (73) and (74) shall be amended as follows:

“Article 73. (1) Safety zone (SZ) is the horizontal zone of the road starting from the right edge of the right guide strip in the direction of traffic according to Figure 32.a. Measures shall be taken in accordance with the hazard classification in Article 74 to prevent road accidents or reduce their consequences when leaving the carriageway by MVs in the SZ.

(2) The main parameters of the SZ shall be: in height – light gauge, width of the safety zone (WSZ), increased width of the safety zone (IWSZ) and maximum permissible driving speed (Vpermissible) of passenger cars. The vertical safety distance h (Figure 32a) shall be in accordance with Article 71(5).

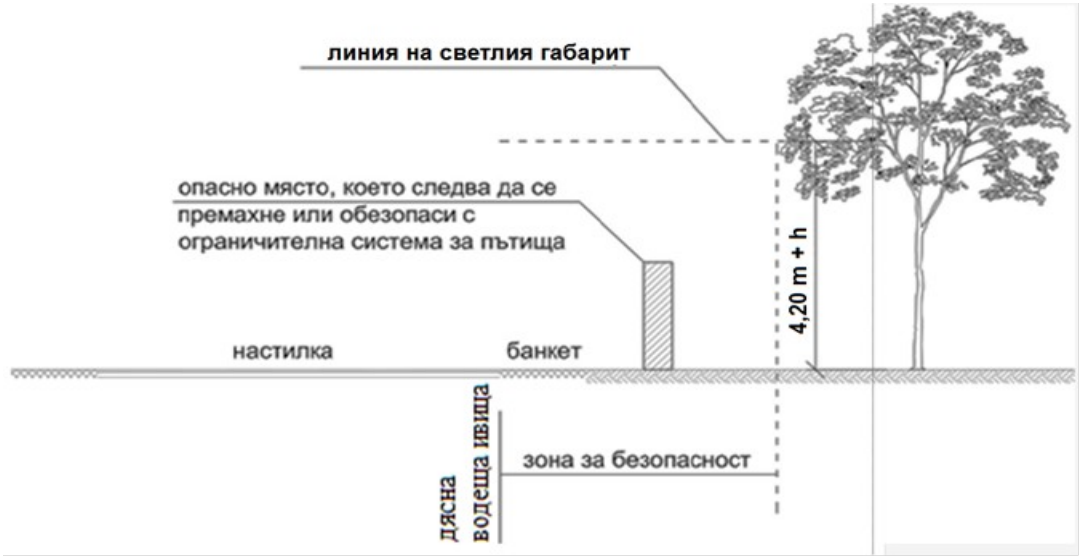
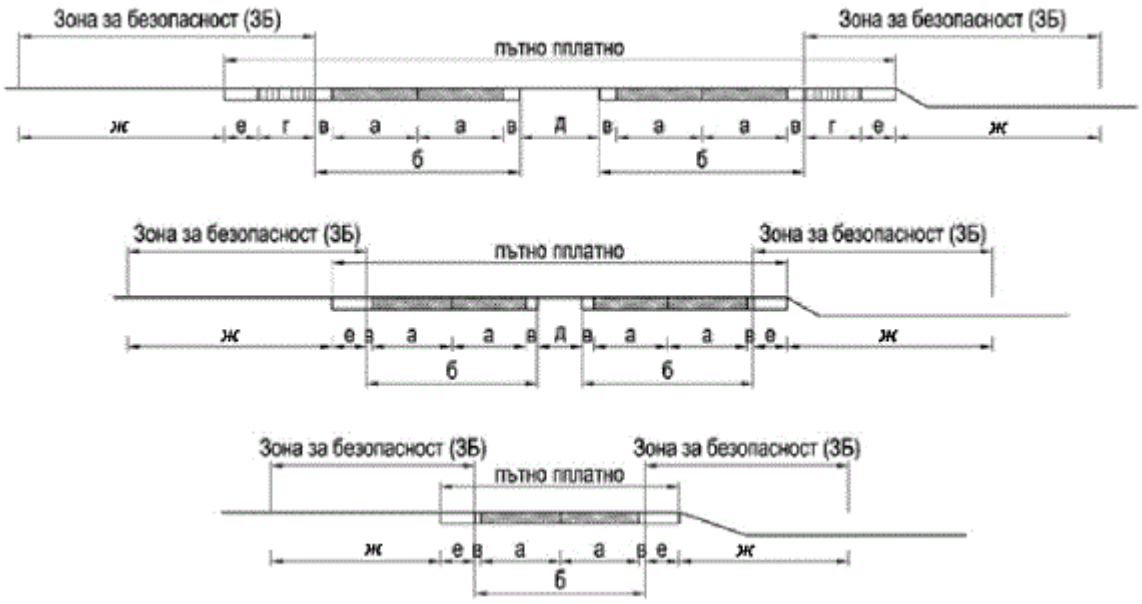


Figure 32a) SZ with a hazardous location

(3) Measures shall be taken to ensure that the vertical dimension of the clearance gauge defined in Article 71 is maintained in accordance with Figure 31 in order to prevent accidents or road traffic collisions when vehicles come into contact in a vertical direction with road structures, accessories and elements.

(4) Examples of SZ schemes for a motorway, express-way and two-lane road are given in Figure 32.b.



Nota bene: “a” – active traffic lane; “b” – driving lane; “c” – guiding strip;
“d” – stopping lane; “e” – dividing strip; “f” – hard shoulder;
“g” – strip after the hard shoulder – inclination, trench, etc.

Figure 32.b. Example of SZ diagrams for motorway, express-way and two-lane road

(5) The basic parameters of the WSZ and IWSZ shall be specified in Table 18 and shall be determined depending on the class of the road and the permissible maximum speed Vpermissible for the

movement of vehicles of category “B” according to Art. 1 of the RTL. The measurement of WSZ and IWSZ is perpendicular to the axis of the carriageway and starts at the right end of the right leading strip in the direction of traffic, according to Figure 32.b.

Table 18

Road class	Permissible driving speed in the road section	Width of the safety zone	Increased width of the safety zone
	Maximum permissible driving speed $V_{permissible}$ according to the RTL, km/h	m	m
Motorway	140	16.00	20.00
Express-way	120	13.00	17.00
First-class road	90	8.00	12.00
Second-class road	90	8.00	12.00
Third-class road	90	8.00	12.00
Local road (municipal or private)	90	8.00	12.00
	Local speed limit of a permanent nature according to the Road Traffic Law, km/h	m	m
Motorway	120	13.00	17.00
	110	11.00	15.00
	100	10.00	14.00
Express-way	100	10.00	14.00
	90	8.00	12.00
	80	6.00	10.00
First-class road	70	4.00	8.00
	≤60	3.00	7.00
Second-class road	70	4.00	8.00
	≤60	3.00	7.00
Third-class road	90	4.00	8.00
	≤60	3.00	7.00
Local road (municipal or private)	70	4.00	8.00
	≤60	3.00	7.00

(6) The increased width of the safety zone is the WSZ, increased by 4 m, which shall be applied in the presence of third parties in roadside sites and recreation areas.

(7) The boundary of the SZ does not require special road marking. It may extend beyond the reach of the road and fall into the limiting construction line of the road under Article 6 of the Roads Traffic Law.

Article 74. (1) The hazards for which measures should be taken in the SZ are classified from the first to the fourth degree, depending on the potential risk to non-traffic third parties or to persons travelling in a MV when the vehicle exits the carriageway.

(2) The first-degree hazards are those present in the IWSZ and are associated with a high risk for non-road users:

1. sites with intensive stay of MVs and passengers – areas for passenger service, MVs and infrastructure (road parking lots, recreation areas, gas stations, auto services, catering facilities, etc.);

2. chemical and other equipment with explosion risk;

3. carriageways with velocity $V_{permissible} \geq 100$ km/h outside urban areas and Vpermissible ≥ 70 km/h in settlements;

4. high-speed railway lines with permissible speed of trains Vpermissible ≥ 160 km/h;

5. overground lines of the underground;

6. buildings and structures at risk of collapse in the event of traffic accidents;

7. other relevant hazards.

(3) The second-degree hazards are those present in the IWSZ and associated with a risk for non-road users:

1. pedestrian areas and side-walks and bicycle lanes with **Vpermissible** ≥ 50 km/h on the road;

2. railway lines (excluding industrial railway branches) with Vpermissible < 160 km/h;

3. roads with a daily average annual intensity (DAAI) of more than 500 MVs/24h, etc.;

4. playgrounds;

5. other relevant hazards.

(4) The third-degree hazards are those present in the WSZ and associated with a risk to the occupants of MVs and are:

1. non-deformable obstructions of large area, vertically located in relation to the direction of traffic – abutments of overpasses, portals of tunnels, etc.;

2. non-deformable single obstacles – pillars of overpasses, billboards, trees with a diameter of more than 10 cm (measured at 0.30 m above the ground) and stumps with a diameter of more than 20 cm, etc.;

3. non-deformable noise protection walls;

4. concrete foundations of portal frames, consoles or other supporting structures;

5. other relevant hazards.

(5) The fourth-degree hazards are those present in the WSZ and associated with a risk to the occupants of MVs and are:

1. deformable, but not allowing to circumvent obstructions, such as supports and stands for small and medium-sized traffic signs and road markings made of steel tubes with an outer diameter > 76,1 mm and a wall thickness > 2,9 mm, or of aluminium tubes with an outer diameter

> 76,0 mm and a wall thickness > 3,0 mm, or obstacles not capable of being sheared at a single point;

2. water bodies, rivers and canals with a depth greater than 1 m;

3. slopes in a trench or embankment with a slope > 1:3;

4. road trenches with a depth greater than 0.30 m and with a slope > 1:3;

5. other relevant hazards.

(6) Obstructions which allow bypassing, poles which are easily deformed and/or subject to shearing on impact according to BDS EN 12767 are not hazards within the meaning of this Regulation.

(7) In the event of a hazard in the SZ, action shall be taken in the following order: removal, relocation, modification by alteration of the structural features so that the same does not constitute a hazard, and securing, by measures specified in the Regulation referred to in Article 14(3) of the RTL.

(8) During construction of new roads and during major repairs and reconstructions of existing roads in SZ, the design of elements and/or the placement of equipment and accessories that may be classified as hazards under paragraphs 1 to 6 shall be avoided.

(9) In cases where the requirements of paragraph 8 cannot be met in certain sections of the road with a traffic intensity of less than or equal to 3000 MVs/24 h, in certain local areas with hazards and/or identified conflict zones, measures such as traffic intensity greater than 3000 MVs/24 h shall be secured."

3. In the Transitional and Final Provisions an Article (5a) shall be inserted:

"Article 5a. (1) The provisions of Articles (73) and (74) shall apply to investment projects for which the proceedings for the approval of an investment project and the proceedings for the issuance of a building permit shall commence after the entry into force of the Regulation referred to in Article 14(3) of the RTL, and those that have been commenced shall be completed according to the previous procedure.

(2) Proceedings referred to in paragraph 1 shall be deemed to have been initiated from the date of submission of the investment project for approval by the competent authority."

Article 7. The Regulation is issued on the basis of Article 14(3) of the RTL.

§ 8. The Regulation shall enter into force on the day of its publication in the Official Journal.

THE MINISTER

OF REGIONAL DEVELOPMENT

AND PUBLIC WORKS:

ANDREY TSEKOV

Annex No 1

to Article 7(2), Article 26(1)

Implementation of start and end elements of road restraint systems

1. Abbreviations

ESE – start and/or ending element;
MDS – median dividing strip;
3N – three-wave rail;
RIA – Road Infrastructure Agency;

2. Requirements:

2.1. The minimum distance between the end bars of the bar to be used for the construction of start and end zeroing elements shall be 4 m;

2.2. The starting element by long zeroing on a two-wave rail shall not be less than 12 m long and shall be executed with three rails mounted on not less than seven posts. The last post must be entirely below the ground level and shall be not less than 50 cm from the longitudinal line of the RRS (Figure 28);

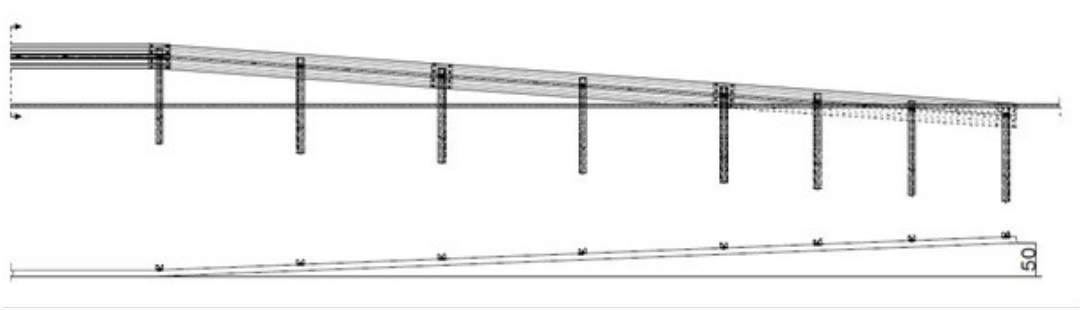


Figure 28
Fe
Figure 28

2.3. The end element by short zeroing on a two-wave rail shall not be less than 4 m long and shall be executed with one rail mounted on three posts. The last post shall be driven completely below the ground level and shall be not less than 20 cm from the longitudinal line of the RRS (Figure 29);

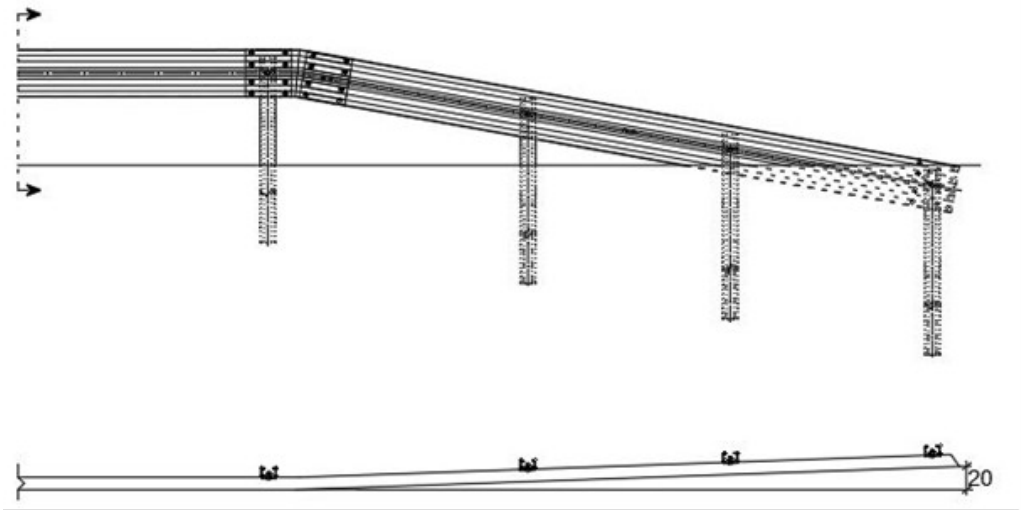


Figure 29

2.4. The start and end element by long zeroing with a three-wave rail shall not be less than 12 m long and shall be executed with three rails mounted on nine posts. The last post must be entirely below the ground level and must be at least 50 cm from the longitudinal line of the RRS (Figure 30);

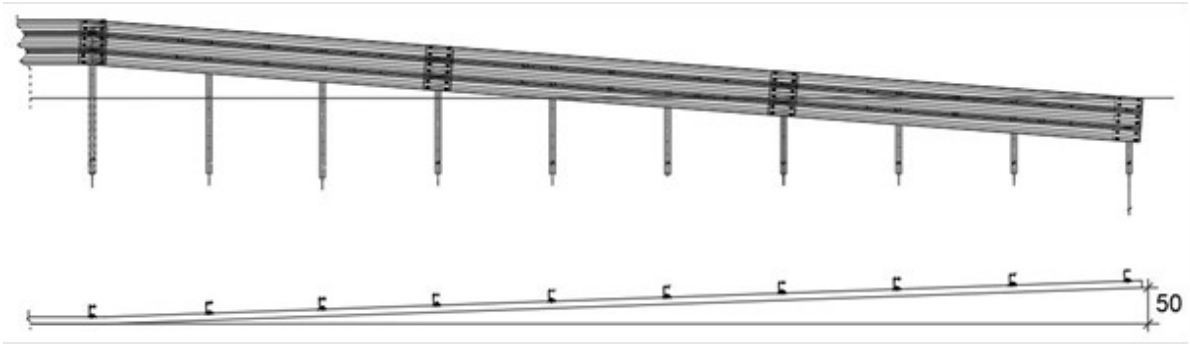


Figure 30

2.5. The end element by short zeroing with a three-wave rail shall have a length of not less than 4 m and shall be executed with one rail mounted on three posts. The last post must be entirely below the ground level and must be at least 20 cm from the longitudinal line of the RRS (Figure 31);

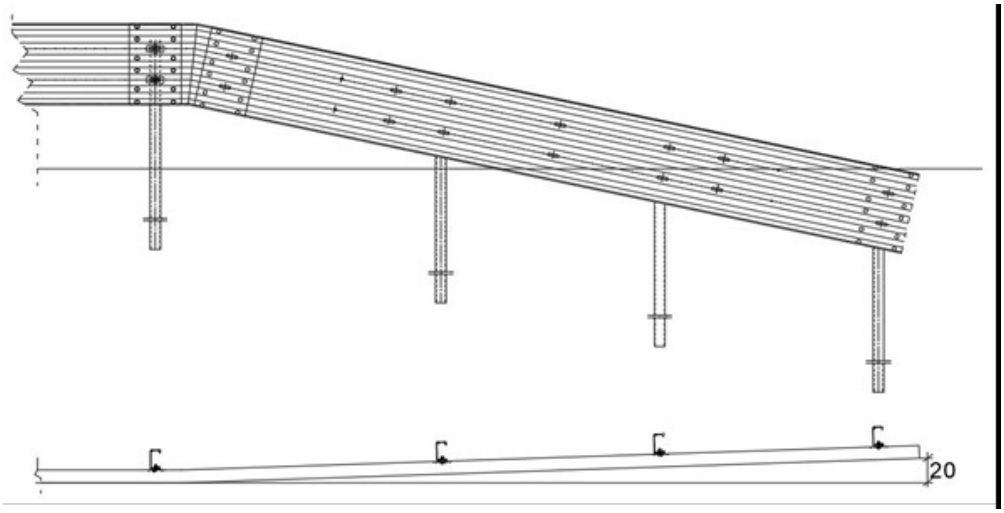


Figure 31

2.6. The implementation of short zeroing of the RRS with two-wave rails and with three-wave rails shall be carried out by means of an element (detail) which changes the angle of inclination and the angle of bevelling outwards from the lane;

2.7. The implementation of long zeroing with a two-wave and a three-wave rail may be without an element to change the slope and the lateral bevelling at the expense of the loose ends in the openings for assembling the buses to each other.

3. Selection criteria and implementing rules for start and end elements (terminals) for road restraint systems:

3.1. At speeds above 50 km/h and DAAI > 3000 MVs/24 h, for the start of the RRS the following shall be applied:

3.1.1. In the case of motorways and other roads with MDS, a single terminal is placed on the right to start the RRS (Figure 32). A shock absorbing buffer or double terminal shall be placed at the traffic flow separation points, to the right, in the direction of travel and in the median dividing strip for the beginning of the RRS (Figure 33). For the end of a restraint system, a long zeroing shall be placed. If it is impossible to perform long zeroing, short zeroing shall be allowed.

3.1.2. On all roads, to ensure safety in roadside areas with third party zones, a Type R shock absorbing buffer shall be applied to the beginning of the RRS in the roadway divider island and to the RRS along the left side of the gateway. Places with the presence of third parties shall be: petrol stations, long-term recreation sites and other traffic service sites. Exceptionally, in the absence of a direct threat to third parties – when parking spaces and recreation areas are outside the safety zone, a double terminal shall be allowed to start the RRS.

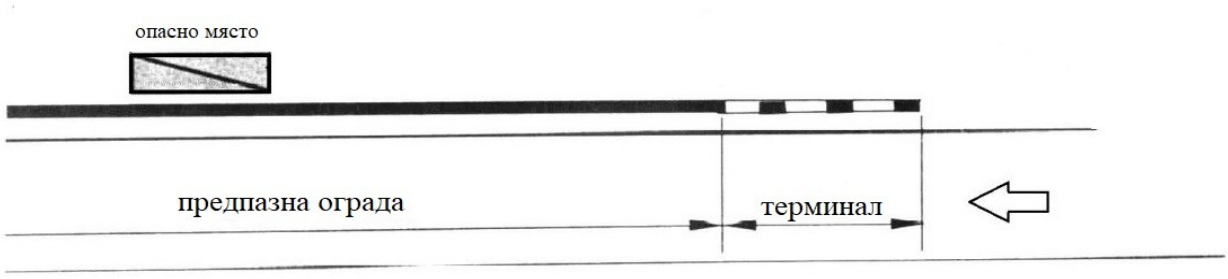


Figure 32

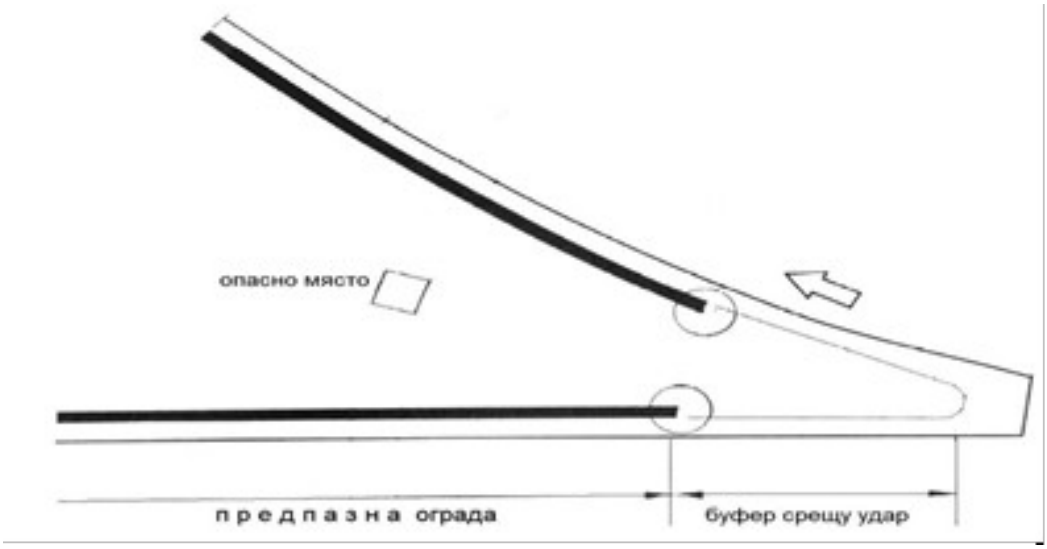


Figure 33

3.1.3. In the case of point obstructions on two-way roads without MDS, the start and end of the RRS shall be implemented via a single terminal.

3.1.4. Except for the cases referred to in point 3.1.1. – 3.1.3., for the start and end of the RRS, single terminals shall be placed to the right in the direction of traffic.

3.2. For roads with DAAI < 3000 MVs/24h:

3.2.1. The start and end of the containment systems shall be carried out in accordance with the following figures:

In the case of two-wave bus restraint systems for road part — the start shall be in accordance with point 2.2 and Figure 28, and the end according to section 2.3 and Figure 29.

➢ In the case of three-wave restraint systems for road part – the start and the end shall be executed with three rails, according to point 2.4 and Figure 30, and if it is impossible to complete the end with long zeroing, short zeroing may be used according to item 2.5 and Figure 31.

➢ In the case of three-wave bus restraint systems for an open road facility – On itself a RRS shall be implemented for facilities and, as transitions before and after, a minimum of 40 m RRS shall be implemented for the road part with an equivalent or one level lower degree of restraint than that of the RRS of the facility in accordance with Figure 1. 34. The beginning and the end shall be executed with long zeroing according to point 2.2.

Figure 34

➢ In the case of three-wave bus restraint systems for an open road facility – On itself a RRS shall be implemented for facilities and, as transitions before and after, a minimum of 40 m RRS shall be implemented for the road part with an equivalent or one level lower degree of restraint than that of the RRS of the facility in accordance with Figure 1. 35. The beginning and the end are long zeroing according to point 2.4.

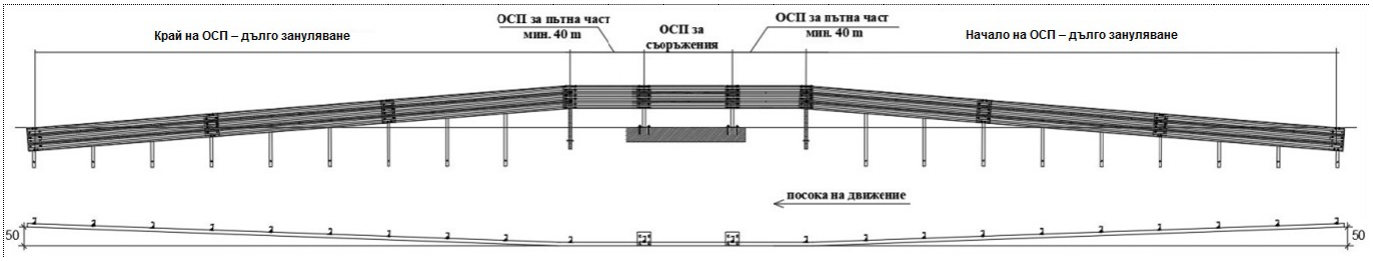


Figure 35

➢ Exceptions: In case of impossibility to perform Figure 34 and Figure 35 and a length of land after the facility greater than 20 m but less than 40 m, the RRS shall be set for the road part and immediately after it and for start and end terminal (Figure 36). In case of impossibility to perform Figure 34 due to the length of the site after the facility greater than 10 m but less than 20 m, start and end terminal shall also be placed immediately after the RRS of the facility (Figure 37). In case of impossibility to perform Figure 35 due to the length of the terrain after the facility of less than 10 m or any other valid reason, the implementation of the zeroing must be coordinated and approved by a specialised unit of the RIA.

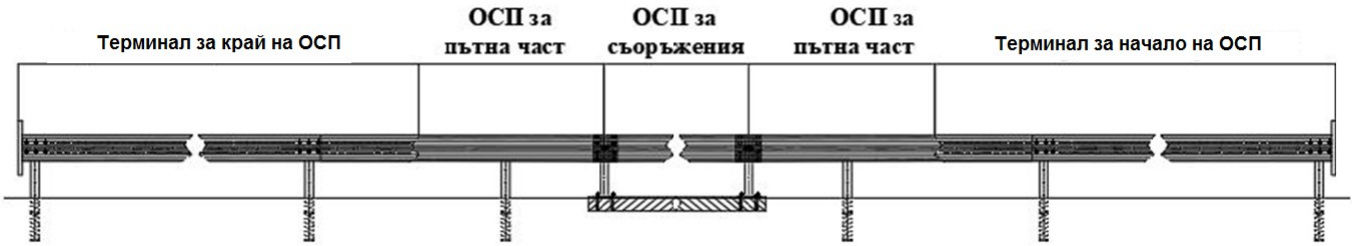


Figure 36

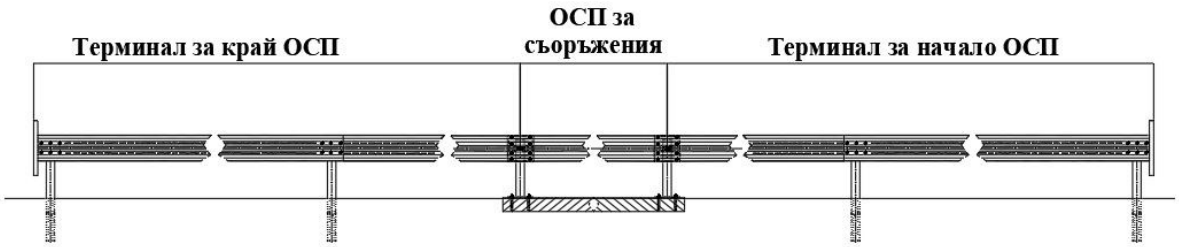


Figure 37

By way of exception and after approval by a specialised unit of the RIA, other elements for start and end may be applied.

Annex No 2

1. Where the initial shock absorbing buffer has the smallest bevel angle/lowest width and belongs to the highest speed class, the test matrix is in the range of Tables 17–21, depending on the highest speed for the cushion family.

Table 17

Initial shock absorbing buffer with the smallest/small bevel angle/width, 110 km/h

Speed class km/h	**Bevel angle/width**		
	Minimum	**Medium**	**Maximum**
110	All tests	-	TC 2.1.100 TC 4.3.110[a)]
100	TC 1.2.100	-	TC 4.2.100[a)]
80	TC 1.2.80	-	TC 4.2.80[a)]
50	TC 1.1.50	-	TC 4.2.50[a)]
[a)] Applicable only to diverting shock absorbing buffers (R).			

Table 18

Initial shock absorbing buffer with the smallest/small bevel angle/width, 100 km/h

Speed class km/h	**Bevel angle/width**		
	Minimum	**Medium**	**Maximum**
100	All tests	-	TC 2.1.100 TC 4.2.100[a)]
80	TC 1.2.80	-	TC 4.2.80[a)]
50	TC 1.1.50	-	TC 4.2.50[a)]
[a)] Applicable only to diverting shock absorbing buffers (R).			

Table 19

Initial shock absorbing buffer with the smallest/small bevel angle/width, 80 km/h

Speed class km/h	**Bevel angle/width**		
	Minimum	**Medium**	**Maximum**
80	All tests	-	TC 1.1.80 TC 4.2.80[a)]
50	TC 1.1.50	-	TC 4.2.50[a)]
[a)] Applicable only to diverting shock absorbing buffers (R).			

Table 20

Initial shock absorbing buffer with the smallest/small bevel angle/width, 50 km/h

Speed class km/h	**Bevel angle/width**		
	Minimum	**Medium**	**Maximum**
50	All tests	-	TC 1.1.50 TC 4.2.50[a)]
[a)] Applicable only to diverting shock absorbing buffers (R).			

Table 21

Initial shock absorbing buffer with the smallest/small bevel angle/width, 100 km/h

Speed class km/h	**Bevel angle/width**		
	Minimum	**Medium**	**Maximum**
110	TC 1.3.110 TC 3.3.110	-	TC 4.3.110[a)]
100	All tests	-	TC 2.1.100 TC 4.2.100[a)]
80	TC 1.2.80	-	TC 4.2.80[a)]
50	TC 1.1.50	-	TC 4.2.50[a)]
[a)] Applicable only to diverting shock absorbing buffers (R).			

2. Where the initial shock absorbing buffer has the largest/large bevel angle/width and belongs to a speed class 100 km/h and the group additionally covers a speed class 110 km/h, the test matrix given in Table 22 shall be applied.

Table 22

Initial shock absorbing buffer with the smallest/small bevel angle/width, 100 km/h

Speed class km/h	**Bevel angle/width**		
	Minimum	**Medium**	**Maximum**
110	TC 1.3.110 TC 3.3.110	-	TC 4.3.110 [a)]
100	TC 1.2.100 TC 4.2.100[a)] TC 5.2.100	-	All tests
80	TC 1.2.80	-	TC 4.2.80 [a)]
50	TC 1.1.50	-	TC 4.2.50 [a)]
[a)] Applicable only to diverting shock absorbing buffers (R).			