

CENTRO PROVE AISICO

LABORATORIO ACCREDITATO AI SENSI DELLA NORMA UNI CEI EN ISO / IEC 17025:2005
ACCREDITED LABORATORY ACCORDING TO NORM UNI CEI EN ISO / IEC 17025:2005

RAPPORTO DI PROVA n° 1411 CRASH TEST REPORT

Tipologia prova: Veicolo leggero – TB11
(Test type) Light vehicle – TB11

Tipologia barriera: Barriera di sicurezza bordo laterale cl. H1 mod. MegaRail ex H1-W2-A
(Test item) H1 Road Safety Barrier for ground mod. MegaRail ex H1-W2-A

Committente: SAFEROAD RRS GmbH
(Client)

Data della prova: 2016/07/12
(Date of Test)



Normativa di riferimento – Reference Standard:

EN 1317-1 :2010 del 07/2010
EN 1317-2:2010 del 07/2010

Lingua ufficiale di riferimento
(Official test report language)

Italiano / Italian

Numero pagine allegati compresi
(Number of pages including annexes)

127

Data Rapporto di Prova
(Date of report)

2016/08/30

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Duplicate

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ALLEGATI –ANNEXES

- All. A – Disegno costruttivo del dispositivo – *Test device manufacturer's designs*
- All. B – Manuale di installazione barriera – *Barrier installation manual*
- All. C1 – Foto barriera ante urto – *Test item photos before the test*
- All. C2 – Foto veicolo ante urto – *Test vehicle photos before the test*
- All. C3 – Foto barriera post urto – *Test item photos after the test*
- All. C4 – Foto veicolo post urto – *Test vehicle photos after the test*
- All. C5 – Foto zenitali urto – *Impact photo sequence from zenithal point of view*
- All. C6 – Foto frontali urto – *Impact photo sequence from frontal point of view*
- All. D – Filmati – *Video records*
- All. E – **Analisi granulometrica**, prova di carico del terreno, prove di resistenza del cordolo in c.a.–
Terrain granoulometric analysis, loading test, reinforced concrete curb resistance tests
- All. F – **Certificato di accreditamento ACCREDIA del Centro Prove AISICO – ACCREDIA accreditation certificate of AISICO Test Centre**
- All. G – **Certificati di prova sui materiali componenti il dispositivo – Test certificates on device materials**

Gli allegati formano parte integrante del Rapporto di Prova. / *The Annexes are an integral part of the Test Report*

1 Laboratorio di prova – Test Laboratory

LABORATORIO DI PROVA – TEST LABORATORY	
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CENTRO PROVE AISICO – TEST HOUSE	
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Il Centro Prove è posizionato all'interno di uno stabilimento di superficie pari a 16 ettari, situato nel comune di Pereto, in provincia dell'Aquila, circa 40 km a est di Roma, nei pressi del casello dell'Autostrada Roma – Teramo.

Il campo è dotato di tre binari di lancio, posizionati rispettivamente a 15°, 20° e 25° rispetto all'asse del dispositivo da testare, che consentono ai veicoli di raggiungere la velocità richiesta per la prova oltre a mantenere perfettamente la traiettoria impostata.

È altresì presente un binario con angolo di inclinazione di 30° per crash su dispositivi di sicurezza riguardanti motociclisti.

AISICO's Test Centre is located inside a 16 hectare facility in Pereto, in the province of Aquila, within about 40 km north of Rome, served by the Rome – Teramo motorway.

The site features three launching tracks – set at angles of 15°, 20° and 25° respectively to the axis of the device to be tested – allowing vehicles to reach the necessary test speed and to perfectly keep on the set trajectory.

There is also a launching track set at an angle of 30° for the crash testing of motorcycle safety devices.

**ACCREDITAMENTO DEL CENTRO PROVE AISICO – AISICO'S TEST CENTRE
ACCREDITATION**

ENTE DI ACCREDITAMENTO ACCREDITATION BODY	ACCREDIA L'Ente Italiano di Accreditamento
NUMERO DI ACCREDITAMENTO ACCREDITATION NUMBER	0424
NORME DI RIFERIMENTO REFERENCE STANDARDS	UNI EN CEI ISO / IEC 17025 : 2005 "Requisiti generali per la competenza dei laboratori di prova e taratura"
NORME DI ACCREDITAMENTO ACCREDITATION STANDARDS	UNI EN 1317-1/2/3:2010; UNI ENV 1317-4:2003; DIN EN 1317-7:2012 ; UNI CEN/TS 1317-8:2012; UNI EN 12767:2008; UNE 135900-1/2:2008; UNI CEN/TS 1793-4:2004; UNI CEN/TS 1793-5:2006; UNI EN 14726:2005; ASTM E415:2008; UNI EN ISO 6508-1:2006; UNI EN ISO 6892-1:2009; AASHTO_ MASH:2009; NCHRP Report 350:1993; PrEN16272-6:2012; PrEN16272-3-2:2012; PrEN/TS16272-5:2012; PAS 68/69:2013; ASTM F2656-15; ISO-IWA14-1/2:2014;
NOTE:	<ul style="list-style-type: none"> - si dichiara che alla data di emissione del presente rapporto di prova, nonché alla data di esecuzione della relativa prova, il Centro Prove AISICO non aveva in corso procedure di sospensione o revoca dell'accREDITAMENTO. - <i>AISICO declares that neither pending suspension proceedings or accreditation revocation were ongoing when the present test report was issued and the relevant crash test was performed.</i>
* Copia della certificazione di accreditamento è presente nel rapporto come Allegato F * A copy of accreditation certification is in the Annex F	

2 Cliente – Customer

GENERALITÀ – PARTICULARS	
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3 Dispositivo di prova – Test item

BARRIERA DI SICUREZZA – SAFETY BARRIER	
TIPO DI DISPOSITIVO INSTALLED TEST DEVICE	Barriera di sicurezza bordo laterale cl. H1 mod. MegaRail ex H1-W2-A H1 Road Safety Barrier for ground mod. MegaRail ex H1-W2-A
DATA DI RICEVIMENTO MATERIALE TEST DEVICE RECEIPT DATE	2016/07/08
DATA DELLA PROVA TEST DATE	2016/07/12
NUMERO DELLA PROVA TEST NUMBER	1411

4 Procedura di prova – Test procedure

4.1 Descrizione della prova – Test description

NORMA DI RIFERIMENTO REFERENCE STANDARD	UNI EN 1317-1:2010 / 1317- 2:2010
TIPO DI PROVA IMPACT TEST TYPE	TB11
VELOCITÀ TEORICA DEL MEZZO THEORETICAL VEHICLE SPEED	100 km/h ^{+7%} / ^{-0%}
ANGOLO TEORICO D'IMPATTO THEORETICAL IMPACT ANGLE	20° ^{+1.5°} / ^{-1°}
MASSA TEORICA DEL MEZZO THEORETICAL VEHICLE MASS	900 ± 40 kg
ENERGIA TEORICA D'IMPATTO THEORETICAL IMPACT ENERGY	40,6 kJ

4.2 Area di prova – Test area

L'area di prova comprende una zona pavimentata di lunghezza 100 metri e larghezza 20 metri, un cordolo in cemento armato per il posizionamento di dispositivi per opere d'arte ed una zona di terreno retrostante per il posizionamento di dispositivi su terra.

The test site consists of an asphalted area which is 100 m long and 20 m wide, a reinforced concrete curb for the installation of bridge side test devices and an unpaved area beyond the curb to install edge side test devices.

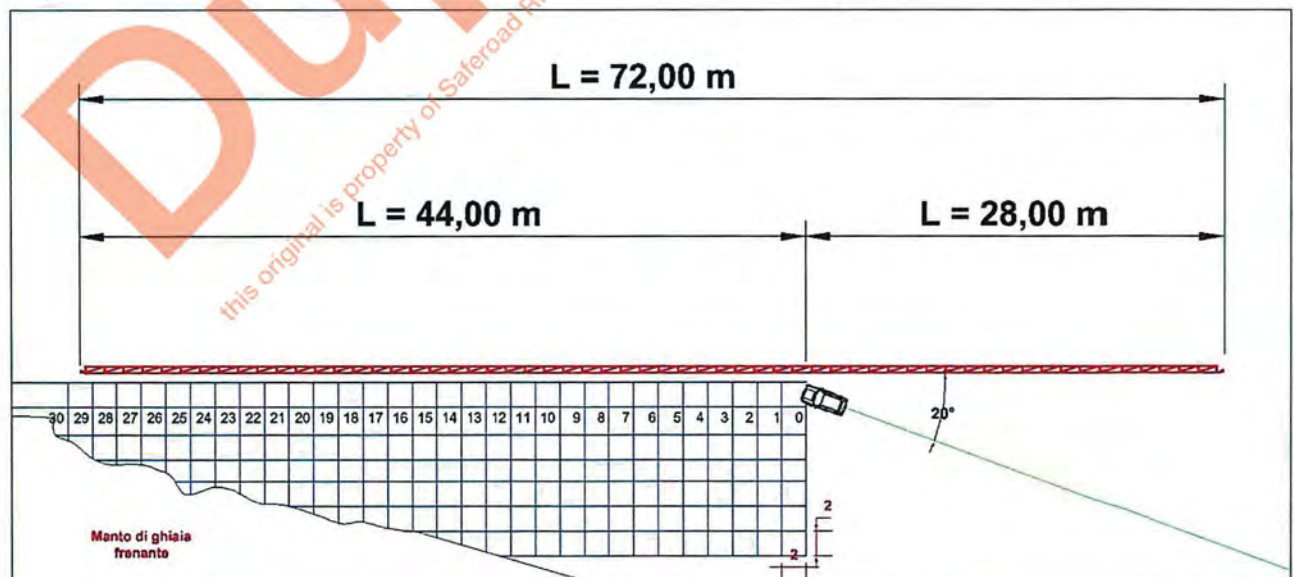


Figura 1 - Figure 1 Rappresentazione della traiettoria d'impatto - Vehicle's impact trajectory

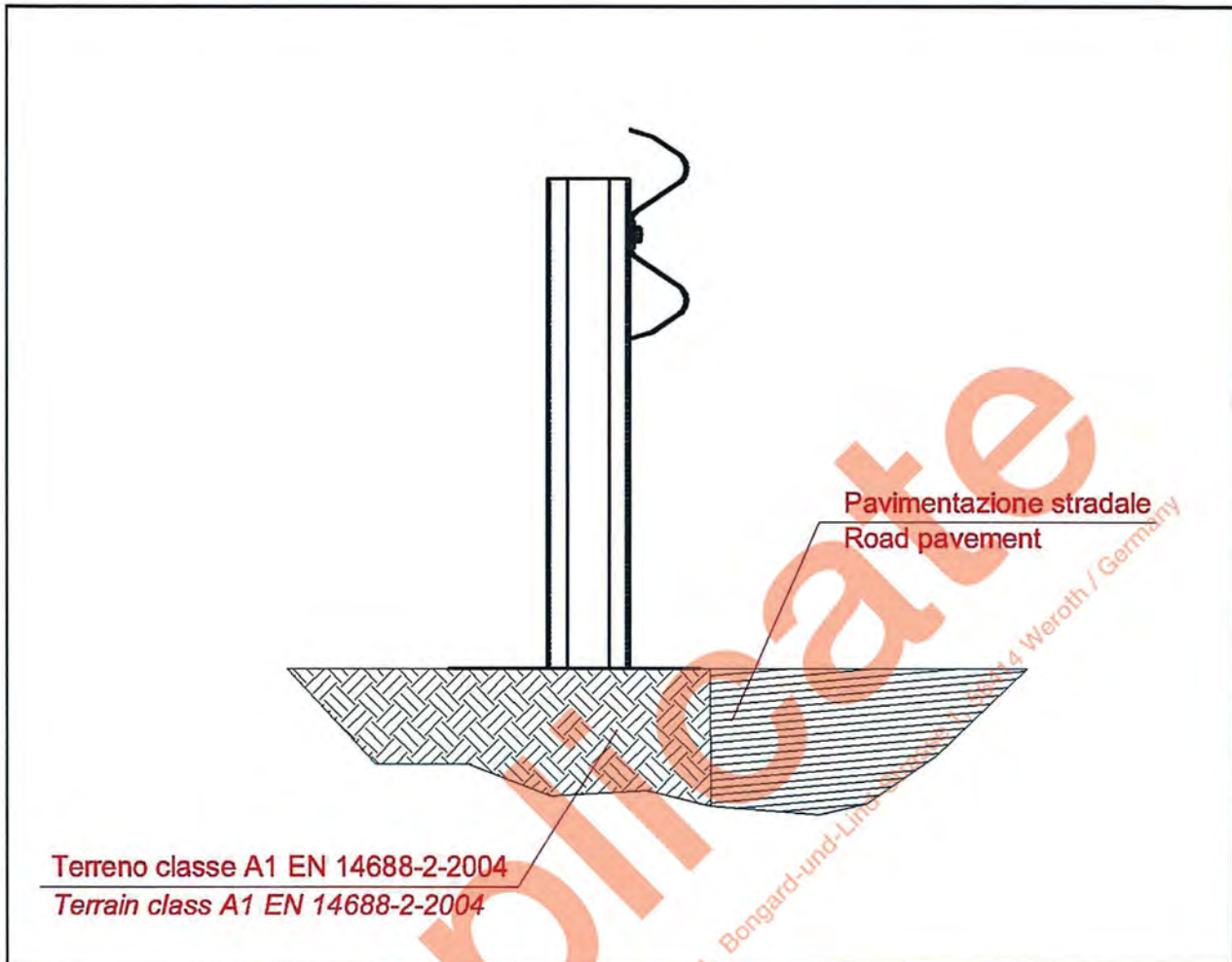


Figura 2 - Figure 2 Sezione dell'installazione - The installation section

Il dispositivo testato è stato infisso in terreno costituito da ghiaia calcarea in matrice sabbioso limosa di classificazione A-1-a secondo le norme EN 14688-2:2004. Nell'allegato E sono riportati i certificati dell'analisi granulometrica e della caratterizzazione geotecnica del terreno, nonché i risultati di prova di carico su piastra secondo la norma CNR 146/92.

The tested device has been driven into A-1-a limestone gravel soil in sandy muddy matrix, in accordance with EN 14688-2:2004 standards. Annex E contains granulometric and geotechnical analysis certificates as well as the results of plate loading tests carried out in accordance with CNR 146/92 standards.

4.3 Descrizione dell'installazione e dei particolari del dispositivo – Test device installation description and technical specifications

	SI/YES	NO/NOT	NOTE/NOTES
CONFORMITÀ TRA DISPOSITIVO RAPPRESENTATO NEI DISEGNI E DISPOSITIVO TESTATO <i>DRAWINGS ARE IN ACCORDANCE WITH TEST DEVICE</i>	X		
CONFORMITÀ TRA INSTALLAZIONE TEORICA DEL DISPOSITIVO ED INSTALLAZIONE REALIZZATA <i>THEORETICAL BARRIER INSTALLATION IS IN ACCORDANCE WITH TEST DEVICE INSTALLATION</i>	X		

Il dispositivo testato è una barriera stradale metallica realizzata con nastri longitudinali, paletti (All. A).

La barriera è costituita da:

- Paletti a C 100x60x25 mm, di spessore 4,0 mm, di lunghezza 1,500 m, disposti ad interasse pari a 3,0 m, infissi nel terreno per 0,800 m;
- Nastro doppia onda lunghezza 4,300 m e altezza 0,306 m e spessore 2,5 mm con bordo superiore posizionato a 0,750 m dal piano stradale;
- Terminali realizzati con n° 10 paletti C 100x60x25 mm, di spessore 4,0 mm, di lunghezza 1,500 m, infissi nel terreno con profondità variabile, n° 3 nastri a doppia onda di lunghezza 4,300 m e spessore 2,5 mm;
- Viti, bulloni e dadi.

Il dispositivo è stato fornito a cura e responsabilità del Cliente; l'installazione è stata effettuata e controllata dall'AISICO.

Tutte le misure indicate sono al netto della zincatura e sono state rilevate dall'AISICO prima dell'esecuzione della prova.

Gli elementi principali del dispositivo sono stati sottoposti a prove di caratterizzazione eseguite su 3 campioni per ogni elemento, ricavati da elementi non disturbati.

Gli elementi principali e le zone dei manufatti dove effettuare i prelievi sono stati individuati di concerto tra il progettista del sistema e l'AISICO.

The tested device was a road safety metal barrier made up of beams, posts, (Annex. A).

The barrier consisted of:

- *C 100x60x25 mm, 4,0 mm thick and 1,500 m long steel posts, 3,0 m long axis distance, driven into the ground for 0,800 m;*
- *4,300 m long, 0,306 m high and 2,5 mm thick-double wave beam, the top of which was positioned to 0,750 m from road surface;*
- *Final elements consisting of: no.10 C 100x60x25 mm, 4.0 mm thick- and 1.500 m long- steel posts, driven into the ground at variable height, no.3 4,300 m long - and 2,5 mm thick- double wave beam;*
- *Screws, bolts and nuts.*

The test device was sampled, delivered installed by the customer; the installation of device has been carried out and controlled by AISICO.

All measures indicated in the attached drawings did not include zinc-coating and were verified by AISICO before the test was performed.

Three unchanged samples of the most important test item elements were analyzed and characterized for each element of the barrier.

The most important elements as well as portions of the barrier to be sampled were identified as agreed by the barrier manufacturer and AISICO.

Le prove eseguite hanno fornito i seguenti risultati (All. The results were the following (Annex G):
G):

ELEMENTO <i>Element</i>	MATERIALE* <i>Material*</i>	RISULTATI <i>Results</i>		
		R _m (N/mm ²)	R _{eH} (N/mm ²)	A (%)
Palo C 100x60x25x4.0 mm – <i>100x60x25x4.0 mm post</i>	S 355JR	502,66	446,06	31,51
Nastro doppia onda – <i>Double wave beam</i>	S355JR	539,81	478,23	28.92

* Caratteristiche del materiale dichiarate dal produttore / *Characteristic of material declared by the manufacturer*

I bulloni utilizzati per il montaggio del dispositivo e le relative forze di serraggio sono indicati nella seguente tabella. *The bolts used for the test device installation and the related clamping couples are shown in the following table.*

BULLONE <i>Bolt</i>	DIMENSIONI <i>Dimensions</i>	CLASSE <i>Class</i>	COPPIA DI SERRAGGIO <i>Clamping couple</i>
Unione Nastro – Nastro <i>Beam - Beam joint</i>	T.T.D.E. M16x27	4.6	140 Nm
Unione Nastro – Palo <i>Beam - Post joint</i>	T.E.D.E. M16x45	8.8	140 Nm

4.4 Descrizione del veicolo – *Vehicle description*

CARATTERISTICHE DEL VEICOLO – VEHICLE TECHNICAL SPECIFICATIONS	
TIPO VEICOLO <i>VEHICLE TYPE</i>	Autovettura - Car
NUMERO ASSOCIATO AL VEICOLO <i>VEHICLE NUMBER</i>	1063
MODELLO <i>MODEL</i>	OPEL CORSA
ANNO DI PRODUZIONE <i>PRODUCTION YEAR</i>	1995
NUMERO TELAIO <i>VEHICLE IDENTIFICATION NUMBER</i>	WOL000073T4142156
MASSA A VUOTO <i>WEIGHT WITHOUT BALLAST</i>	796,5 kg
BARICENTRO PER LA PROVA <i>VEHICLE CENTRE OF GRAVITY</i>	$X_g = 910$ mm $Y_g = 5$ mm $Z_g = 512$ mm
POSIZIONE STRUMENTAZIONE <i>EQUIPMENT LAYOUT</i>	$X_I = 0$ mm; $Y_I = 0$ mm; $Z_I = 0$ mm; $X_{II} = -40$ mm; $Y_{II} = 0$ mm; $Z_{II} = 0$ mm; $X_{\Omega} = +40$ mm; $Y_{\Omega} = 0$ mm; $Z_{\Omega} = 0$ mm;
TIPO ZAVORRA <i>BALLAST TYPE</i>	//
TIPO MANICHINO <i>DUMMY MODEL</i>	Hybrid III 50° percentile
POSIZIONE MANICHINO <i>DUMMY POSITION</i>	Lato passeggero <i>Passenger side</i>
MASSA MANICHINO <i>DUMMY WEIGHT</i>	78 kg
MASSA TOTALE <i>TOTAL WEIGHT</i>	926,8 kg

DIMENSIONI DEL VEICOLO – VEHICLE DIMENSIONS

WB	PASSO SINISTRO LEFT WHEEL BASE	2460 mm
WB	PASSO DESTRO RIGHT WHEEL BASE	2460 mm
F	SBALZO ANTERIORE FRONT OVERHANG	700 mm
R	SBALZO POSTERIORE REAR OVERHANG	500 mm
L	LUNGHEZZA VEICOLO VEHICLE LENGTH	3660 mm
W	LARGHEZZA VEICOLO VEHICLE WIDTH	1600 mm
H	ALTEZZA VEICOLO VEHICLE HEIGHT	1410 mm
T _{ant}	CARREGGIATA ANTERIORE FRONT TRACK	1380 mm
T _{post}	CARREGGIATA POSTERIORE REAR TRACK	1360 mm

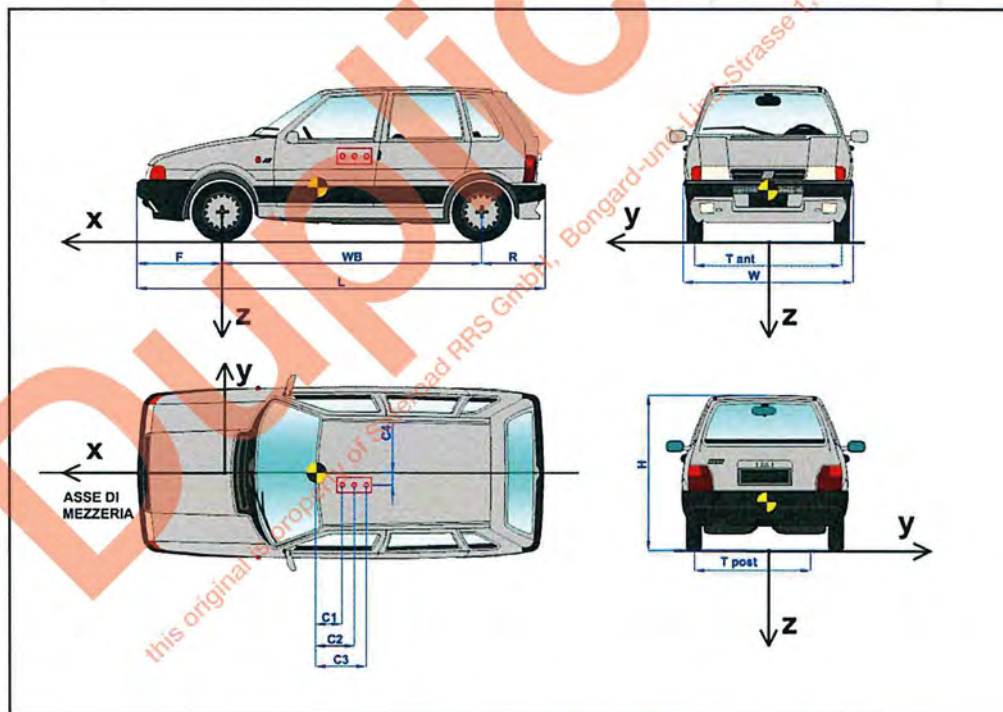


Figura 1 Dimensioni del veicolo – Vehicle dimensions

4.4.1 Valutazione dello stato del veicolo in data 2016/07/12 – *Vehicle roadworthiness assessment on 2016 July 12*

I pneumatici sono stati gonfiati alla pressione raccomandata dal produttore.	<i>Tyres were inflated up to the pressure recommended by the manufacturer.</i>
Le condizioni del veicolo soddisfano i requisiti per il rilascio del certificato di idoneità alla circolazione riguardo pneumatici, sospensioni, allineamento delle ruote e carrozzeria.	<i>The vehicle met all the requirements for the granting of a roadworthiness certificate, with respect to tyres, suspensions, wheel alignment and body.</i>
Non sono state apportate riparazioni, modifiche o rinforzi che possano alterare le caratteristiche generali del veicolo o possano invalidare la presente certificazione.	<i>No repairs, modifications or strengthening work had been carried out, capable of altering the vehicle general characteristics or of invalidating this certification.</i>
Il veicolo risulta pulito; eventuali presenze di fango e depositi che potrebbero causare polvere durante l'urto sono stati rimossi prima della prova.	<i>The vehicle was clean, any mud or other deposits capable of causing dust during the collision had been removed before the test.</i>
Sulla superficie esterna del veicolo sono stati posizionati segni di riferimento per facilitare le analisi.	<i>Marks had been made on the exterior of the vehicle body to assist in the analysis.</i>
Il veicolo non è stato bloccato dal controllo del volante o da altri dispositivi durante l'urto e all'interno dell'area di uscita.	<i>The vehicle was not blocked by the steering wheel control or other devices during the collision and inside the exit area.</i>

4.4.2 Metodologia utilizzata per il calcolo del baricentro del veicolo – Methodology applied to the vehicle centre of gravity calculation

Per il calcolo del baricentro dei veicoli a due assi è stata applicata la norma ISO 10392 – Veicoli stradali con due assi – Determinazione del centro di gravità – che prevede:

- la determinazione di una serie di parametri geometrici caratteristici del veicolo e dei pesi che si scaricano sulle quattro ruote con il veicolo posizionato su superficie piana:

Parametro n.	Denominazione
1	Passo asse lato SX
2	Passo asse lato DX
3	Carreggiata Ant.
4	Carreggiata Post.
5	Peso in piano ruota Ant SX
6	Peso in piano ruota Ant DX
7	Peso in piano ruota Post SX
8	Peso in piano ruota Post DX

- la determinazione dei raggi statici dei quattro pneumatici:

Parametro n.	Denominazione
9	Raggio statico ruota Ant SX
10	Raggio statico ruota Ant DX
12	Raggio statico ruota Post SX
11	Raggio statico ruota Post DX

- il sollevamento in successione, prima di un asse e poi dell'altro, a tre diverse altezze (200 – 400 – 500 mm) con misura, a ciascuna altezza di sollevamento, dei pesi (M_i) che si scaricano sulle due ruote rimaste a terra; le misure di peso verranno effettuate anche nella fase di abbassamento (altezze di 400 – 200 mm) per un totale di cinque misure per ciascun asse sollevato (per le misure di peso viene utilizzata un'apposita bilancia);

- il calcolo delle seguenti grandezze:

Parametro n.	Denominazione
12	Altezza del Baricentro dal suolo
13	Distanza del Baricentro dall'asse longitudinale del veicolo
14	Distanza del Baricentro dall'asse trasversale del veicolo

In order to determine the centre of gravity of vehicles with two axles ISO 10392 standards – Road vehicles with two axles – Determination of centre of gravity – were applied so as to:

- define a range of typical geometric parameters and the vehicle weights which are distributed to all four wheels when the vehicle is positioned on a flat surface:

Parameter no.	Definition
1	Left wheel base
2	Right wheel base
3	Front track
4	Rear track
5	Left front wheel weight
6	Right front wheel weight
7	Left rear wheel weight
8	Right rear wheel weight

- to determine the static radii of the four wheels:

Parameter no.	Definition
9	Left front static wheel radius
10	Right front static wheel radius
12	Left rear static wheel radius
11	Right rear static wheel radius

- to perform the uplifting in turn of the two axles (front and rear) at three different heights (200 – 400 – 500 mm) and the related wheel weight measurement at each different height. Weight measurements have to be performed also when bringing down the axles (400 -200 mm) for a total of five measurements for each axle lifted up (a specific weighing machine is needed in this case);

- to determine the following quantities:

Parameter no.	Definition
12	Centre of gravity height from the ground
13	Centre of gravity distance from vehicle longitudinal axle
14	Centre of gravity distance from vehicle transversal axle

5 Strumentazione – Equipment

Per misurare le caratteristiche del moto e dell'urto del veicolo, viene installato a bordo del mezzo un Sistema di Acquisizione Dati, formato da:

- Centralina di acquisizione dati (Centralina DAS 3200L della EME Co.) fissata all'interno del veicolo formata da due moduli di 8 canali ciascuno, per un totale di 16 canali;
- Un contenitore di protezione in alluminio al cui interno sono installate due terne di accelerometri unidirezionali disposti secondo i tre assi del veicolo (longitudinale, trasversale e verticale).

La prima terna (**terna n. 1**) è formata da tre accelerometri aventi un fondo scala a 100 g; una seconda terna (**terna n. 2**) è installata a circa 4.0 cm dalla prima, lungo l'asse longitudinale del veicolo in direzione posteriore, ed è formata da tre accelerometri con fondo scala a 50 g. Tale terna viene installata allo scopo di garantire comunque il rilevamento dei dati accelerometrici durante la prova in caso di malfunzionamento della prima.

To measure the characteristics of the vehicle motion and collision a Data Acquisition System was installed on board, comprising:

- *A central data acquisition unit (DAS 3200L central unit manufactured by EME Co.) installed in the interior of the vehicle and consisting of two modules with 8 channels each, totalling 16 channels;*
- *An aluminium case containing two sets of three unidirectional accelerometers arranged according to the three axes of the vehicle (longitudinal, transverse and vertical).*

The first set (set 1) consisted of three accelerometers with a 100 g measuring range; a second set (set 2) was installed at a distance of about 4.0 cm from the first one, along the longitudinal axis of the vehicle at the rear, consisting of three accelerometers with a 50 g measuring range. This was installed to ensure the acquisition of accelerometric test data in the event the first set was faulty.

6 Copertura fotografica – *Photographic coverage*

DESCRIZIONE DELLA COPERTURA – *LAYOUT OF CAMERAS*

POSTAZIONE 1 <i>POSITION 1</i>	- videocamera OLYMPUS(250 fot/s) – OLYMPUS video camera (250 fot/s) - videocamera HD (25 fot/s) – HD video camera (25 fot/s)
POSTAZIONE 2 <i>POSITION 2</i>	- videocamera OLYMPUS(250 fot/s) – OLYMPUS video camera (250 fot/s) - videocamera HD (25 fot/s) – HD video camera (25 fot/s)
POSTAZIONE 3 <i>POSITION 3</i>	- videocamera OLYMPUS(250 fot/s) – OLYMPUS video camera (250 fot/s) - videocamera HD (25 fot/s) – HD video camera (25 fot/s)
POSTAZIONE 4 <i>POSITION 4</i>	- videocamera OLYMPUS(250 fot/s) – OLYMPUS video camera (250 fot/s) - videocamera HD (25 fot/s) – HD video camera (25 fot/s)
POSTAZIONE 5 <i>POSITION 5</i>	- videocamera OLYMPUS(250 fot/s) – OLYMPUS video camera (250 fot/s)
POSTAZIONE 6 <i>POSITION 6</i>	- videocamera OLYMPUS(250 fot/s) – OLYMPUS video camera (250 fot/s) - videocamera HD (25 fot/s) – HD video camera (25 fot/s)

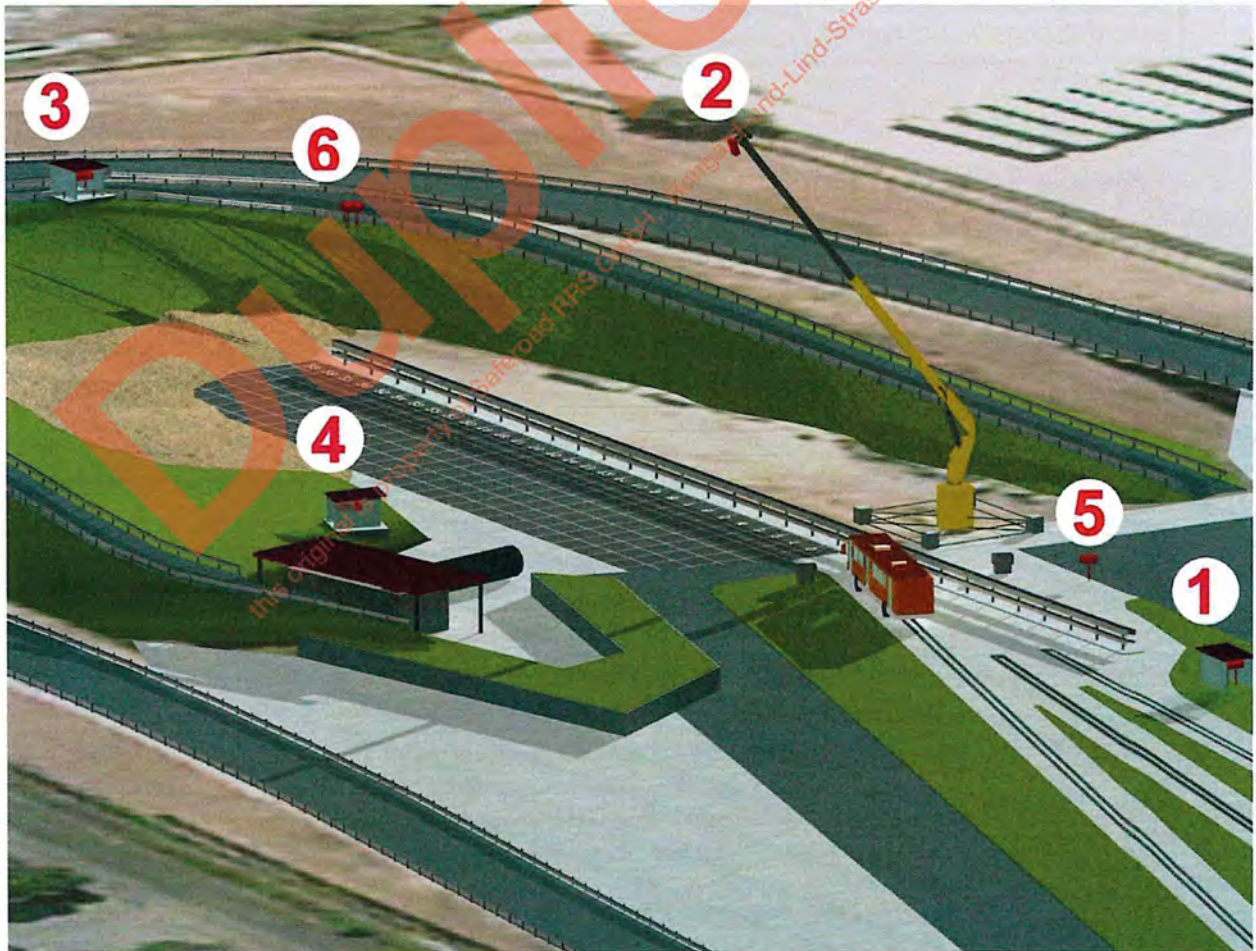


Figura 4 – *Figure 4* Campo prove – *Crash test area*

7 Risultati – Results

7.1 Condizioni di prova – Weather conditions

TEMPO WEATHER	Sereno Clear
TEMPERATURA TEMPERATURE	31°C

7.2 Esito lancio – Test conditions

VELOCITÀ DI IMPATTO IMPACT SPEED	100,3 km/h
DIFFERENZA DA VELOCITÀ TEORICA DIFFERENCE FROM NOMINAL SPEED	+0,3 km/h (+0,3 %)
ANGOLO DI IMPATTO IMPACT ANGLE	20,1°
DIFFERENZA DA ANGOLO TEORICO DIFFERENCE FROM NOMINAL ANGLE	+0,1° (+0,5 %)

Prova n°- Test # 1411

Tolleranze combinate di velocità e angolo nell'area: SI
Combinated tollerances of speed and angle in the area: YES

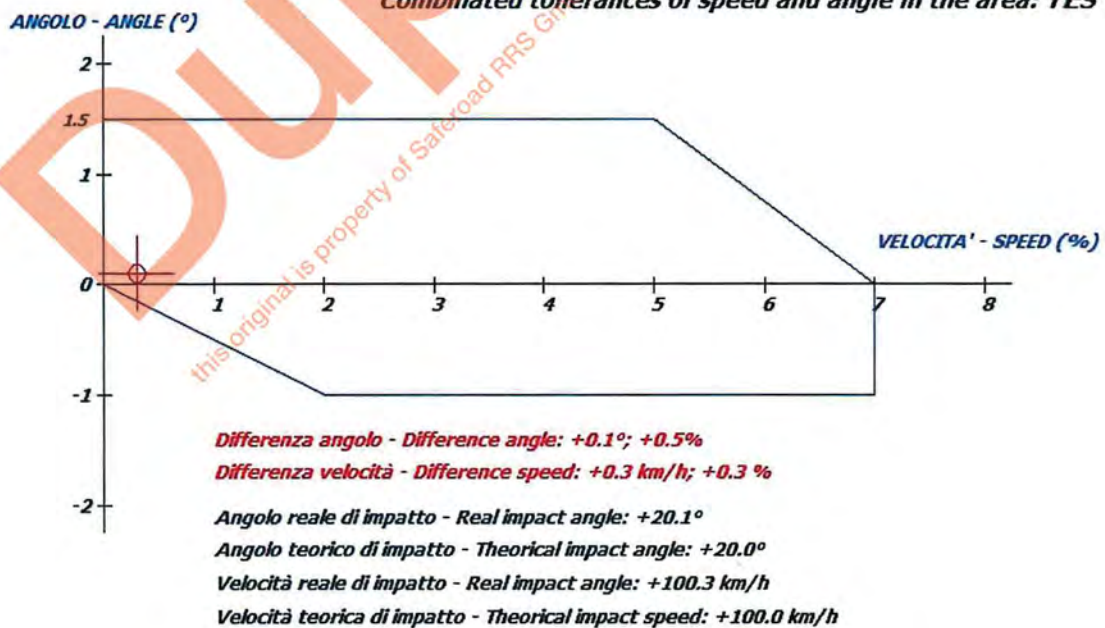


Figura 5 - Figure 1 Area delle tolleranze combinate – Combined limit area

7.3 Dispositivo di prova – Test device

COMPORTAMENTO DEL DISPOSITIVO – GENERAL	
DEFLESSIONE DINAMICA MASSIMA (D_m) MAXIMUM DYNAMIC DEFLECTION	0,4 m
DEFLESSIONE DINAMICA MASSIMA NORMALIZZATA (D_N) NORMALISED MAXIMUM DYNAMIC DEFLECTION	0,4 m
LARGHEZZA DI LAVORO DISPOSITIVO (W_m) BARRIER WORKING WIDTH	0,6 m
LARGHEZZA DI LAVORO DISPOSITIVO NORMALIZZATA (W_N) NORMALISED BARRIER WORKING WIDTH	0,6 m – W_1
DEFORMAZIONE PERMANENTE MASSIMA MAXIMUM PERMANENT DEFLECTION	0,3 m
LUNGHEZZA DEL CONTATTO CONTACT LENGTH	7,1 m
PUNTO DI IMPATTO ACTUAL IMPACT POINT	36,9 m

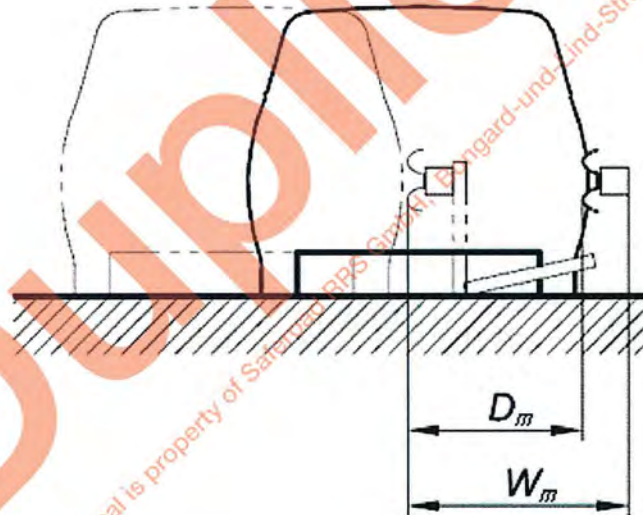


Figura 6 – Figure 6 Comportamento del dispositivo – Device behaviour

RILEVAMENTO DANNI / MISURE – DAMAGE ASSESSMENT/MEASUREMENTS

PALO POST	SPOSTAMENTO TRASVERSALE CROSS DISPLACEMENT (cm)				SPOSTAMENTO VERTICALE VERTICAL DISPLACEMENT (cm)		MISURE SUL DISPOSITIVO DEVICE MEASUREMENTS
	A	B	C	E	h1	h2	
-9	0	0	0	18	75	0	A = SPOSTAMENTO PARTE INFERIORE PALO LOWER POST DISPLACEMENT
-8	0	0	0	18	75	0	
-7	0	0	0	18	75	0	B = SPOSTAMENTO PARTE INFERIORE LAMA BEAM DISPLACEMENT
-6	0	0	0	18	75	0	
-5	0	0	0	18	75	0	C = SPOSTAMENTO PARTE SUPERIORE LAMA BEAM DISPLACEMENT
-4	0	0	0	18	75	0	
-3	0	0	0	18	75	0	D = SPOSTAMENTO CORRENTE INFERIORE LOWER BEAM DISPLACEMENT
-2	0	0	0	18	75	0	
-1	0	0	0	18	75	0	E = LARGHEZZA DI LAVORO STATICA STATIC WORKING WIDTH
0	0	0	0	18	75	0	
1	3	4	4	22	75	0	h1= ALTEZZA PARTE SUPERIORE LAMA UPPER BEAM HEIGHT
2	6	23	23	57	77	0	
3	12	24	25	61	77	0	h2= ALTEZZA PARTE SUPERIORE CORRENTE LOWER BEAM HEIGHT
4	4	0	5	40	75	0	
5	0	1	1	21	75	0	
6	0	0	0	18	75	0	
7	0	0	0	18	75	0	
8	0	0	0	18	75	0	
9	0	0	0	18	75	0	
10	0	0	0	18	75	0	
11	0	0	0	18	75	0	
12	0	0	0	18	75	0	
13	0	0	0	18	75	0	
14	0	0	0	18	75	0	
15	0	0	0	18	75	0	

PALO POST	Lama inf. deformata Deformed Lower Beam	Palo piegato Deformed Post				NOTE NOTES Descrizione dei danni prodotti Damage description
-9						
-8						
-7						
-6						
-5						
-4						
-3						
-2						
-1						
0						
1	X	X				
2	X	X				
3	X	X				
4	X	X				
5	X	X				
6						
7						
8						
9						
10						
11						
12						
13						
14						
15						

CRITERI DI ACCETTAZIONE DELLA PROVA – IMPACT TEST ACCEPTANCE CRITERIA

	SI/YES	NO/NOT	NOTE/NOTES
IL DISPOSITIVO CONTIENE IL VEICOLO <i>THE TEST DEVICE HOLDS THE TEST VEHICLE</i>	X		
IL DISPOSITIVO PRESENTA DEGLI ELEMENTI PRINCIPALI LONGITUDINALI COMPLETAMENTE ROTTI O STACCATI DOPO L'URTO <i>COMPLETE BREAKAGE OR COMING OFF OF MAIN LONGITUDINAL ELEMENTS OF THE TEST DEVICE</i>		X	
ELEMENTI DEL DISPOSITIVO DEL PESO SUPERIORE DI 2 kg COMPLETAMENTE STACCATI <i>TEST ITEMS PARTS OVER THE MASS OF 2 kg TOTALLY DETACHED</i>		X	
ELEMENTI DEL DISPOSITIVO SONO PENETRATI ALL'INTERNO DELL' ABITACOLO DEL VEICOLO <i>TEST ITEM ELEMENTS PENETRATED THE PASSENGER COMPARTMENT OF THE VEHICLE</i>		X	
L'ABITACOLO DEL VEICOLO PRESENTA DEFORMAZIONI CHE POSSONO CAUSARE LESIONI GRAVI AI PASSEGGERI <i>THE PASSENGER COMPARTEMENT HAS DEFORMATIONS THAT CAN CAUSE SERIOUS DAMAGE TO PASSENGERS</i>		X	

7.4 Veicolo di prova – Test vehicle

Il veicolo descrive correttamente la traiettoria di avvicinamento preimpostata ed impatta il dispositivo nel punto prefissato con un angolo di 20,1°.

Dopo l'impatto il veicolo viene contenuto dal dispositivo deformandolo per 10,0 m Il veicolo si distacca dalla barriera ad una distanza di 7,10 m dal punto di impatto restando all'interno dell'area di uscita e si arresta dopo aver percorso circa 58 m dal punto d'impatto.

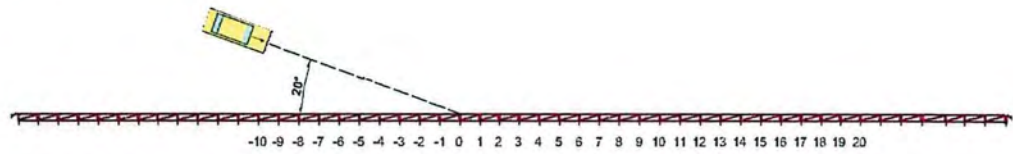
Nessun elemento del dispositivo in prova è penetrato nell'abitacolo del veicolo e nessuna parte importante del veicolo o della barriera si è distaccata.

The vehicle correctly describes the previewed trajectory and, after the uncoupling, hit the barrier in the prefixed point with a 20,1° impact angle.

After impact, the vehicle was correctly redirected by the test device which was deformed for 10,0 m. The vehicle got detached from the barrier at 7,10 m from the impact point remaining inside CEN box and it arrested itself after having covered more than 58 m from the impact point.

No element of the test device penetrated the vehicle and no significant portion of the vehicle or of the barrier came completely off.

Ai = ANGOLO DI IMPATTO
Vi = VELOCITA' DI IMPATTO



$A_i = 20,1^\circ$
 $V_i = 100,3 \text{ km/h}$

Figura 7 – Figure 7 Angolo di impatto - Actual impact angle

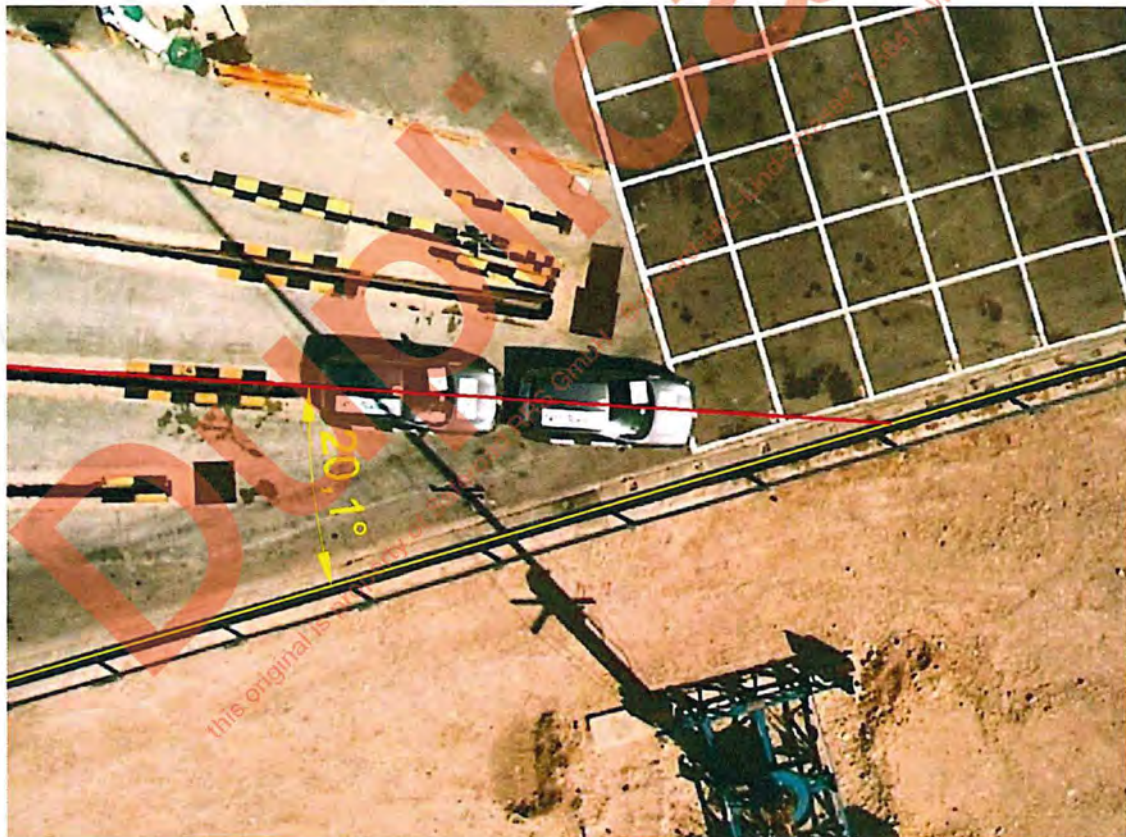
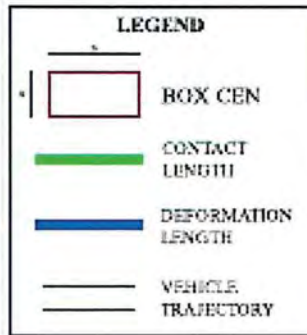


Figura 8 – Figure 8 Foto dell'angolo di impatto – Actual impact angle photo



BOX CEN data

Dati BOX CEN
X=4,4 m B=10,0 m
Inizio BOX CEN= 12,0 m

Barrier-vehicle contact

Contatto barriera-veicolo
Lunghezza = Length: 7,1 m
Inizio = start 4,9 m fine = end: 12,0 m

Barrier deformation

Deformazione barriera
Lunghezza = Length: 10,0 m
Inizio = start 0,0 m fine = end: 10,0 m

Vehicle data

Dati veicolo
Lunghezza = Length: 3,7 m
Larghezza = Width: 1,6 m

TRAIETTORIA RILEVATA

Ruota anteriore destra
TRAJECTORY
Front left wheel

Celle	x	y
0	0,0	1,0
1	2,0	0,5
2	4,0	0,1
3	6,0	0,1
4	8,0	0,3
5	10,0	0,7
6	12,0	1,3
7	14,0	2,1
8	16,0	3,1
9	18,0	4,3
10	20,0	5,7
11	22,0	7,3
12	24,0	9,1
13	26,0	11,1
14	28,0	13,3
15	30,0	15,7
16	32,0	18,3
17	34,0	21,1
18	36,0	24,1
19	38,0	27,3
20	40,0	30,7
21	42,0	34,3
22	44,0	38,1
23	46,0	42,1
24	48,0	46,3
25	50,0	50,7
26	52,0	55,3
27	54,0	60,1
28	56,0	65,1
29	58,0	70,3

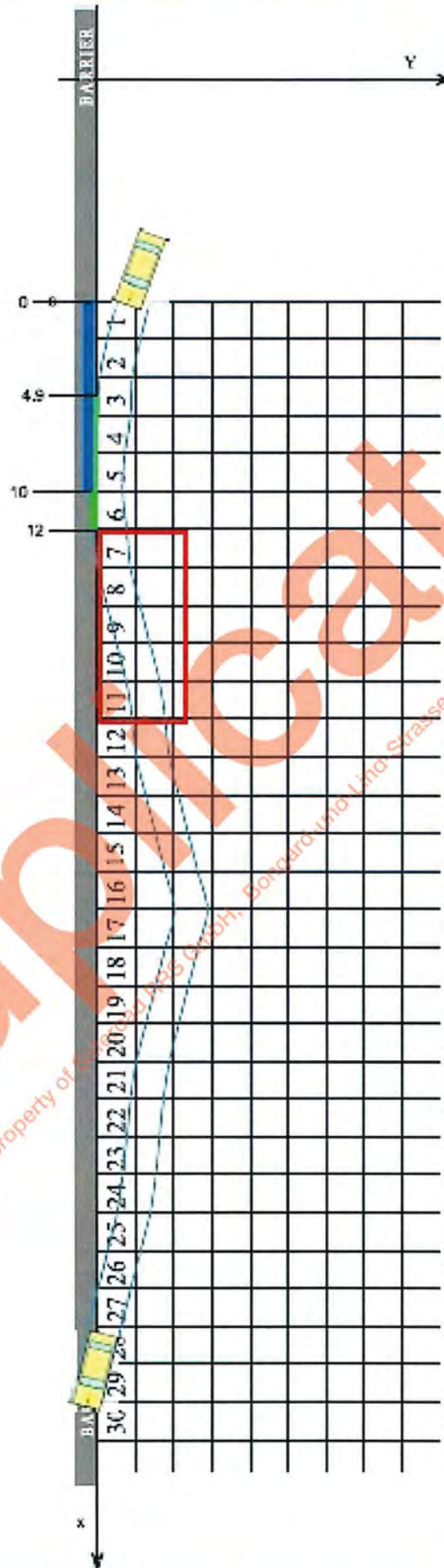


Figura 9 – Figure 9 Traiettorie del veicolo – Vehicle trajectory

7.4.1 **Descrizione dei danni subiti dal veicolo – Description of the damage and deformation suffered by the test vehicle**

Spigolo anteriore destro deformato, paraurti anteriore divelto, cofano anteriore molto deformato. *Right front edge deformed, front bumper pulled off, front bonnet very deformed.*

INDICE DI DEFORMAZIONE DELL'ABITACOLO DEL VEICOLO VEHICLE COCKPIT DEFORMATION INDEX

VCDI

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CRITERI DI ACCETTAZIONE DELLA PROVA – IMPACT TEST ACCEPTANCE CRITERIA

	SI/YES	NO/NOT	NOTE/NOTES
L'ANGOLO DI IMPATTO E LA VELOCITÀ DEL VEICOLO SONO ALL'INTERNO DEI LIMITI DI TOLLERANZA <i>ACTUAL IMPACT SPEED AND ANGLE ARE WITHIN TOLERANCE LIMITS</i>	X		
LA COMBINAZIONE DELLA VELOCITÀ DEL VEICOLO E DELL'ANGOLO DI IMPATTO È ALL'INTERNO DELL'AREA DELLE TOLLERANZE COMBinate <i>ACTUAL IMPACT SPEED AND ANGLE ARE WITHIN TOLERANCE ENVELOPE</i>	X		
DURANTE E DOPO L'IMPATTO NON PIÙ DI UNA RUOTA DEL VEICOLO OLTREPASSA LA PARTE PIÙ ARRETRATA DEL SISTEMA DEFORMATO <i>DURING AND AFTER THE IMPACT, NO MORE THAN ONE OF THE WHEEL OF THE VEHICLE PASSES OVER THE REARMOST PART OF DEFORMED SISTEM</i>	X		
IL VEICOLO SI RIBALTA NELL'AREA DI PROVA <i>VEHICLE ROLLS OVER DURING THE TEST</i>		X	
DOPO L'URTO, IL VEICOLO RIMANE ALL'INTERNO DEL BOX CEN <i>VEHICLE WITHIN "EXIT BOX"</i>	X		

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7.5 Valutazione della severità dell'impatto – *Impact severity assessment*

L'elaborazione dei dati viene effettuata in conformità a quanto previsto dalla norma UNI EN 1317. *Data were processed in accordance with UNI EN 1317 standards.*

I dati relativi alle componenti di accelerazione longitudinale, trasversale e verticale acquisiti dalla terna n. 1 sita in corrispondenza del baricentro del veicolo ed i dati acquisiti dal sensore di velocità angolare vengono bilanciati via software rimuovendo l'offset che si registra nei primi 0.8 secondi (fase in cui il veicolo è sotto tiro e non è ancora avvenuto lo sgancio del carrello di traino). *Data on longitudinal, transverse and vertical acceleration components acquired by the "set 1", located at the vehicle centre of gravity and the data acquired by the angular velocity sensor are balanced by software by removing the offset recorded in the first 0.8 seconds (i.e. the phase in which the vehicle was under tension and the tow trolley has not yet been released).*

Tali dati vengono poi filtrati in classe di frequenza CFC 180 attraverso il filtro BUTTERWORTH 4 poli conforme alla norma ISO 6487. *This piece of data was then filtered in frequency class CFC 180 through BUTTERWORTH 4-pole filter conforming to ISO 6487 standards.*

7.5.1 Diagrammi delle accelerazioni – Graphs of linear accelerations

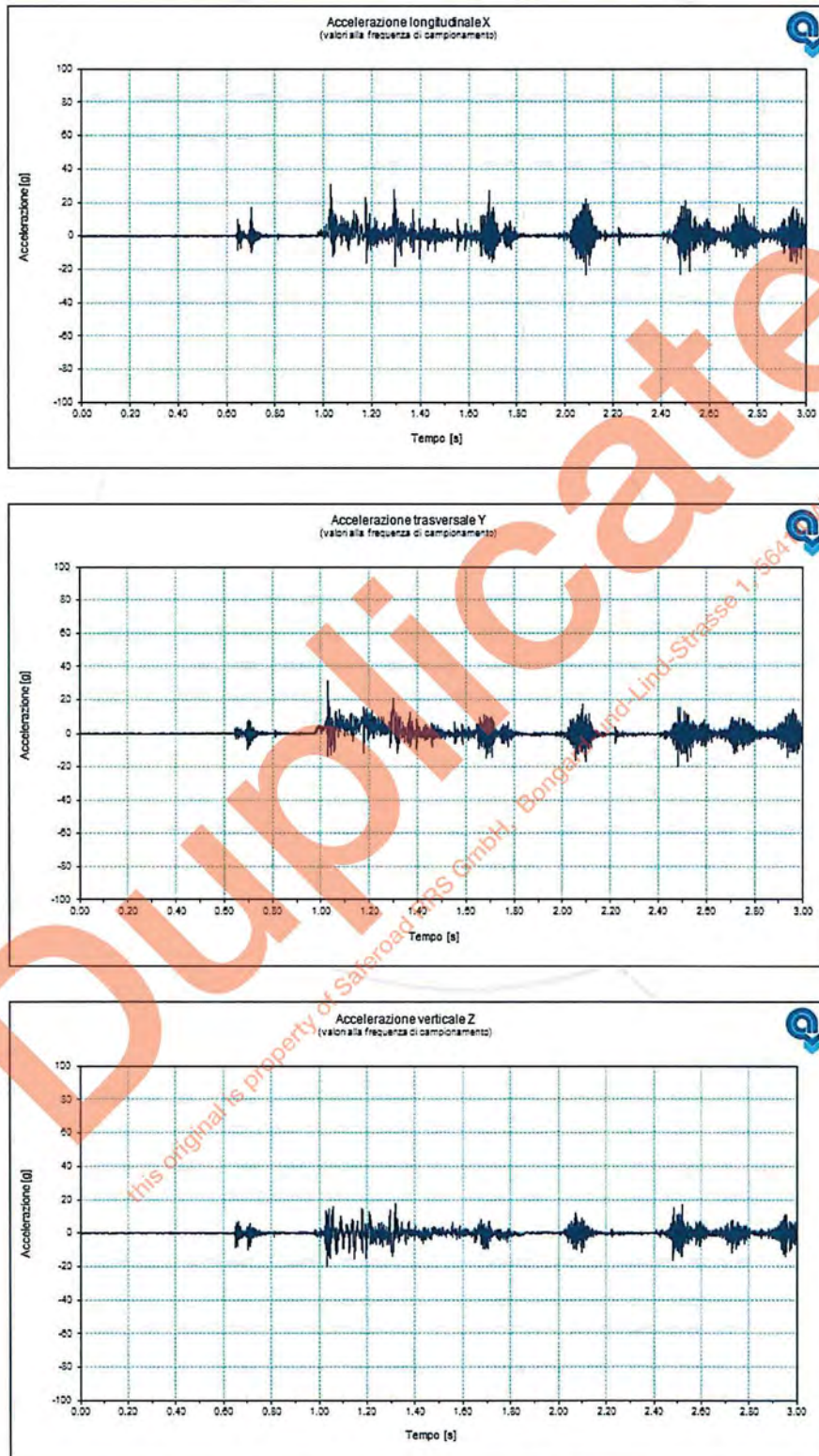


Figura 10 – Figure 10 Diagrammi delle accelerazioni – Graphs of linear accelerations

7.5.2 Diagrammi delle accelerazioni – Graphs of linear accelerations

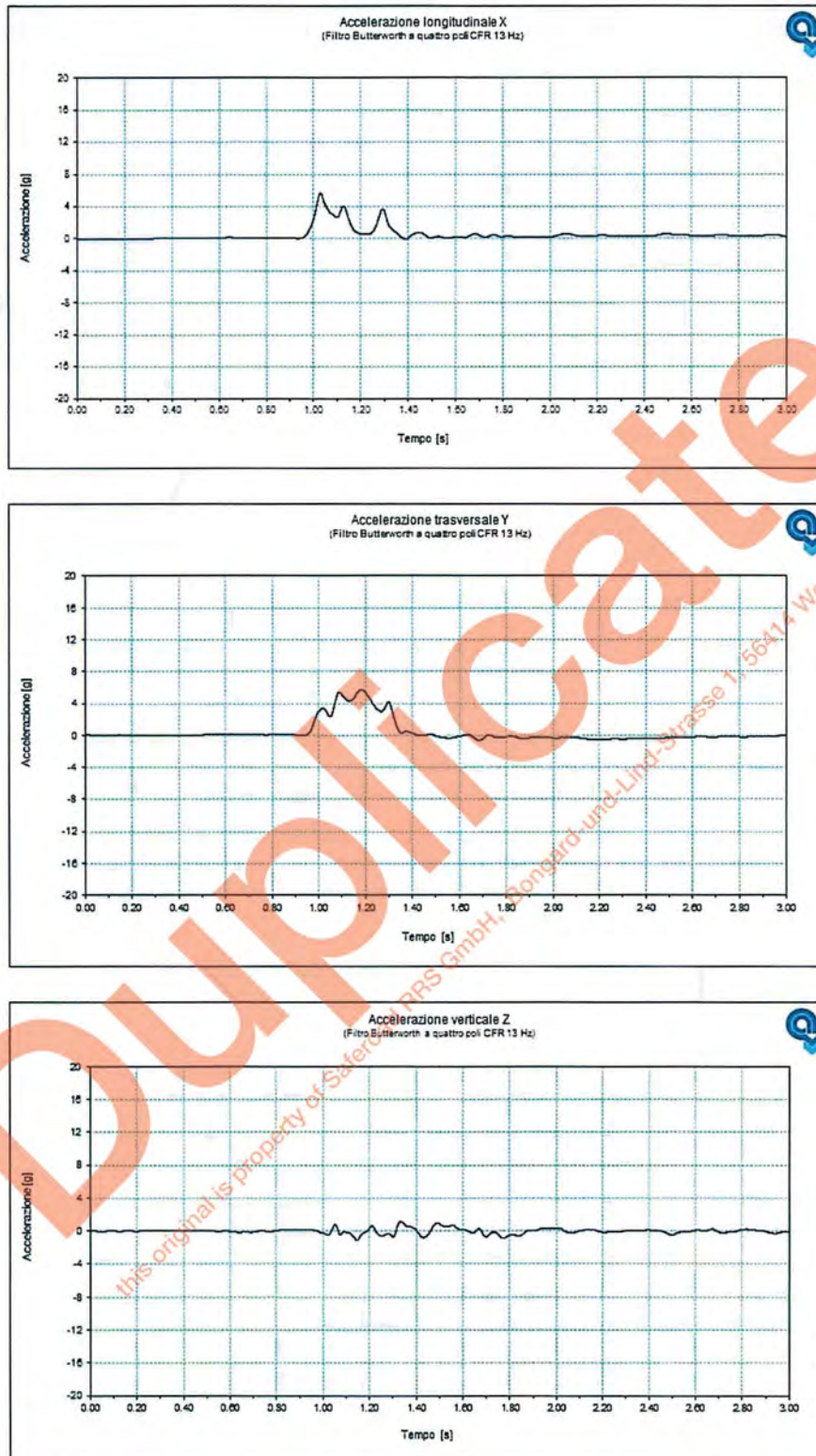


Figura 11 – Figure 11 Diagrammi delle accelerazioni – Graphs of linear accelerations

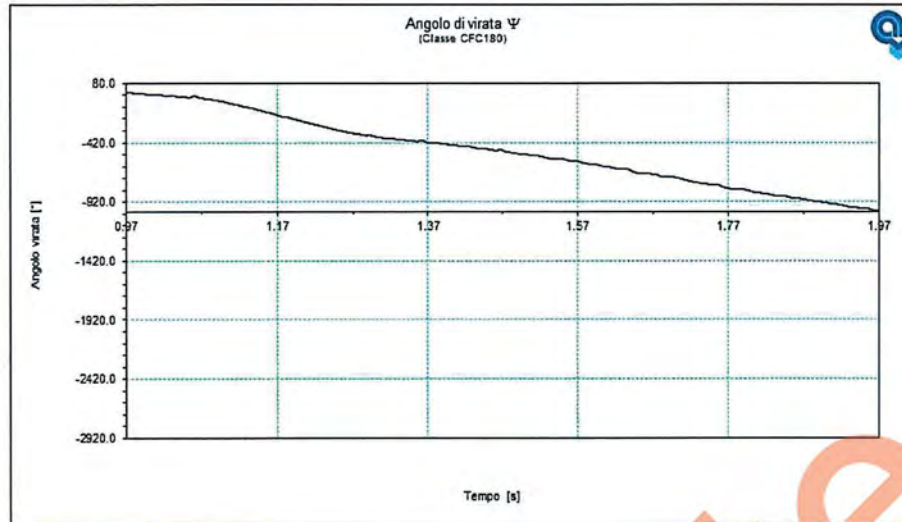
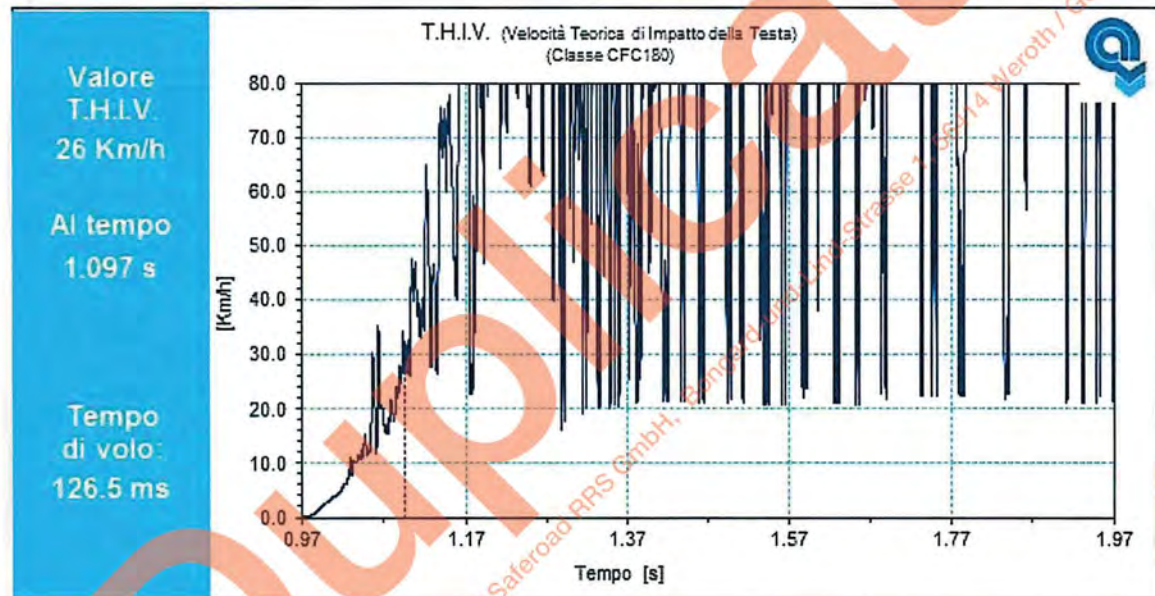
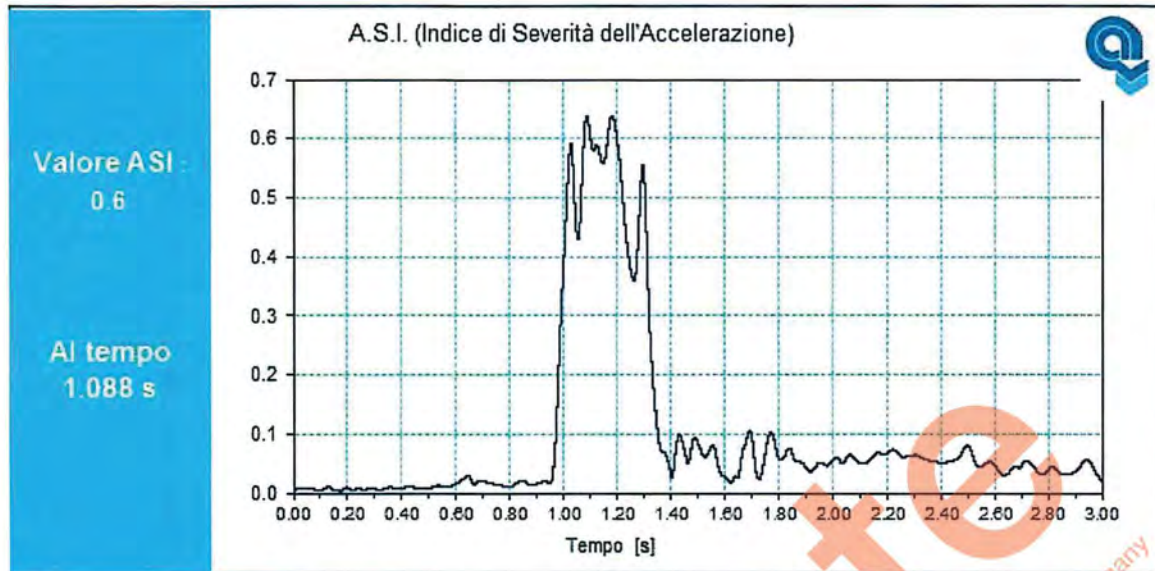


Figura 12 – Figure 12 – Velocità angolare – Angular velocity

7.5.3 Severità dell'impatto – Impact severity

INDICI DI SEVERITÀ – SEVERITY INDEX		
ASI	INDICE DI SEVERITÀ DELL'ACCELERAZIONE ACCELERATION SEVERITY INDEX	0,6 - A
THIV	VELOCITÀ TEORICA D'URTO DELLA TESTA THEORETICAL HEAD IMPACT VELOCITY	26 km/h
T	TEMPO DI VOLO TIME OF FLIGHT (TOF)	126,5 ms
Dx	DISTANZA LIBERA DI VOLO (UNI EN 1317-1) FREE FLIGHT DISTANCE	0,6 m
Dy	DISTANZA LIBERA DI VOLO (UNI EN 1317-1) FREE FLIGHT DISTANCE	0,3 m



8 Valutazioni finali – Final assessments

SOMMARIO DEI RISULTATI – SUMMARY RESULTS			
DATI GENERALI		GENERAL	
TIPO DI PROVA	TB11	TEST TYPE	TB11
NUMERO DI PROVA	1411	TEST NUMBER	1411
DISPOSITIVO TESTATO	Barriera di sicurezza bordo laterale cl. H1 mod. MegaRail ex H1-W2-A	TEST DEVICE	H1 Road Safety Barrier for ground mod. MegaRail ex H1-W2-A
DATA DELLA PROVA	2016/07/12	TEST DATE	2016/07/12
PARAMETRI DELLA PROVA		TEST PARAMETERS	
MASSA DEL VEICOLO	926,8 kg	VEHICLE MASS	926,8 kg
VELOCITÀ VEICOLO	100,3 km/h	VEHICLE VELOCITY	100,3 Km/h
ANGOLO DI IMPATTO	20,1°	IMPACT ANGLE	20,1°
RISULTATI DELLA PROVA		TEST RESULTS	
MAX DEFLESSIONE DINAMICA	0,4 m	DYNAMIC DEFLECTION	0,4 m
MAX DEFLESSIONE DINAMICA NORMALIZZATA	0,4 m	NORMALISED DYNAMIC DEFLECTION	0,4 m
LARGHEZZA DI LAVORO DISPOSITIVO	0,6 m	TEST DEVICE WORKING WIDTH	0,6 m
LARGHEZZA DI LAVORO DISPOSITIVO NORMALIZZATA	0,6 m – W1	TEST DEVICE NORMALISED WORKING WIDTH	0,6 m – W1
MAX DEFORMAZIONE PERMANENTE	0,3 m	PERMANENT DEFLECTION	0,3 m
ASI	0,6 - A	ASI	0,6 - A
THIV	26 km/h	THIV	26 km/h
COMPORTEMENTO DEL DISPOSITIVO		TEST DEVICE BEHAVIOUR	
IL DISPOSITIVO CONTIENE IL VEICOLO	SI	THE BARRIER CONTAINED THE TEST VEHICLE	YES
PARTI PRINCIPALI LONGITUDINALI DEL DISPOSITIVO ROTTE O DIVELTE	NO	COMPLETE BREAKAGE OF ANY PRINCIPAL LONGITUDINAL ELEMENTS OF THE TEST ITEM	NOT
ELEMENTI SUPERIORI A 2 Kg COMPLETAMENTE STACCATI	NO	TEST ITEMS PARTS OVER THE MASS OF 2 Kg TOTALLY DETACHED	NOT
COMPORTEMENTO DEL VEICOLO		VEHICLE BEHAVIOUR	
NON PIÙ DI UNA RUOTA DEL VEICOLO OLTREPASSA LA PARTE PIÙ ARRETRATA DEL SISTEMA DEFORMATO	SI	NOT MORE THAN ONE WHEEL OF THE VEHICLE PASSES OVER THE REAR MOST PART OF DEFORMED SYSTEM	YES
IL VEICOLO SI RIBALTA NELL'AREA DI PROVA	NO	THE VEHICLE ROLLS OVER INSIDE THE TEST AREA	NOT
LA TRAIETTORIA DEL VEICOLO SI TROVA ALL'INTERNO DEL BOX CEN	SI	VEHICLE TRAJECTORY WITHIN EXIT BOX	YES

9 Dichiarazioni generali – General statements

I risultati delle prove nel presente rapporto si riferiscono solo agli oggetti sottoposti a prova.

The test results set out in this report only refer to tested objects.

Il presente rapporto non può essere riprodotto, se non integralmente, tranne dietro autorizzazione scritta da parte del laboratorio che l'ha stilato.

No part of this report may be reproduced, without the prior written permission of the drafting laboratory.

Correzioni al presente rapporto di prova possono essere effettuate soltanto mediante la redazione di un nuovo documento che viene designato come "revisione" al rapporto di prova cui fa riferimento.

Corrections to this test report may be made only by drafting a new document, which is then designated as a "revision" of the original report.

Aggiunte al presente rapporto di prova possono essere effettuate soltanto mediante un nuovo documento che viene designato come "supplemento" al rapporto di prova cui fa riferimento.

Additions to this test report may be made only in a new document, which is then designated a "supplement" to the test report to which it refers.


Il seguente rapporto di prova è corredato di materiale video-fotografico.

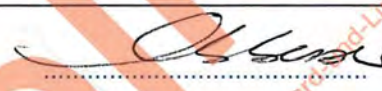
The following test report is complete with photo and video material.

La lingua ufficiale di riferimento di questo rapporto è l'Italiano.

Italian is the official language of the report.

10 Approvazione del rapporto di prova – *Test report approval*

TECNICI CHE HANNO ESEGUITO LA PROVA – <i>TESTING RESPONSIBLE ENGINEERS</i>		
<i>NOME- NAME</i>	<i>COMPETENZA-COMPETENCE</i>	<i>FIRMA-SIGNATURE</i>
Ing. Andrea Bianchi	Responsabile scientifico delle prove, elaborazione dati e redazione del rapporto di prova – <i>Test scientific data processing and report editing responsible.</i>	

IL DIRETTORE DEL CENTRO – <i>TEST HOUSE DIRECTOR</i>
Ing. Stefano Calamani


Pereto, li 2016/08/30

Fine Rapporto di prova n.1411 del 2016/08/30 / *End of Test Report n. 1411 of 2016/08/30*

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ALLEGATO A - ANNEX A

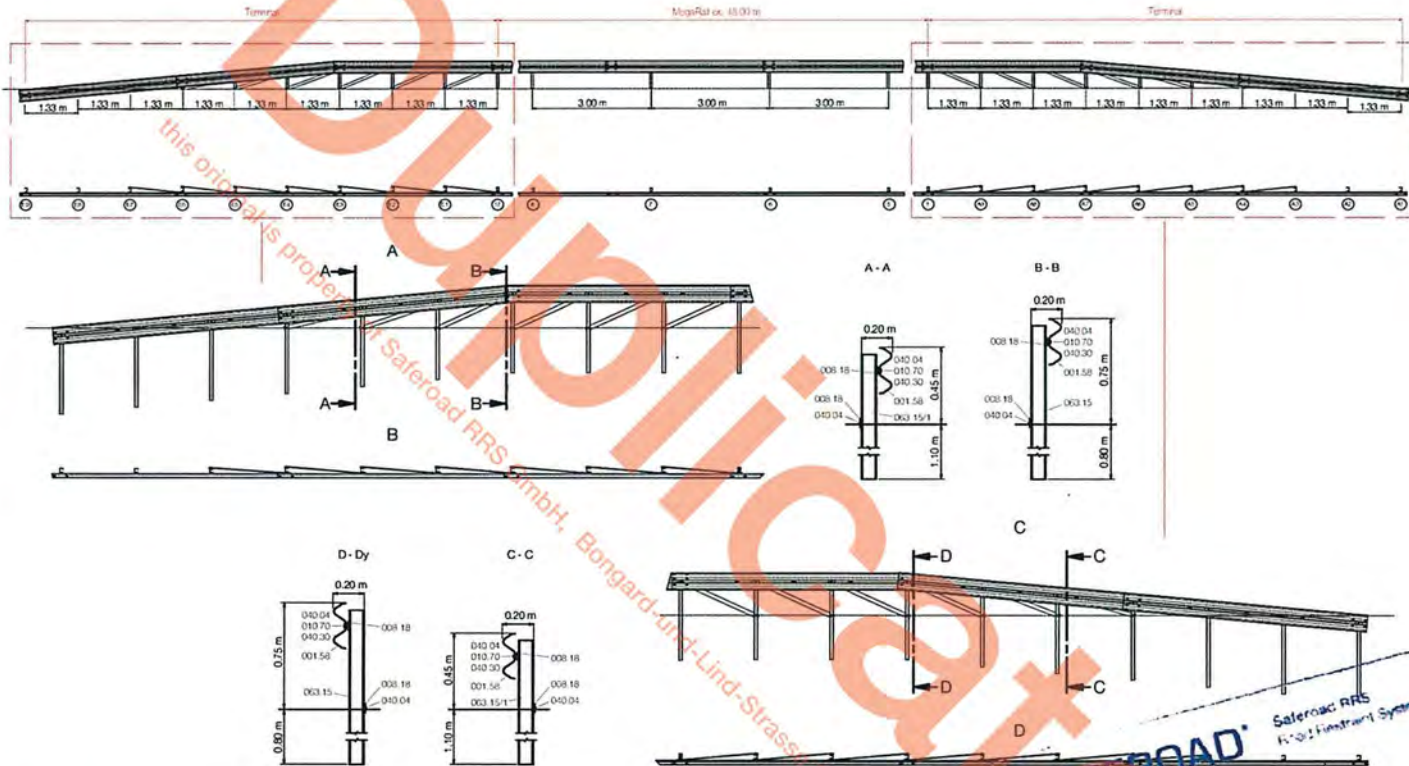
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Systemübersicht · System overview · Présentation du système · Panorámica del sistema · Descripción general del sistema · Visão geral do sistema · Prehľad systému ·
Sisteme Genel Bakış · Przegląd systemu · Обзор системы · Prezintărea generală sistem · Overzicht van het systeem · Systematögning · Systemritning ·
MegaRail ex
Testaufbau · Test setup, TB11 + TB42, 48.0 m



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Systemübersicht · System overview · Présentation du système · Panoramica del sistema · Descripción general del sistema · Visão geral do sistema · Prehled systému ·
Sisteme Genel Bakış · Przegląd systemu · Обзор системы · Prezentare generală sistem · Overzicht van het systeem · Systemtegning · Systemtning

MegaRail ex
Absenkung · Terminal

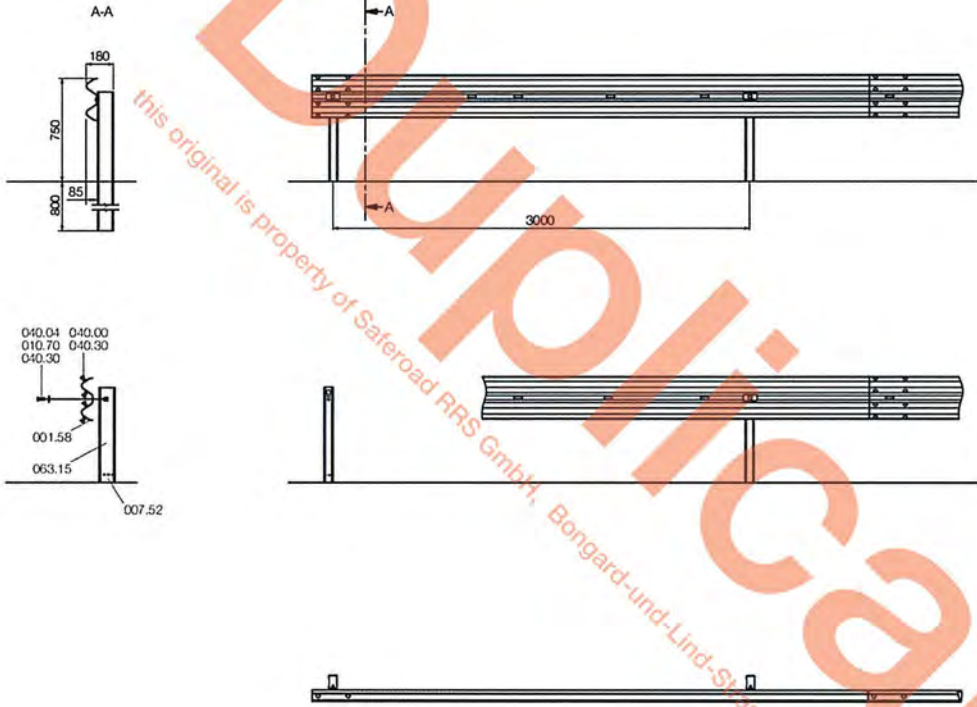
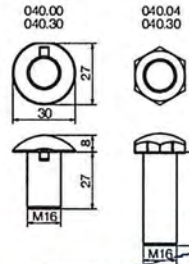


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Parts

Art. no.	Description	Qty/m
001.58	Beam A, 4.300 mm, 2,5	0,25
007.52	Post stiffener	0,33
010.70	Plate M16, 85x35x4 mm	0,33
040.00	Parthead bolt M16x27, 4,6	2
040.04	Parthead bolt M16x45, 8,8	0,33
040.30	Washer Ø18x30	2,33
063.15	Post C100x60, 1.500 mm	0,33

Fasteners



Systemübersicht · System overview · Présentation du système · Panoramica del sistema · Descripción general del sistema · Visão geral do sistema · Prehled systému
Sisteme Genel Bakış · Przegląd systemu · Обзор системы · Prezentare generală sistem · Overzicht van het systeem · Systemtögning · Systemtning

MegaRail ex
H1 · W2 · A

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Artikelbeschreibung Description	Artikel-Nr. Part no.	Material Material	Norm Norm	Gewicht Weight	Terminal	MR ex [TB11 + TB42] 48.0 m	Terminal
SP-Holm, A, 4.300 mm, 2,5 Beam, A, 4.300 mm, 2,5	001.58	S355JR	EN 10025 EN 1461	40.86	3	12	3
Pfosten-Verstärkung Post stiffener	007.52	S235JR	EN 10025 EN 1461	1.01		16	
Abspanngurt, 1.500 mm, 5.0 Tension bolt, 1.500 mm, 5.0	008.18	S235JR	EN 10025 EN 1461	4.27	7		7
Decklasche M16, 85x35x4, RL Plate M16, 85x35x4, RL	010.70	S235JR	EN 10025 EN 1461	0.09	9.5	16	9.5
HRK Schraube m. Nase, M16x27, 4.6 Panhead bolt w. nose, M16x27, 4.6	040.00		ISO 4032-5	0.11	20	96	20
HRK Schraube m. 6kt., M16x45, 8.8 Panhead bolt w. hexagon, M16x45, 8.8	040.04		ISO 4032-8	0.13	17.5	16	17.5
Scheibe Ø18 Washer Ø18	040.30		ISO 7091	0.01	37.5	112	37.5
Pfosten, C100x60, 1.500 mm, 4.0 Post, C100x60, 1.500 mm, 4.0	063.15	S355JR	EN 10025 EN 1461	11.62	3.5	16	3.5
Pfosten, C100x60, 1.500 mm, 4.0 Post, C100x60, 1.500 mm, 4.0	063.15/1	S355JR	EN 10025 EN 1461	11.62	6		6

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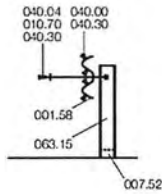
Stückliste · Components list

MegaRail ex

Test setup, TB11 + TB42 · 48.0 m



SAFEROAD®



Artikelbeschreibung Description	Artikel-Nr. Part No.	Material Material	Norm Norm	Gewicht Weight	Anzahl/m Number/m	Anzahl/4 m Number/4 m
SP-Holm, A, 4.300 mm, 2.5 Beam, A, 4.300 mm, 2.5	001.58	S355JR	EN 10025 EN 1461	40.86	0.25	1.00
Pfosten-Versteifung Post stiffener	007.52	S235JR	EN 10025 EN 1461	1.01	0.33	1.33
Pfosten, C100x60, 1.500 mm, 4.0 Post, C100x60, 1.500 mm, 4.0	063.15	S355JR	EN 10025 EN 1461	11.62	0.33	1.33

Artikelbeschreibung Description	Artikel-Nr. Part No.	Material Material	Norm Norm	Gewicht Weight	Anzahl/m Number/m	Anzahl/4 m Number/4 m
Decklasche M16, 85x35x4 mm, RL Plate M16, 85x35x4 mm, RL	010.70	S235JR	EN 10025 EN 1461	0.09	0.33	1.33
HRK-Schraube m. Nase, M16x27, 4.6 Panhead bolt w. nose, M16x27, 4.6	040.00	-	ISO 4032-5	0.11	2.00	8.00
HRK-Schraube m. 6kt., M16x45, 8.8 Panhead bolt w. hexagon, M16x45, 8.8	040.04	-	ISO 4032-8	0.13	0.33	1.33
Scheibe Ø 18 Washer Ø 18	040.30	-	ISO 7091	0.01	2.33	9.33

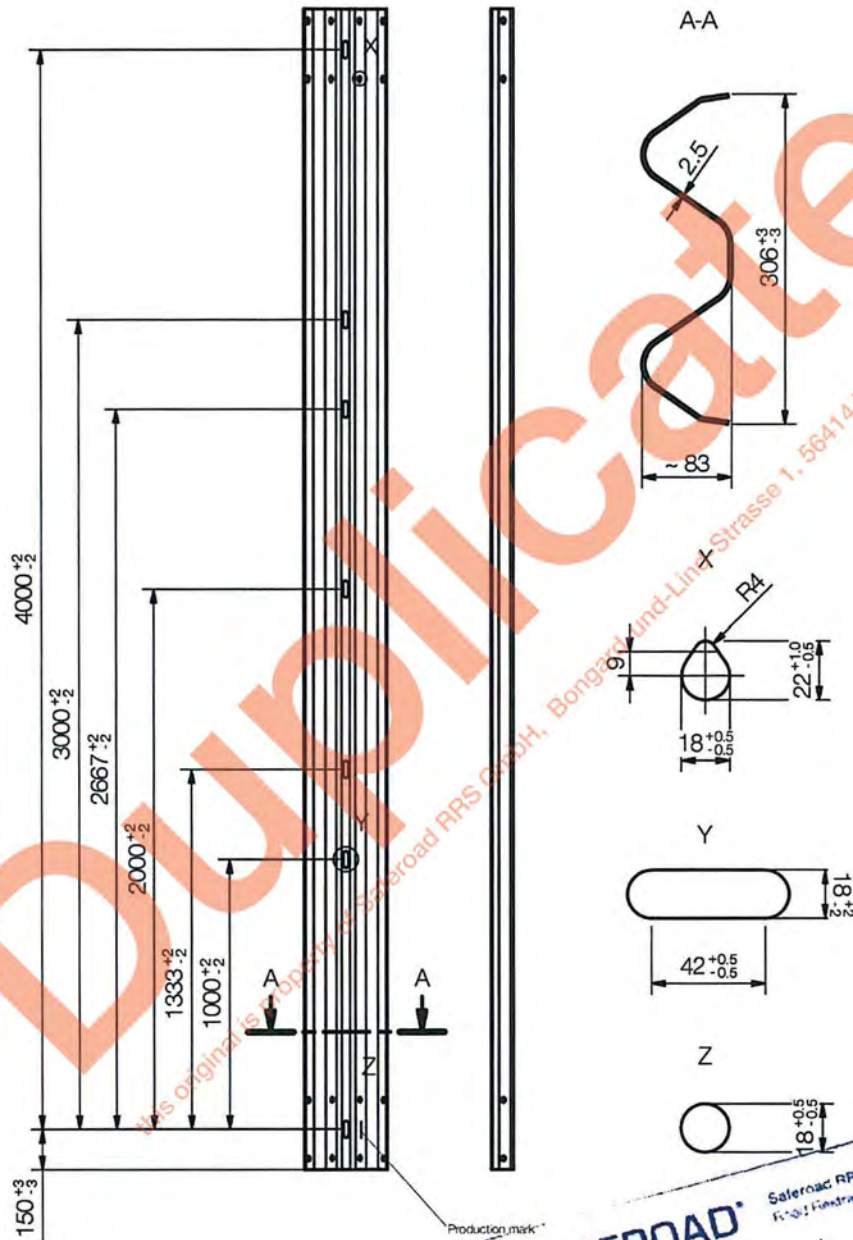
Stückliste · Components list

MegaRail ex
H1 · W2 · A



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Bauteilzeichnung · Part drawing

001.58

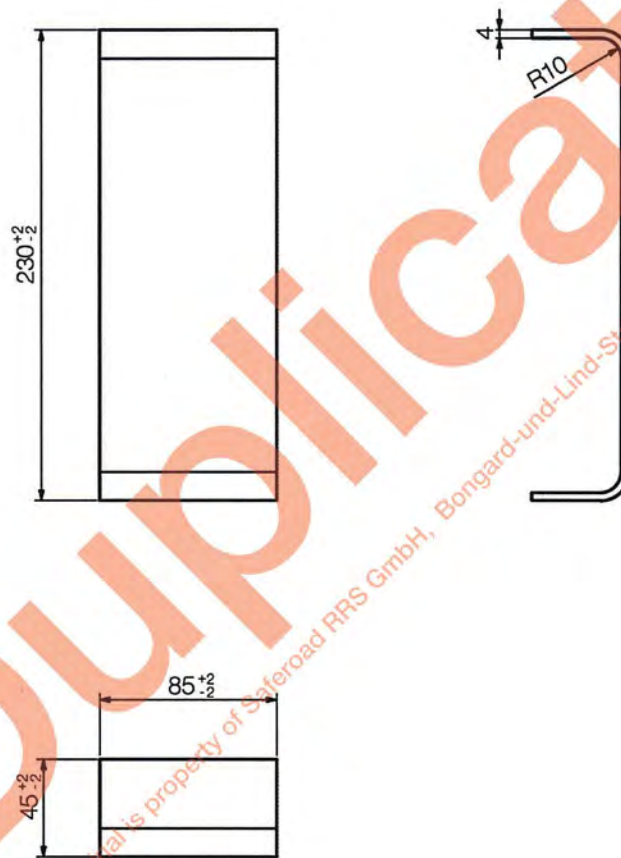
SP-Holm, A, 4.300 mm, 2,5 · Beam, A, 4.300 mm, 2,5



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L001.58 - S355JR
15-07-2016

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Bauteilzeichnung · Part drawing

007.52

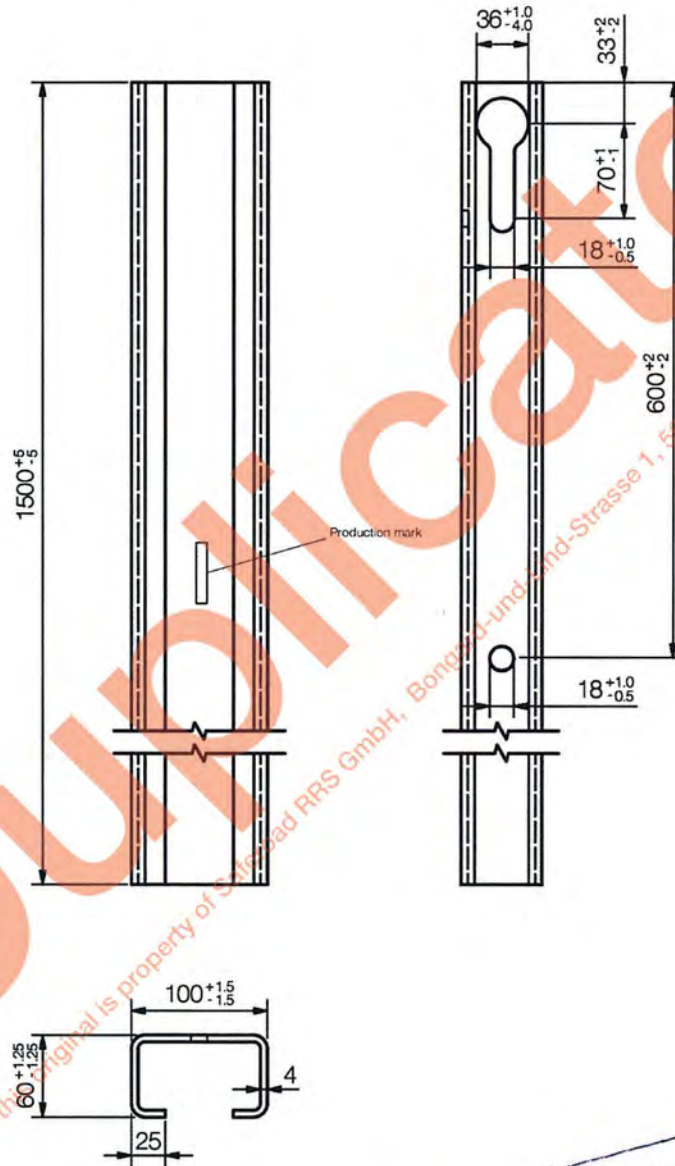
Pfosten-Versteifung · Post stiffener



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E007.52 · S235JR
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Bauteilzeichnung · Part drawing

063.15

Pfosten, C100x60, 1.500 mm, 4.0 · Post, C100x60, 1.500 mm, 4.0

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Road Restraint Systems

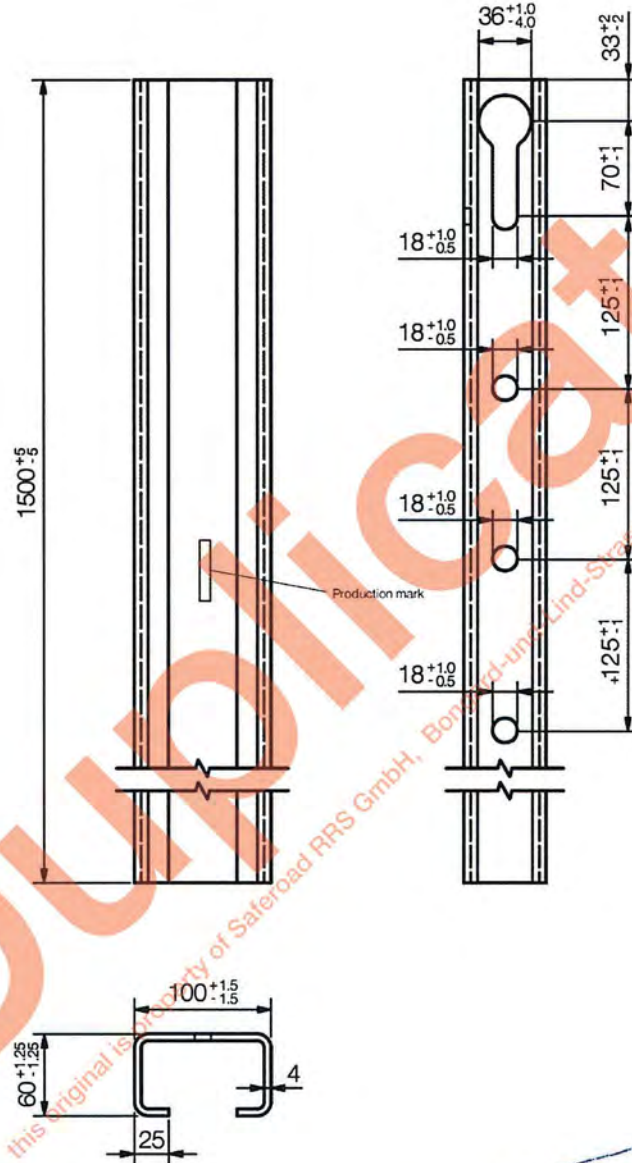
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P063.15 · S355JR
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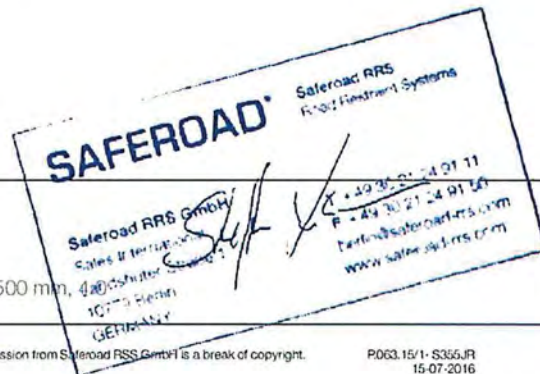
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Bauteilzeichnung · Part drawing

063.15/1

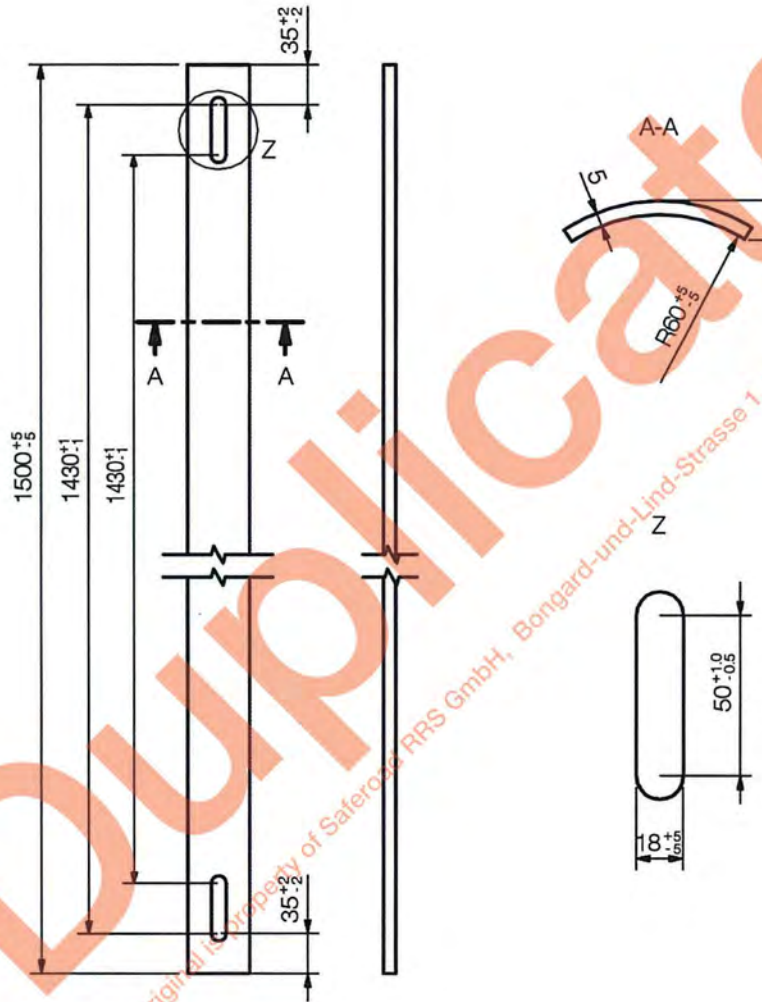
Pfosten, C100x60, 1.500 mm, 4.0 · Post. C100x60, 1.500 mm,



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P063.15/1 - S365JR
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Bauteilzeichnung · Part drawing

008.18

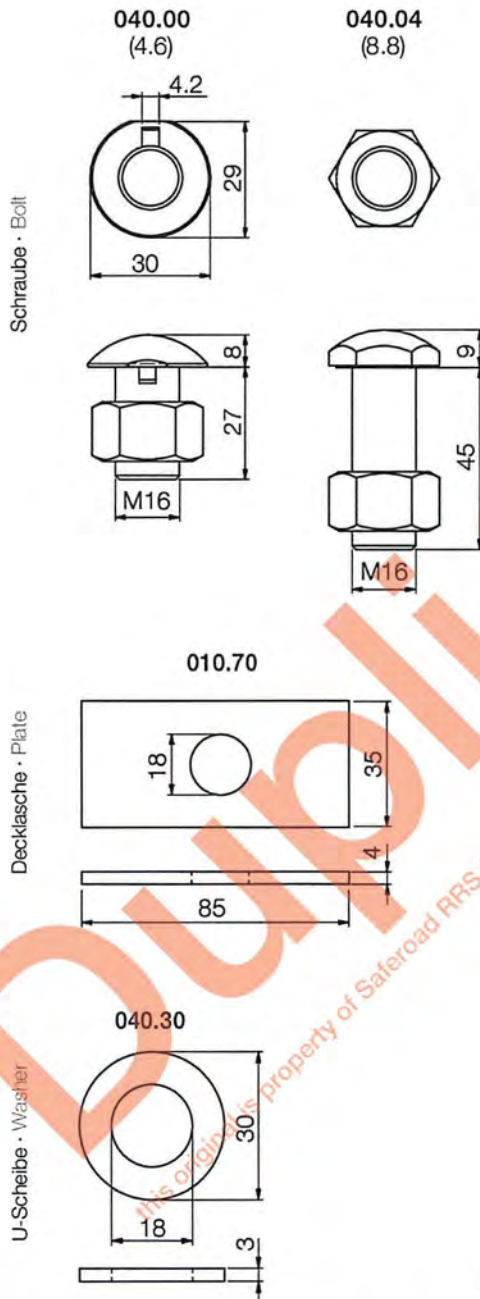
Abspanngurt, 1.500 mm, 5.0 · Tension belt, 1.500 mm, 5.0



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P.080.18 - S235JR
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Bauteilzeichnung · Part drawing

MegaRail ex
Befestigungsmaterial · Fasteners



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ALLEGATO B - ANNEX B

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MegaRail  **ex**
H1 · W2 · A

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EINBAUANLEITUNG · INSTALLATION INSTRUCTION



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Technical information
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Repairs/ Disposing/ Inspection and Maintenance
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Other information

PART 2

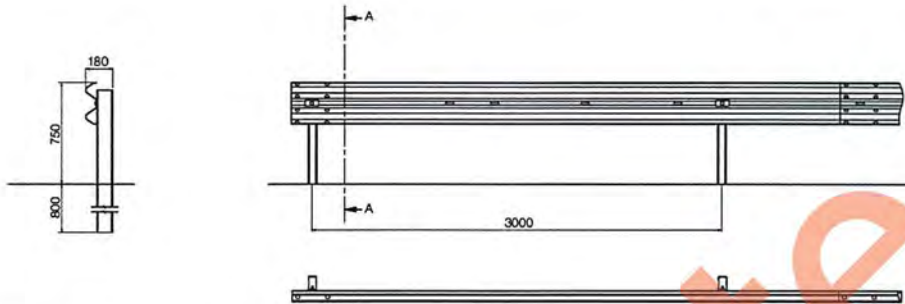
Technical documentation

Installation conditions
Assembly drawing
Components list

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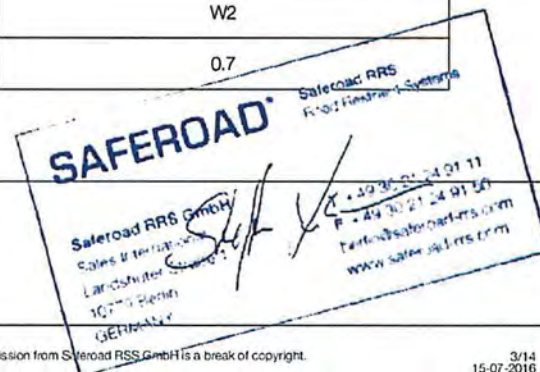


Erstprüfung Initial type test (ITT)	TB11: AISICO No. 1411 TB42: AISICO No. 1410
EG-Konformitätszertifikat / Hersteller EU Certificate of Conformity / Manufacturer	siehe gesonderte Übersicht see separate overview
Charakteristisches Material des Systems Characteristic material of the system	S235JR S355JR
Breite des Systems [m] Construction width	0.18
Höhe des Systems ab Fahrbahnoberkante [m] Construction height from roadway surface level	0.75
Länge der Systemelemente / -baugruppen [m] Length of system elements	4.00
Maximale seitliche Position des Systems [m] Maximum lateral position of the system	0.80
Maximale seitliche Position des Fahrzeugs [m] Maximum lateral position of the vehicle	1.30
Maximale dynamische Durchbiegung [m] Dynamic deflection	0.70
Testlänge [m] Test length	48.00
Geprüfte Systemgründung / -aufstellung Tested system foundation / installation	gerammt rammed
Bemerkungen Remarks	

Ergänzende Angaben nach DIN EN 1317-2: 2011-0 Additional information acc. to DIN EN 1317-2:2011-0	
Normalisierter Wirkungsbereich [m] Normalised working width	0.8
Normalisierte Wirkungsbereichsklasse Wn Class of normalised working width	W2
Normalisierte dyn. Durchbiegung [m] Normalised dynamic deflection	0.7

Datenblatt · Data sheet

MegaRail ex
 H1 · W2 · A



Allgemeine Informationen

Symbolbedeutung



Tip: Hinweise für Arbeitserleichterungen und effiziente Abläufe.

Anforderungen an das Montagepersonal

Die Montage darf nur durch geschultes und qualifiziertes Fachpersonal durchgeführt werden. Montagefirmen erhalten bedarfsgerecht eine projektbegleitende technische Betreuung durch den Hersteller.

Bestimmungsgemäßer Gebrauch

Das Rückhaltesystem ist zum Einbau in den Straßenverkehrsraum entsprechend den nationalen Bestimmungen vorgesehen. Es dient dem Schutz von Fahrzeuginsassen beim Abkommen eines Fahrzeuges von der Fahrbahn, dem Schutz Dritter und dem Schutz von Objekten und ist in Mittel- und Seitentrennstreifenbereichen sowie am Fahrbahnrand einsetzbar.

Transport

Beim Transport ist Persönliche Schutzausrüstung entsprechend den nationalen Bestimmungen zu tragen. Transportieren Sie die Systemkomponenten mit einem LKW – gegen Verrutschen der Ladung gesichert – auf die Baustelle.

Arbeitsschutz

Beim Einbau ist Persönliche Schutzausrüstung entsprechend den nationalen Bestimmungen zu tragen.

General Information

Symbol Descriptions



Tip: Information on facilitating work processes and efficient operations.

Requirements of the Assembly Personnel

The installation must only be undertaken by trained and qualified personnel. Installation firms obtain a special technical advisor from the manufacturer to support the project.

Usage Compliance

The Restraint System is designed for installation on road traffic areas according to national regulations. It is intended to protect occupants of errant vehicles on the roadway, to protect third parties and objective and can be installed in central reserves and side lanes as well as on verges.

Transport

During transport, personal protective clothing must be used. When transporting the systems to the site by truck, secure the load to prevent slippage.

Work Protection

Personal Protective Clothing must be used according to national regulations.



Technische Informationen

Technical Information

Schraubverbindungen

Muttern handfest anziehen und dann mit dem Drehmomentschlüssel festziehen. Sämtliches Verschraubungsmaterial wird senkrecht zu den zu verbindenden Teilen angeordnet.

Bolt Connections

Fit nuts manually and then tighten with torque wrench. All fixtures to be fitted vertically to the connecting parts.

Schraube · Bolt	Mmin	Mmax
M 16	70 Nm	140 Nm

Dauerhaftigkeit

Die Mindestschichtdicke für Schrauben und Muttern beträgt gemäß EN ISO 10684 an den jeweiligen Messstellen 40 µm. Verzinkung der Schrauben und des Stahls nach EN ISO 1461 und EN 1179.

Durability

The minimum coat thickness for screws and nuts shall be in accordance with EN ISO 10684 at the respective measuring points 40 µm. Galvanising of bolts and steel per EN ISO 1461 und EN 1179.

Erwartete Dauerhaftigkeit

Ca. 20 Jahre, in Abhängigkeit von der atmosphärischen Korrosionsbelastung, z.B. Meeresluft, Industrieluft u.s.w

Expected Durability

Approx. 20 years, depending on atmospheric corrosion e.g. maritime air, industrial air, etc.

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Vorbereitende Maßnahmen

Schutzausrüstung bereitstellen und anlegen

Stellen Sie folgende Persönliche Schutzausrüstung bereit und verwenden Sie sie bei den Einbau-Arbeiten:

- Warnkleidung
- Kopf-, Gehör-, Hand- und Fußschutz

Werkzeug bereitstellen

Die hier genannten Werkzeuge sind erforderlich:

- Pfosten-Ramm-Maschine
- Handramme mit Schlauch + Bügel für Kettenaufnahme
- Pfostenzieher
- Bohrmaschine bis 23 mm mit Bohrer
- Wasserwaage/ Vorschlaghammer
- Drehmomentschlüssel bis 140 Nm mit Stecknüssen

Sie können sich jedoch die Arbeit durch den Einsatz von alternativen und/oder zusätzlichen Werkzeugen, Geräten und Maschinen gegebenenfalls komfortabler gestalten.

Verkehr sichern, Baustelle vorbereiten/einrichten

Führen Sie die an Baustellen üblichen Verkehrssicherungs-Maßnahmen nach den nationalen Bestimmungen durch. Die Baustelle muss Platz bieten für:

- ausgelegte Systemkomponenten
- Pfosten-Ramm-Maschine (-Gerät, z. B. Handramme)
- LKWs mit Teleskop-Kran
- Bewegungsfreiheit der Monteure

Liefern, transportieren, auspacken, kontrollieren

Bringen Sie die Systemkomponenten mit dem LKW an die Einbaustrecke. Packen Sie sie aus und kontrollieren Sie an Hand der Lieferscheine den Lieferumfang. Bei Transportschäden und/oder Mangel oder Fehllieferungen verständigen Sie unverzüglich den Spediteur/ Lieferanten.

Entsorgen Sie das Verpackungsmaterial entsprechend den örtlich geltenden Abfallentsorgungs-Bestimmungen. Laden Sie die benötigten Elemente mit dem Teleskop-Kran neben der Einbaulinie ab.

Preparatory Measures

Allocate and wear protective clothing

Provide the following personal protective clothing and use during installation works:

- reflective clothing
- head, ear, hand and foot protection

Allocate tools

The following tools are required:

- Post rammer
- manual rammer w. hose and bracket for chain fixture
- Post pully
- drill until 23 mm with drill bits
- level / sledgehammer
- torque key to 140 Nm with sockets

However, you can facilitate the work by using alternative tools, equipment and machinery as necessary.

Traffic Management, prepare site and set-up

Set up the traffic management measures usually required by the national regulations. The construction site must have sufficient space for:

- laid-out system components
- post rammer (or equipment e.g. manual rammer)
- truck with telescope crane
- ample space for the assembly crew

Supply, transport, off loading and delivery check

Bring the system components by truck to the installation section. Off-load and check that the delivery is as per the delivery docket. The carrier or supplier has to be notified immediately if there is any transport damage or discrepancies with the delivery.

Dispose of the packaging material according to the applicable local refuse disposals regulations. Lift the required guardrails with the telescope crane along the Container with bolts, washers and nuts.



Kontrolle

1. Überprüfen der Konstruktion

Nach dem Einbau des Rückhaltesystems prüfen Sie den festen Sitz aller Schraubverbindungen. Richten Sie das System ggf. nach. Überzeugen Sie sich, dass die Strecke der Systemzeichnung entspricht.

2. Einhaltung der Montagetoleranzen

Grundsätzlich ist das System nach Pfosten-Ramm-Plan und Montagetafel zu installieren. Die in der nachfolgenden Tabelle aufgeführten Toleranzen sollten nur in Ausnahmefällen angewendet werden.

3. Baustelle räumen, System freigeben

- Räumen Sie alles Baumaterial und jeden Abfall weg.
- Führen Sie eine Sichtkontrolle durch, ob die Einbaustrecke vollkommen frei von Objekten ist.
- Räumen Sie die Absperrungen ab und nach Abnahme melden Sie dem Betreiber die Fertigstellung des Systems.

Inspection

1. Checking the assembly

After the installation of the road restrain system, check that all bolt fittings are tight. Align the system where appropriate. Ensure that the section corresponds with the system drawing.

2. Maintaining the installation tolerances

Basically, the system has to be installed in accordance to the technical documentation (post foundation and assembly drawing). The tolerances listed in the following table should be used only in exceptional cases.

3. Clear building site, approve system

- Remove all building material and every piece of refuse.
- Carry out a visible inspection even if the installation roadway is perfectly free of objects.
- Remove mobile safety barriers and after inspection, report completion of the system to the Client.

Einhaltung der Montagetoleranzen · Maintaining the installation tolerances		
Bezugsmaß Reference Measure	Toleranz in cm Tolerance in cm	Anmerkung Comment
Abstand der Pfosten in Längsrichtung Post spacing in longitudinal direction	(+/-) 10 cm	
OK Planke Top of Beam	(+/-) 10 cm	Bezogen auf Geländehöhe With reference to height from road surface
Abweichung Pfosten aus der Flucht Post deviation from alignment	3 cm	auf 12 m Länge on 12 m section
Abweichung der Planke aus der Flucht Beam deviation from alignment	3 cm	auf 12 m Länge on 12 m section



Anbringung von Zusatz- einrichtungen am System

Für die Anbringung von zusätzlichen Einrichtungen der Straßenausstattung sind bereits Vorkehrungen an den Elementen des Systems getroffen worden.

Verkehrszeichen

Die Montage von üblichen Verkehrszeichen ist auf dem Kastenprofil bzw. auf der verkehrsabgewandten Seite des Kastenprofils an den Abstandhaltern oder Pfosten möglich. Für die Befestigung sind die dafür bestimmten Verkehrszeichenhalter zu benutzen. Dabei ist darauf zu achten, dass das so montierte Verkehrszeichen nicht in den Verkehrsraum ragt.

Fußgängerschutz

Für das Anbringen des Fußgängergleitschutzes sind am Pfosten bereits entsprechende Befestigungspunkte vorhanden. Gleiches gilt für den Zweiradfahrerschutz und das Anbringen eines Aufsatzgeländers.

Blendschutzeinrichtungen

Die Montage von Blendschutzeinrichtung ist auf dem Pfosten grundsätzlich möglich. Dort sind bereits Bohrungen für die üblichen Befestigungskonstruktionen vorhanden. Abhängig von der Art des Blendschutzes können eventuell zusätzliche Bohrungen erforderlich sein.

Fitting additional safety devices to the system

There are connection features on the system for attaching additional road safety devices.

Traffic Signs

The assembly of common traffic signs is possible at the rear of the guardrail beams in the box beam section i.e. on the spacer bar or posts. For attaching use the specific traffic sign holders. If there is a danger that certain traffic signs encroach into the traffic area, consultation with the manufacturer regarding the positioning of the traffic sign is required.

Pedestrian Protection

For mounting pedestrian protection rails, corresponding mounting points are already available at the spacer bars. The same applies to motorcycle rails and the fitting of a vertical extension rail.

Anti-glare systems

It is possible to fit anti-glare systems onto the posts. Bolt holes are already located for the usual connection fixtures. Extra bolt holes can be made depending on the type of anti-glare systems.

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Reparaturen, Inspektion und Wartung

Reparaturen

Grundsätzlich sind nur diejenigen Bauteile am System auszutauschen, die eine bleibende (plastische) Verformung aufweisen.

Handelt es sich um nur unwesentliche, örtlich begrenzte, Verformungen an einem Bauteil, so ist ein Austausch nicht unbedingt erforderlich. Sind Pfosten verbogen, so müssen diese ausgetauscht werden. Leichte Schrägstellungen der unverformten Pfosten können nur dann durch Richten behoben werden, wenn sich dadurch die Flucht der Längsprofile (Planke) wieder herstellen lässt.

Ist ein bloßes Richten nicht möglich, und sind mehrere Bauteile beschädigt, so ist im Bereich der Unfallstelle das System im modularen 4 Meter Raster komplett auszutauschen. Dabei sind alle demontierten Verbindungsmittel (Schrauben) durch neue zu ersetzen. Die hierbei entstandenen erweiterten Pfostenlöcher sind zu verfüllen und ausreichend zu verdichten.

Außerdem ist darauf zu achten, dass Beschädigungen an den verzinkten Oberflächen vermieden werden. Kleine Fehlstellen an der Zinkoberfläche sind nach sorgfältiger Vorbereitung durch auftragen einer Zinkstaubbeschichtung nachzubessern. Überzähliges Material ist vollständig von der Reparaturstelle zu entfernen.

Reparaturarbeiten können durch jeden Fachbetrieb problemlos erledigt werden. Die einzelnen Bauteile für Reparaturarbeiten sind auf dem Markt frei erhältlich, wobei darauf zu achten ist, dass diese von einem CE-zertifizierten Hersteller stammen.

Beschädigte Teile entsorgen / recyceln

Recyceln Sie beschädigte Teile entsprechend den gesetzlichen und örtlichen Abfallentsorgungsvorschriften. Es sind keine toxischen bzw. gefährlichen Materialien in Verwendung.

Inspektion und Wartung

Führen Sie alle 12 Monate eine Sichtprüfung durch. Das System ist wartungsfrei.

Repairs, Inspection and Maintenance

Repairs

Basically, you need to replace only those components that have any residual (plastic) deformation in the system.

If these are merely minor deformations in one component that are local in nature, replacement is not really necessary. However, if posts are bent, they must be replaced. Minor skews in the non-deformed posts can be attended to by straightening or turning them, but only if the alignment of the longitudinal section (plank) can be restored.

If straightening or turning is not possible, and if more than one component is damaged, the system in the damaged section must be replaced completely using the modular 4 metre sections. In the process, all disassembled connection fittings (screws) must be replaced with new ones. The expanded holes in the posts resulting from this must be filled up and sealed adequately.

Moreover, care must be taken to ensure that the galvanised surfaces do not get damaged. Minor defective spots on the galvanised surface must be attended to by careful preparation with the application of zinc dust coating. Surplus material must be removed completely from the area that has been repaired.

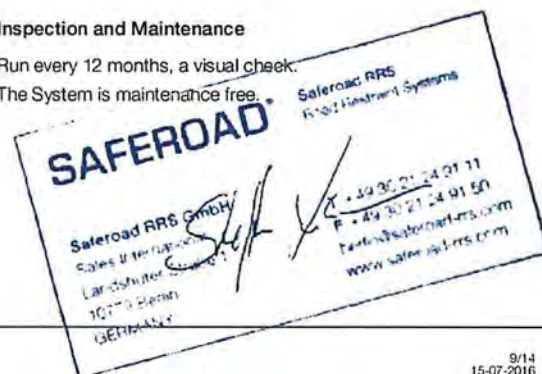
Repair work can easily be undertaken by any contractor. The required components can be purchased on the open market as long as they have the CE Mark of the manufacturer.

Dispose/recycled damaged components

Recycle damaged parts according to legal and local waste disposal regulations. There are no hazardous and dangerous substances.

Inspection and Maintenance

Run every 12 months, a visual check. The System is maintenance free.



Bedarfsanforderungen und Anpassungen an örtliche Bedingungen

Umbauten des geprüften Rückhaltesystems in anderer als der zuvor beschriebenen Bauweise sind ohne die schriftliche Zustimmung des Herstellers nicht zulässig.

Montage

Die Schutzplankenholme müssen in Fahrtrichtung überlappen. Die Pfosten werden mit der geschlossenen Seite zum Verkehr hin installiert.

Paßstücke

Paßstücke können auf der Arbeitsstelle angefertigt werden. Dabei sind folgende Bedingungen während der Herstellung zu beachten:

- Mindestlänge 750 mm auf der Arbeitsstelle (Profilüberlappung),
- keine Überschreitung des vorgegebenen Pfostenabstands der Schutzplankenkonstruktion beim Einbau,
- fachgerechtes Trennen mit einer Trennschleifmaschine oder Säge,
- fachgerechtes Bohren der Verschraubungslöcher,
- fachgerechtes Nachbessern von Schnittstellen und gebohrten Verschraubungslöchern durch Auftragen von Zinkstaubeschichtungsstoffen.

Abweichender Untergrund

Bei der Verwendung auf nicht ebenerdigem Untergrund ist die Lage der Systemlängelemente der Flucht der durchlaufenden Schutzvorrichtung anzupassen.

Radien, Mindestradien

In Kurvenbereichen sind ab einem Radius von 30 m vorgebogene Schutzplankenholme zu verwenden. Für Radien von 50 m bis 10 m sind verkürzte Kastenprofile (z.B. 2 m) zu verwenden, die die entsprechende Radienführung zulassen. Bei Radien < 10 m sind vorgebogene Kastenprofile zu verwenden.

Necessary requirements and conforming to local condition

Modifications to the tested restraint system are not permitted without the written confirmation of the manufacturer.

Assembly

The beams must overlap in the direction of driving. The Posts are installed with the closed side towards the traffic.

Cut pieces

Beams can be cut to fit on site. The following conditions must be adhered to during production:

- Minimum length 750 mm on site (beam overlap)
- On installation the post spacing of the guardrail system must not be extended
- Professional cuts using angle grinder or saw
- Professional drilling for bolt holes
- Professional re-work of cuts and drill holes using zinc spray material

Uneven Ground Conditions

The position of the system on uneven ground conditions should follow the alignment of the adjacent systems.

Radius, minimum radius

In curved road sections of more than radius 30 m, pre-bend radius guardrails must be used. For radii between 50m and 10m, shorter box beams (e.g. 2 m) must be used which meet the curvature. For radii < 10 m pre-bend box beams must be used.



Eingeschränkter Wirkungsbereich

Wird der Wirkungsbereich durch bauliche Gegebenheiten eingeschränkt, ist der Regelabstand zwischen System und Verkehrsraum zu reduzieren.

Restricted Working Width

If the working width is limited due to structural obstructions, the regulatory set-back between the safety barrier system and traffic area should be reduced accordingly.

Ausführung von Verschwenkungen

Ist auf Grund der baulichen Situation eine seitliche Verschwenkung des Systems notwendig, sollte diese gem. den nationalen Vorschriften ausgeführt werden.

Installation of Flared Ends

If there are structural conditions where the terminal ends must be flared back, the flared ends should be installed in accordance with national regulations.

Änderung von Systemteilen

Änderungen an Systemteilen sind mit dem Hersteller abzustimmen.

Modification of System Components

Modifications to the system's components must be agreed with the manufacturer.

Sonstige Hinweise

Auf Grund der abgestuften Systemhöhe ist das System problemlos übersteigbar.

Detaillierte Bauteilzeichnungen des geprüften Rückhaltesystems können nachgereicht werden.

Wird beim Einbau ohne Rücksprache mit dem Hersteller von den vorangegangenen Anforderungen abgewichen, so geht die Mängelhaftung für das Bauprodukt vom Hersteller auf den Monteur über.

Rechtliche Gültigkeit nur in deutscher Sprache.

Other Information

As the system height for the guardrail beam is stepped, it can easily be mounted.

Detailed drawings of the tested restraint system may be submitted.

In case the assembly deviates from preceding requirements without consultation of the manufacturer the liability of the product passes from the manufacturer to the installer.

Valid legal version is in german language.

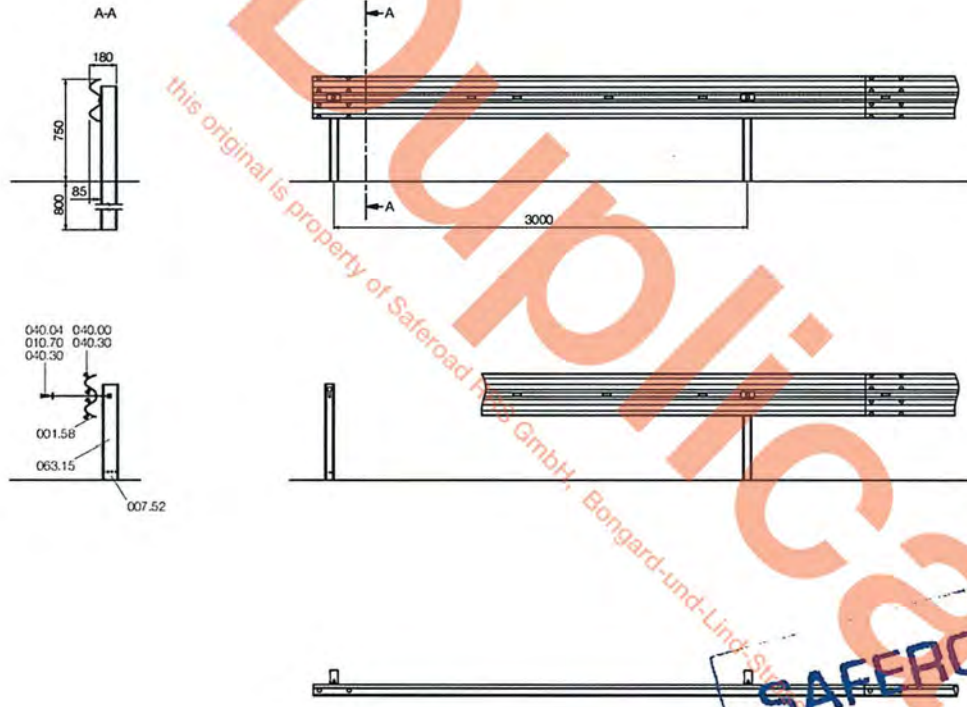
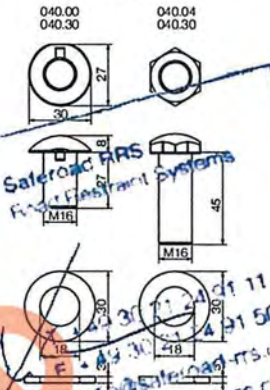


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Parts

Art. no.	Description	Qty/m
001.58	Beam A, 4.300 mm, 2,5	0.25
007.52	Post stiffener	0.33
010.70	Plate M16, 85x35x4 mm	0.33
040.00	Parhead bolt M16x27, 4.6	2
040.04	Parhead bolt M16x45, 8.8	0.33
040.30	Washer Ø18x30	2.33
063.15	Post C100x60, 1.500 mm	0.33

Fasteners



Systemübersicht · System overview · Présentation du système · Panorámica del sistema · Descripción general del sistema · Visão geral do sistema · Přehled systému
 Sistem Genel Bakış · Przegląd systemu · Обзор системы · Prezentare generală sistem · Overzicht van het systeem · Systemtegning · Systemritning · ماظن متاع قريظن

MegaRail ex
H1 · W2 · A

SAFEROAD®



Stückliste - Components list

Name	Artikel Nr. Part no.	Anzahl/m Number/m	Anzahl/4m Number/4m
SP-Holm - Beam (A), 4.300 mm	001.58	0.25	1
Pfostenverstärkung - Post stiffener	007.52	0.33	1.33
Decklasche - Plate M16	010.70	0.33	1.33
HRK-Schraube - Bolt M16x27, 4.6	040.00	2	8
HRK-Schraube - Bolt M16x45, 8.8	040.04	0.33	1.33
Scheibe - Washer Ø 18	040.30	2.33	9.33
Pfosten - Post C100x60, 1.500 mm	063.15	0.33	1.33

Montagetafel · Assembly drawing

MegaRail ex
H1 · W2 · A

SAFEROAD
Sales in Germany
Carlsbrunn
10775 Berlin
GERMANY
+49 30 21 24 91 50
F +49 30 21 24 91 50
mailto:info@saferoad-rrs.com
www.saferoad-rrs.com

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15-07-2016

ALLEGATO C1 - ANNEX C1



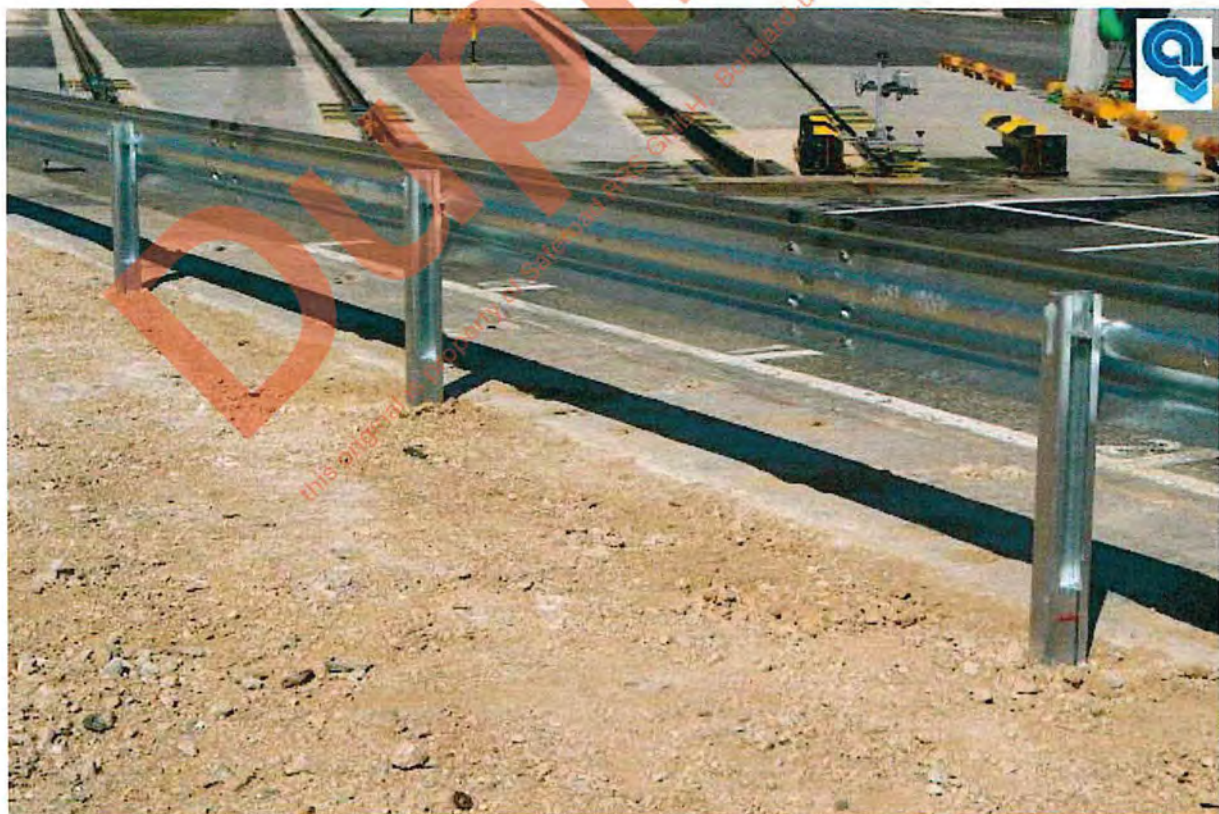




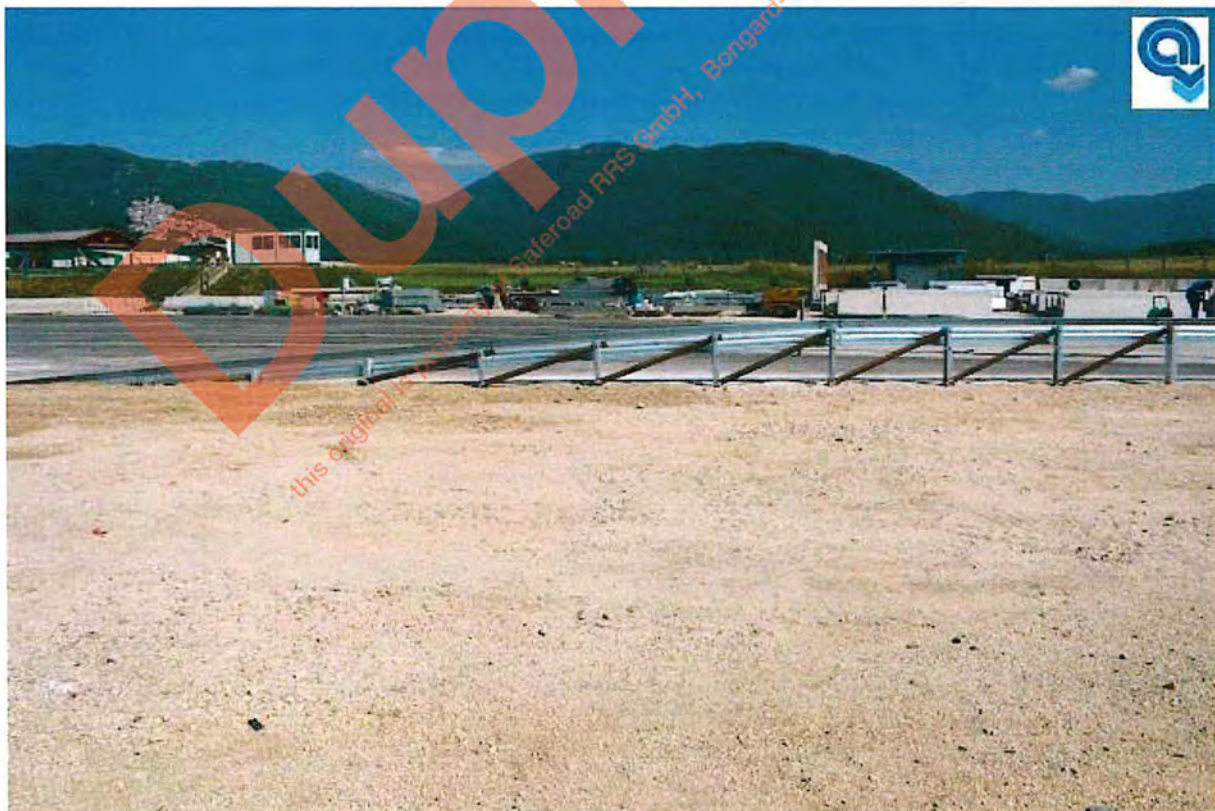












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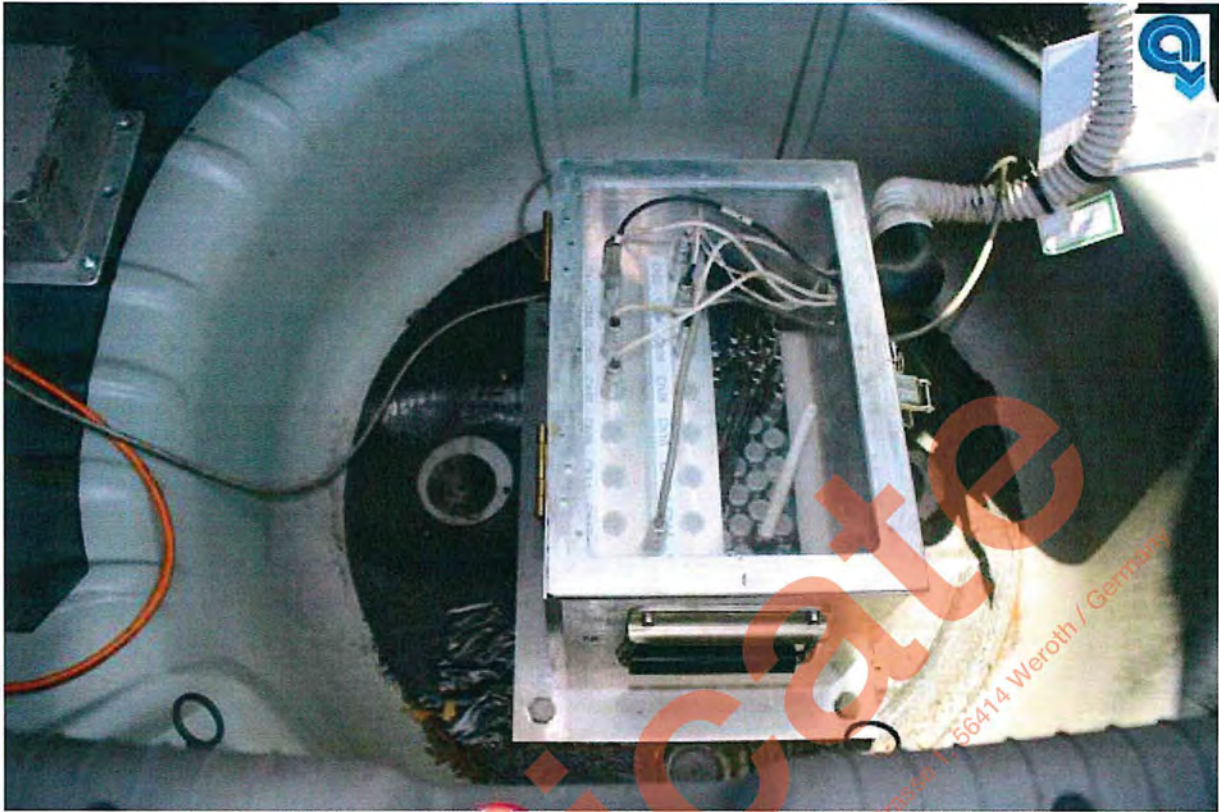
ALLEGATO C2 - ANNEX C2











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ALLEGATO C3 - ANNEX C3











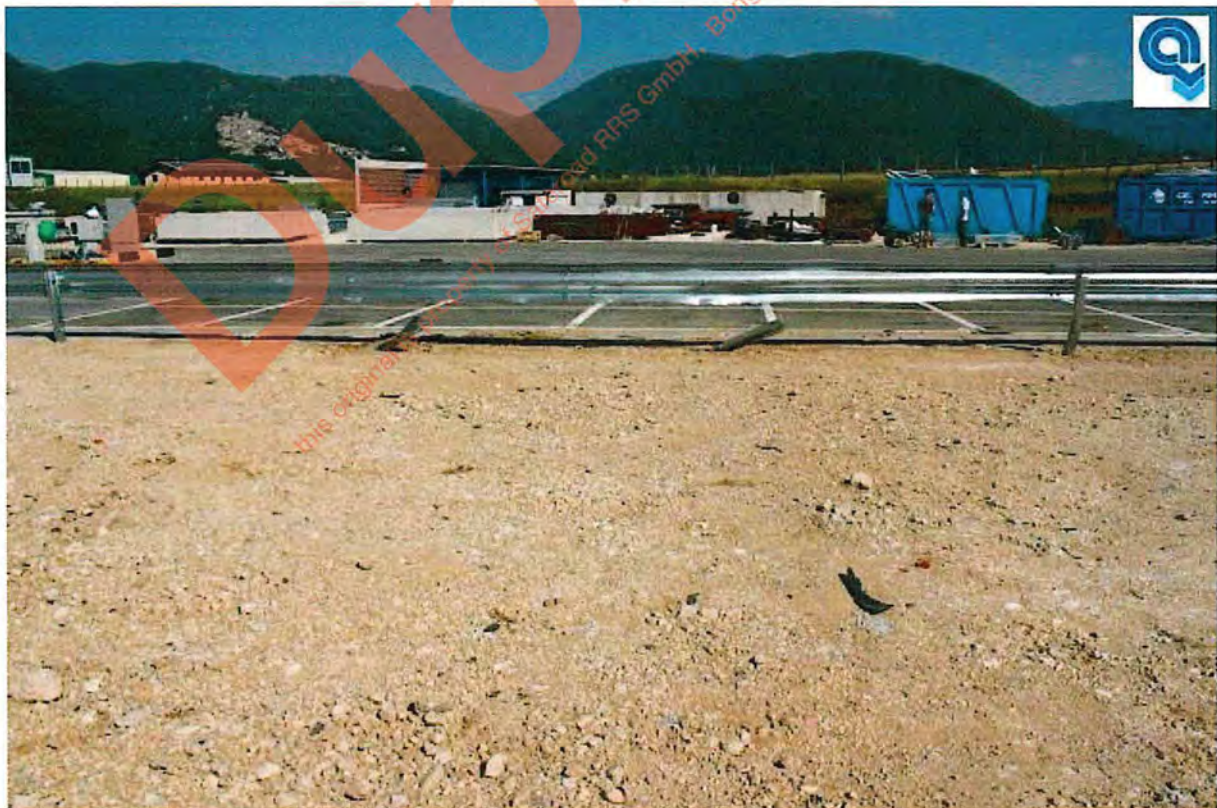




Foto dei paletti di sostegno deformati – Deformed posts photos



Montante/Post +4



Montante/Post +3

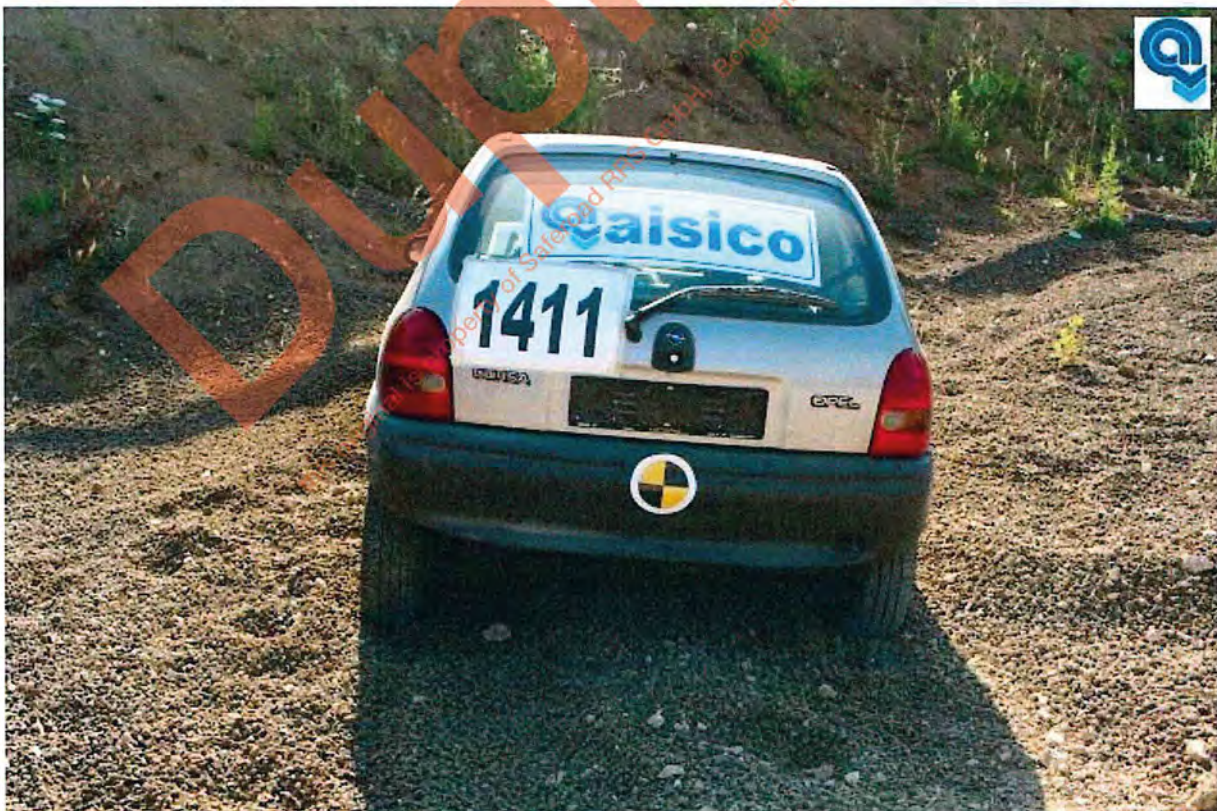


Montante/Post +2



Montante/Post +1

ALLEGATO C4 - ANNEX C4

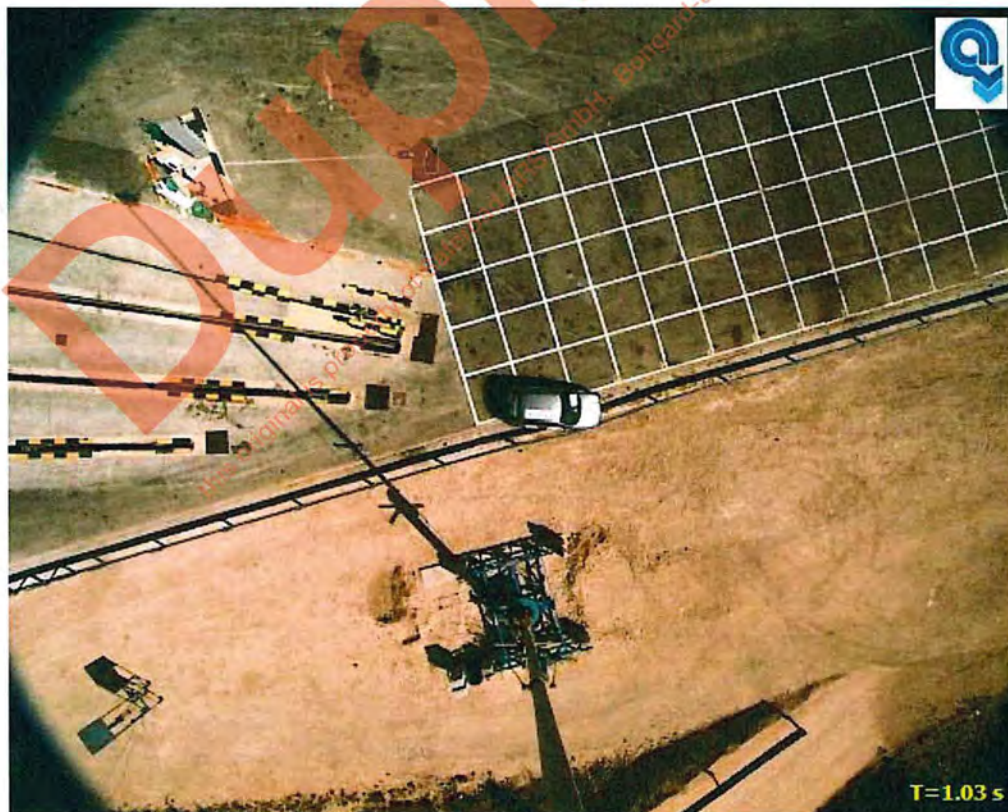
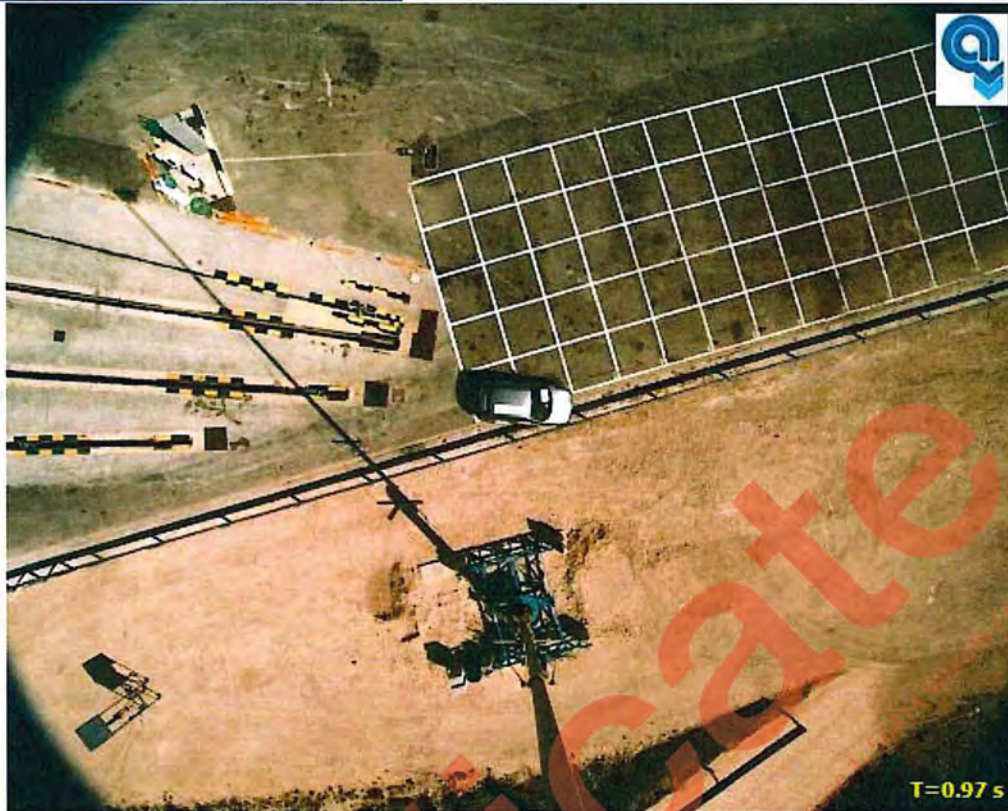


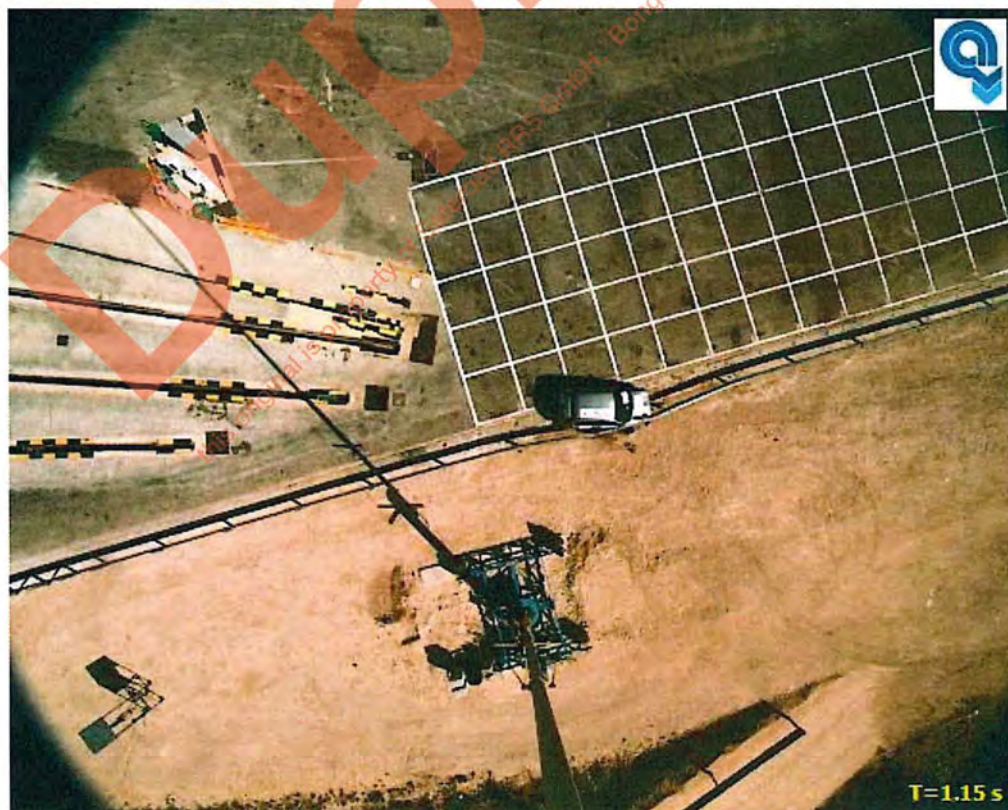
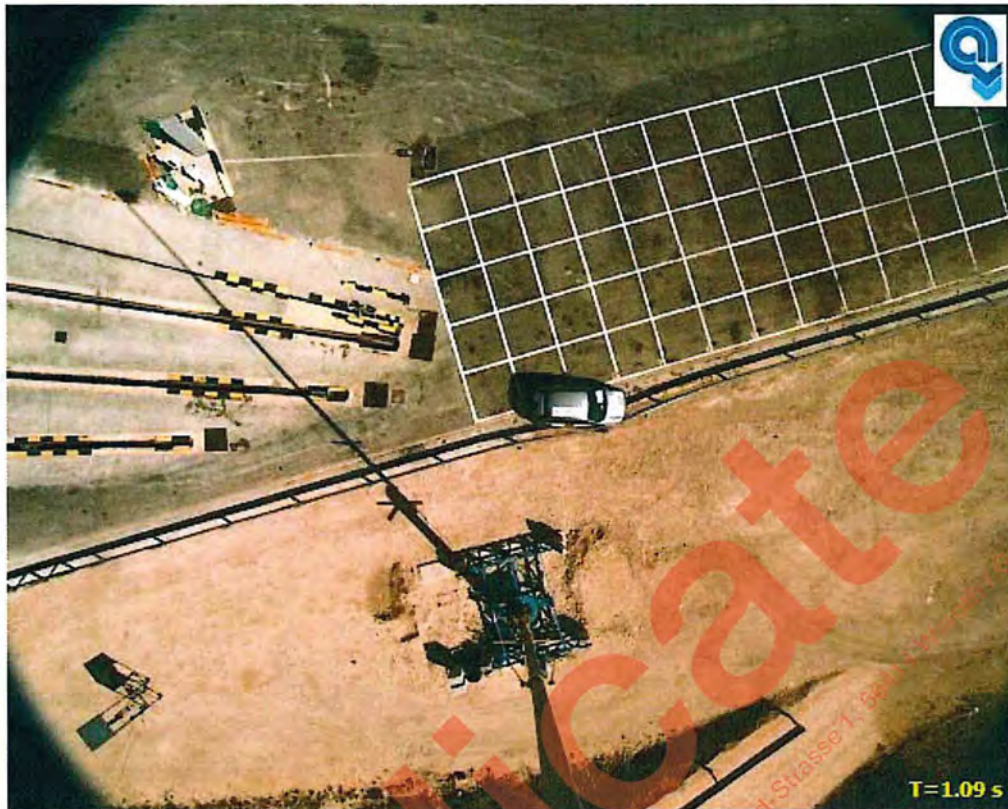


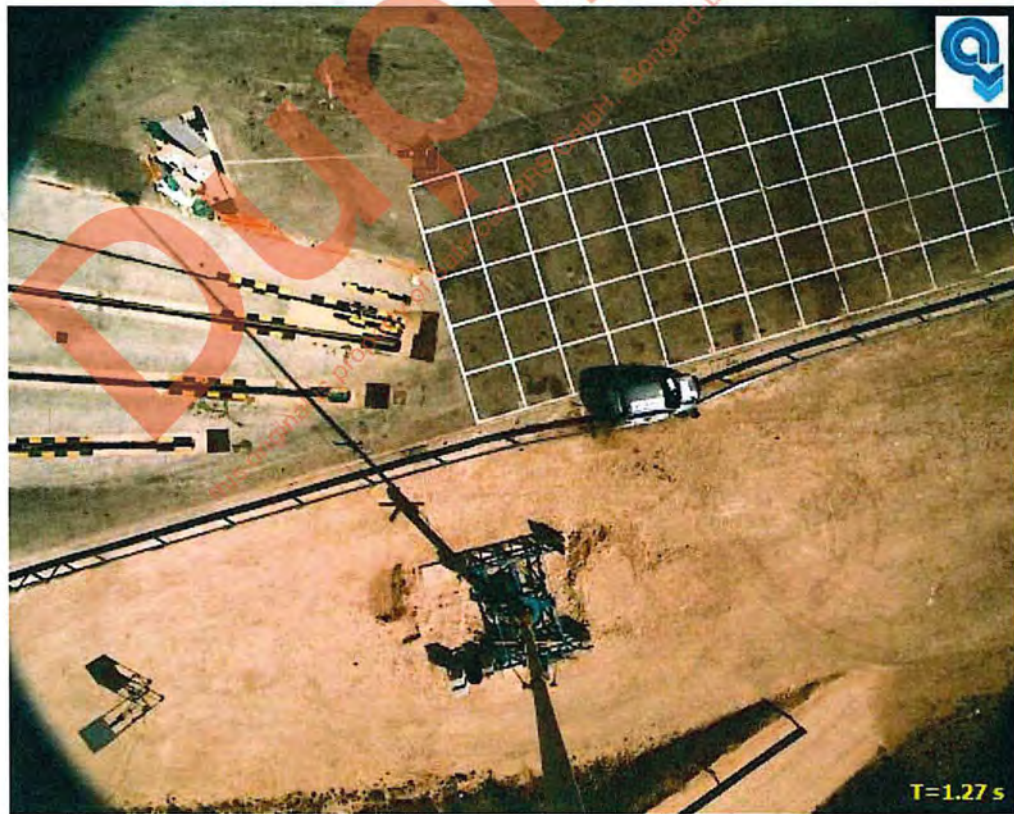
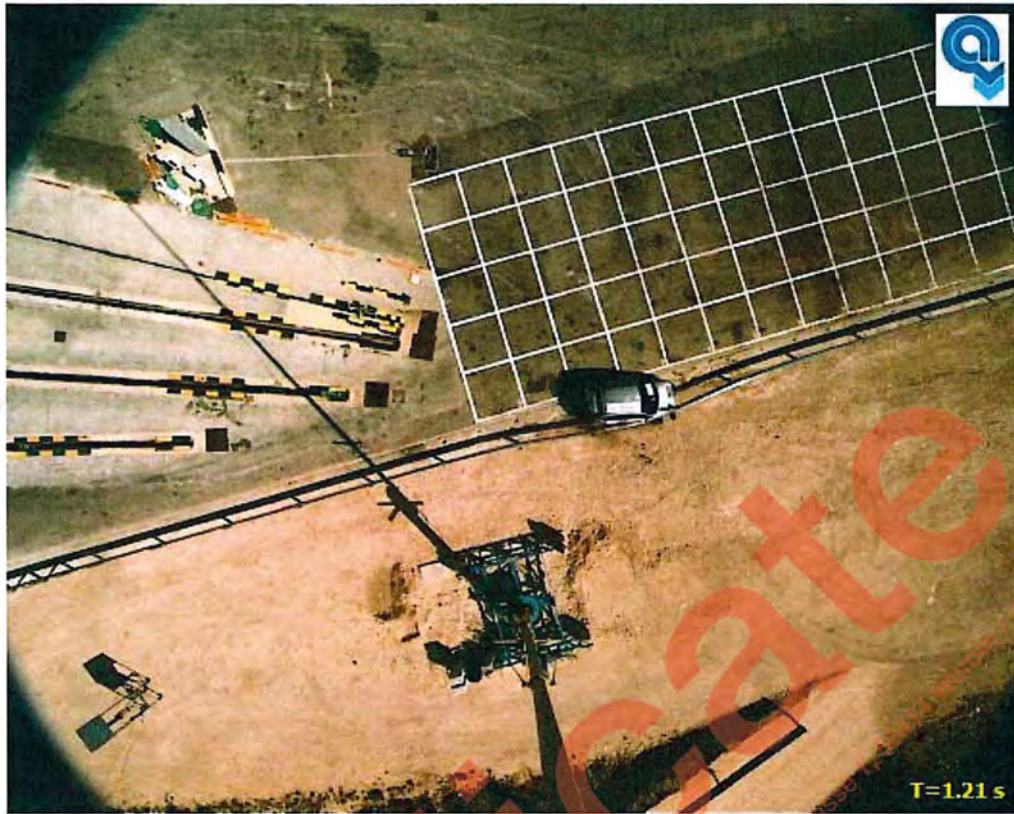


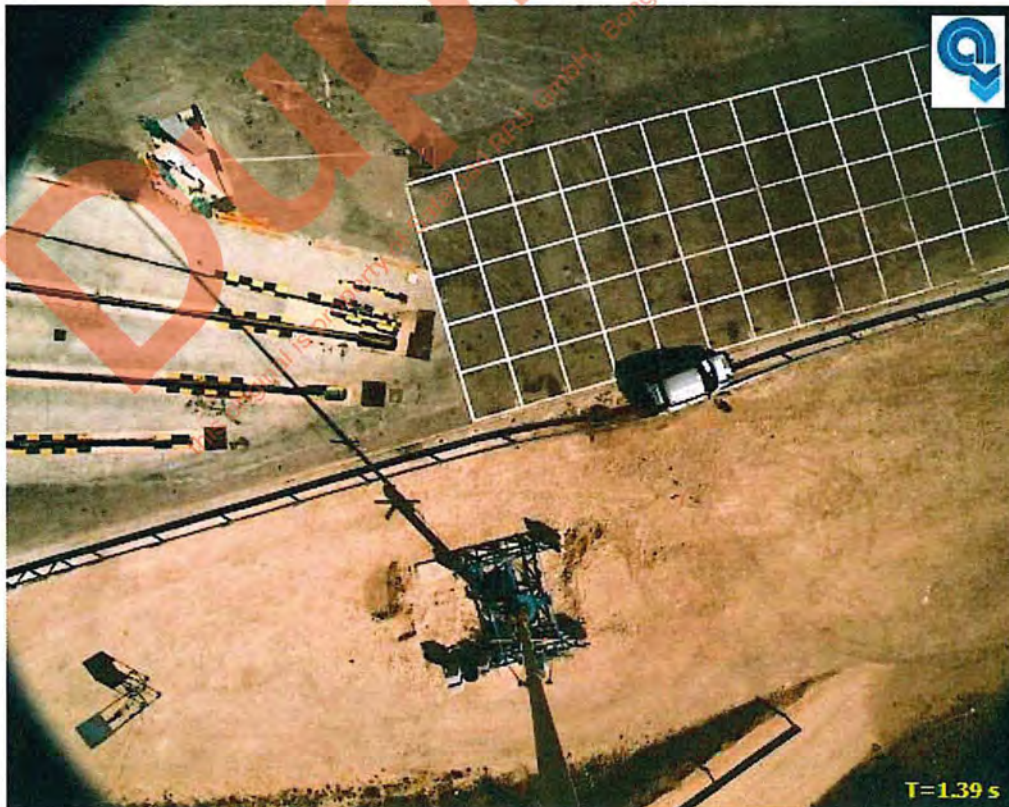
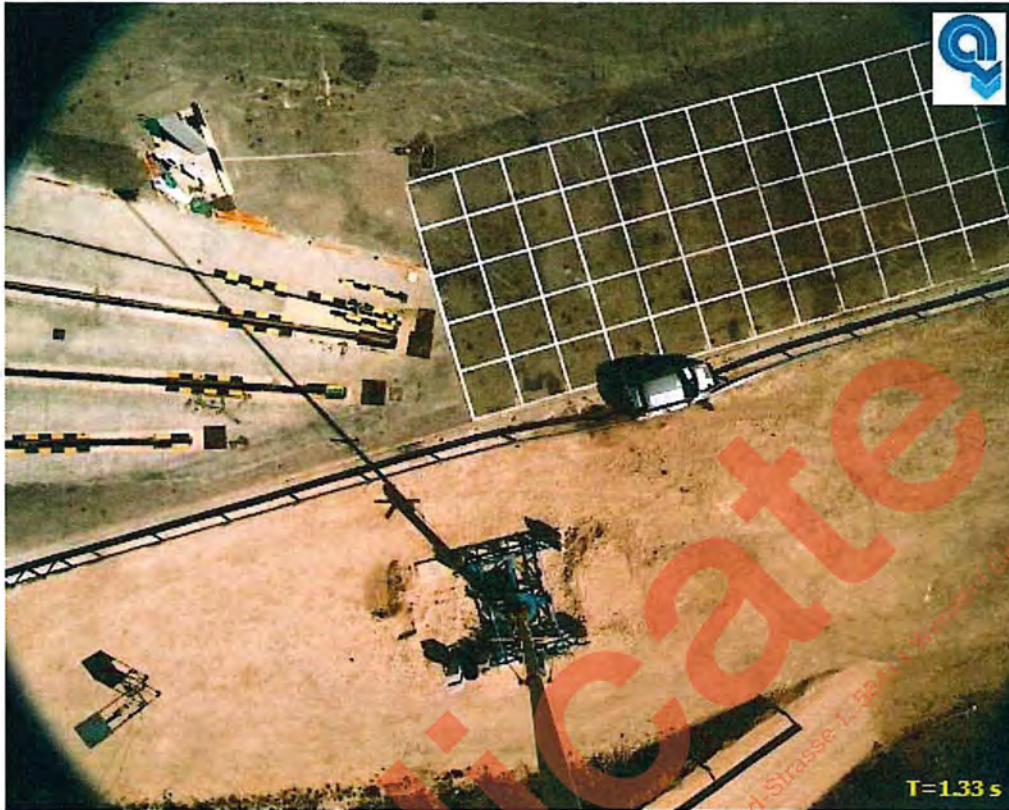


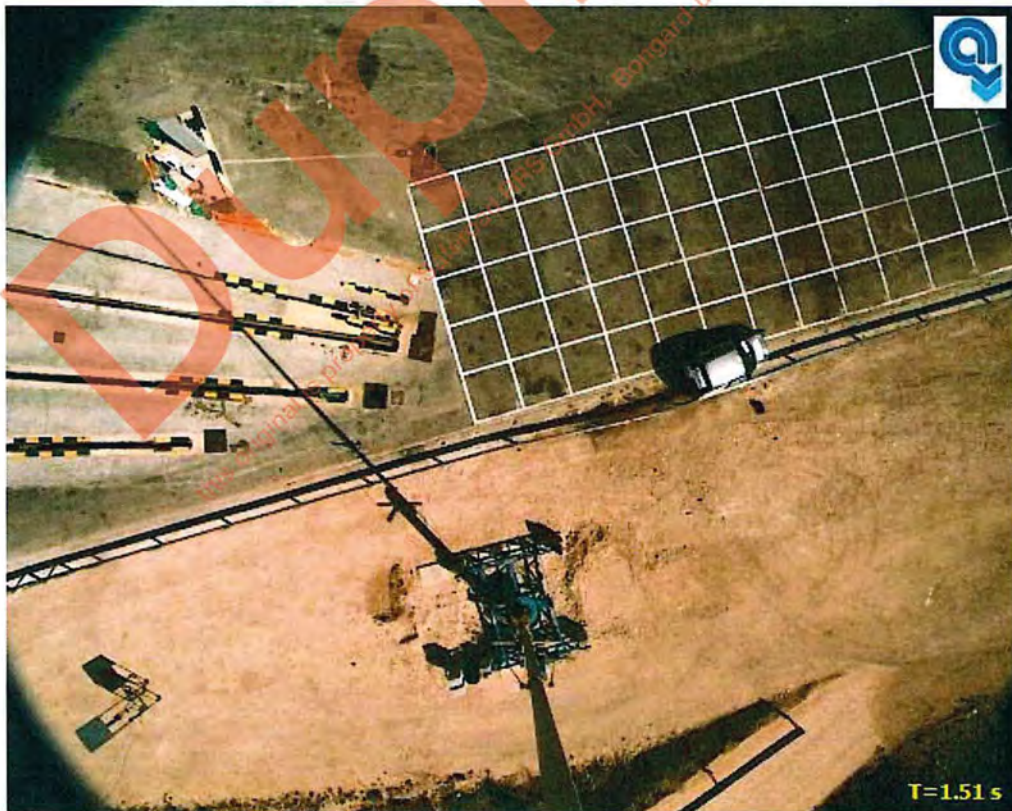
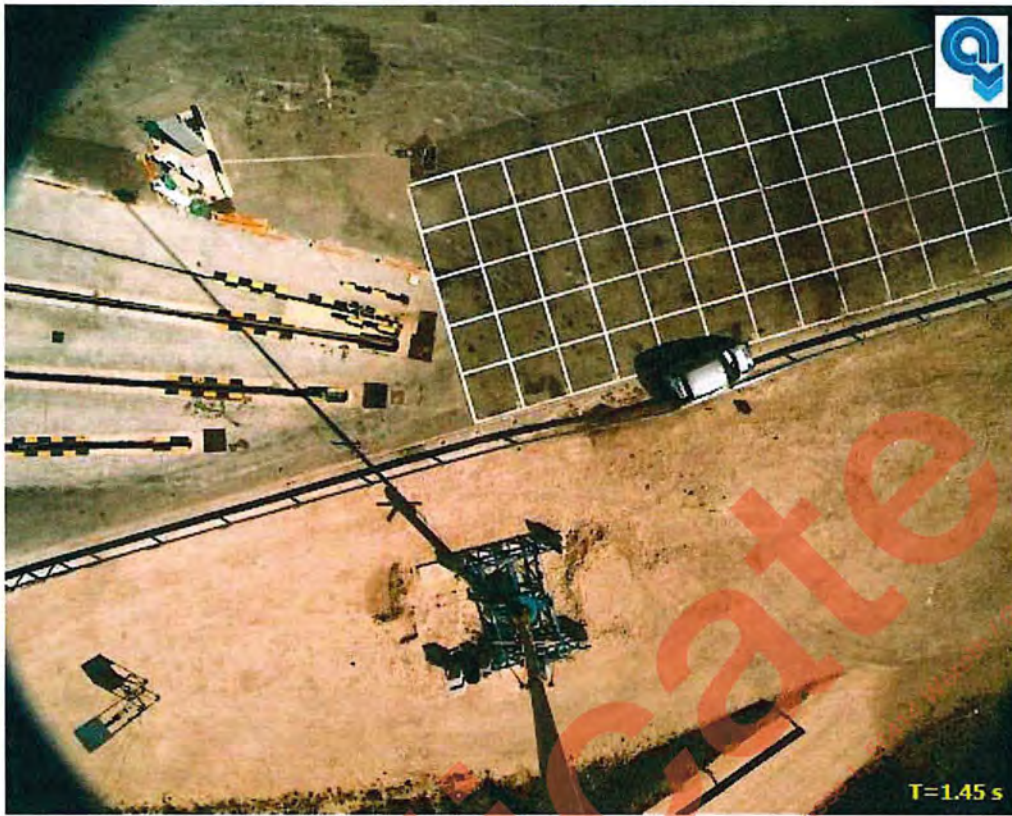
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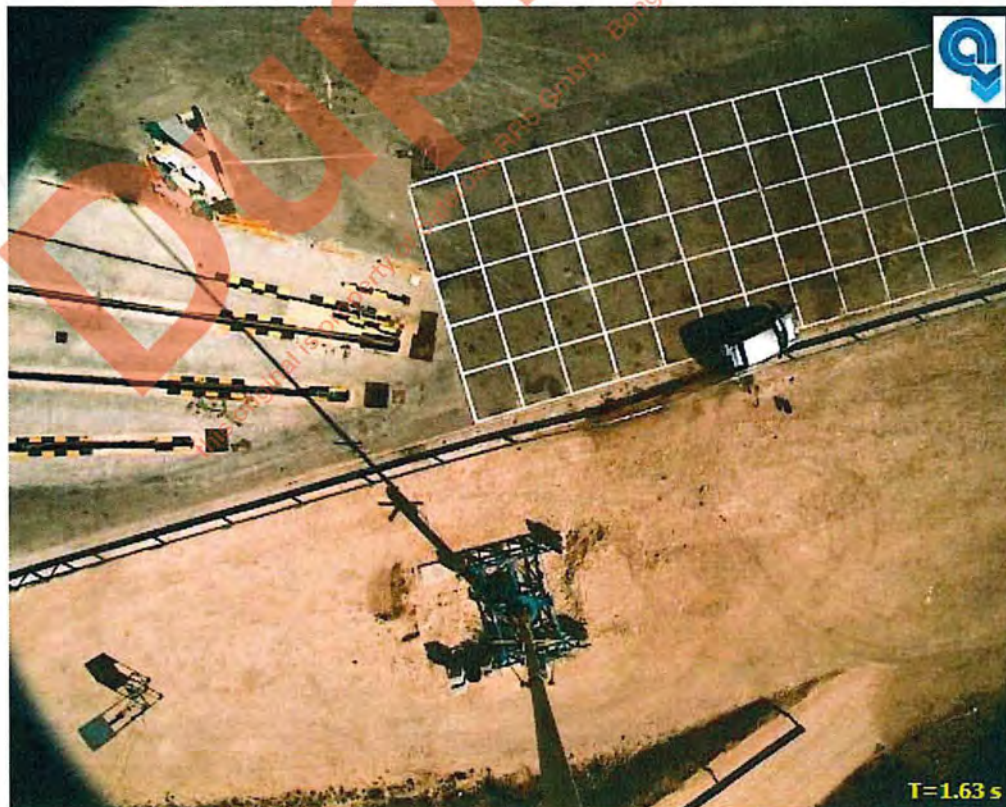
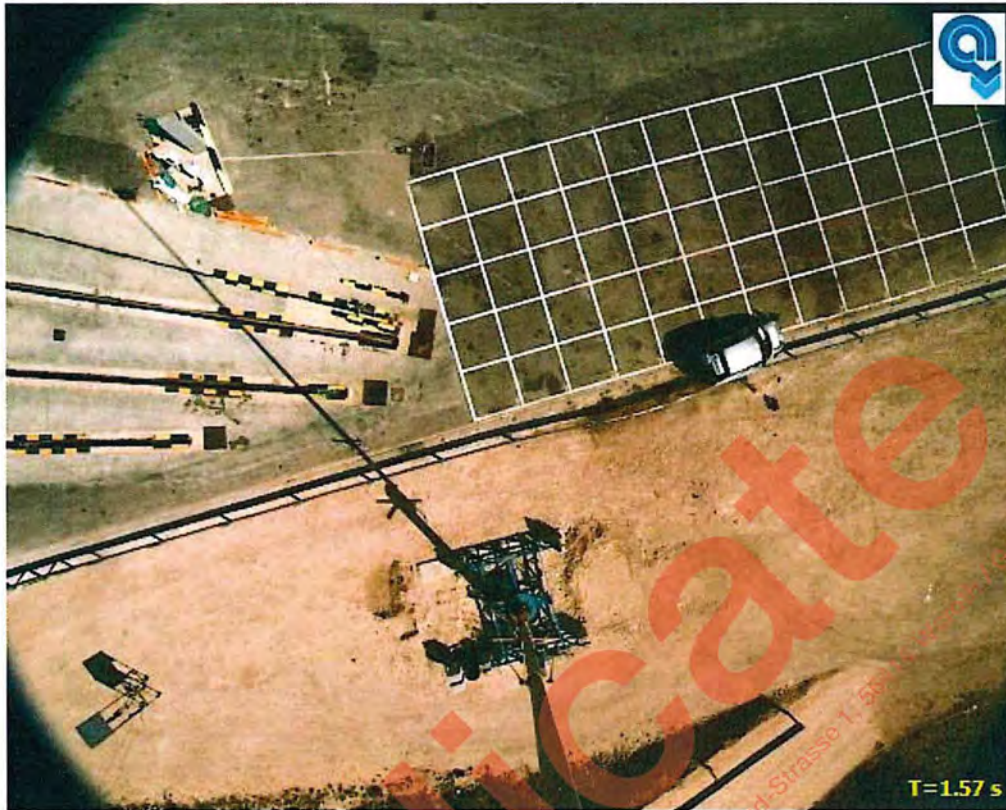


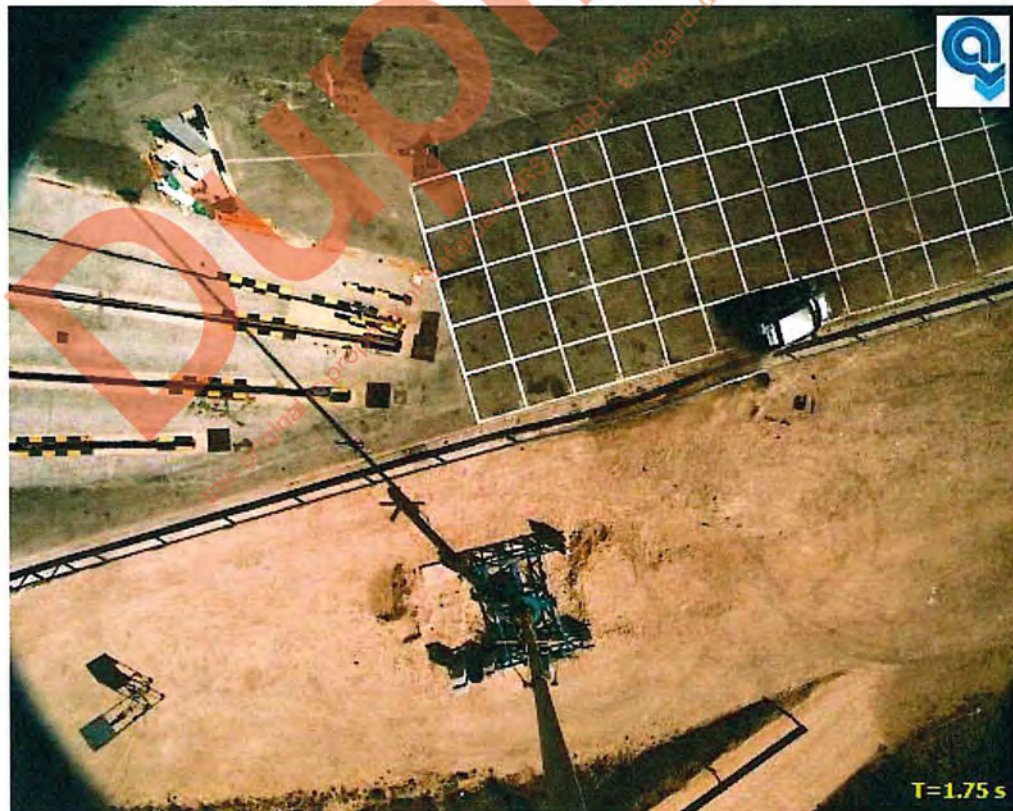
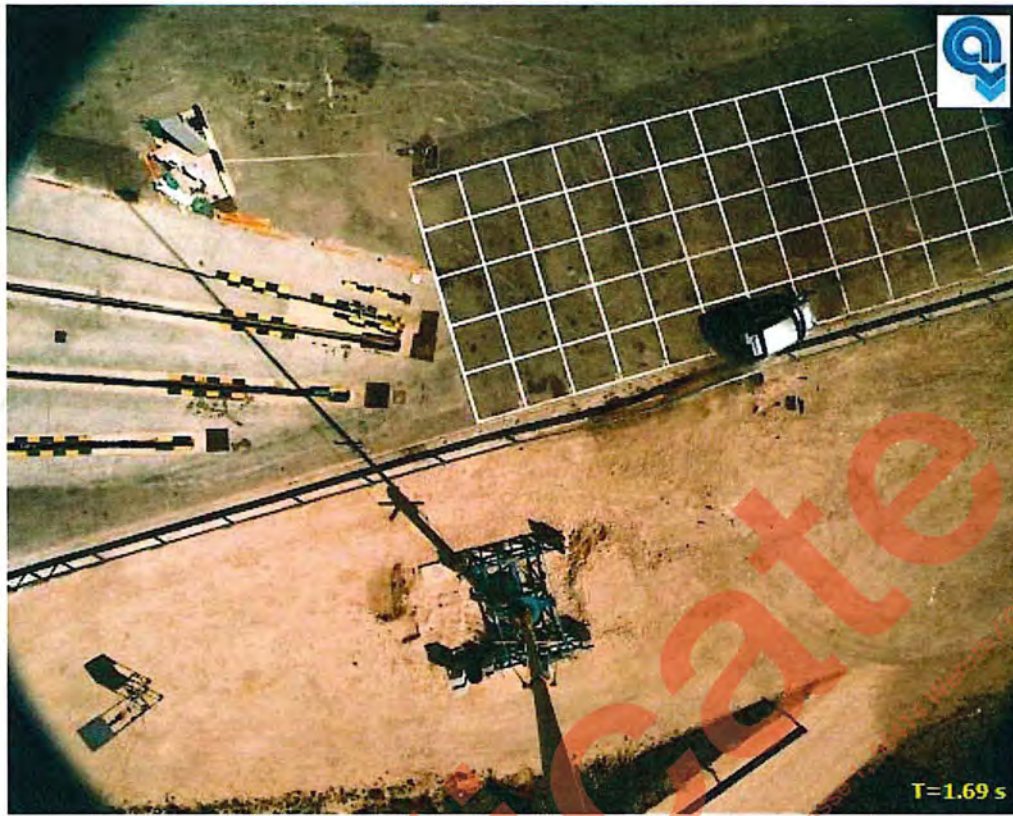


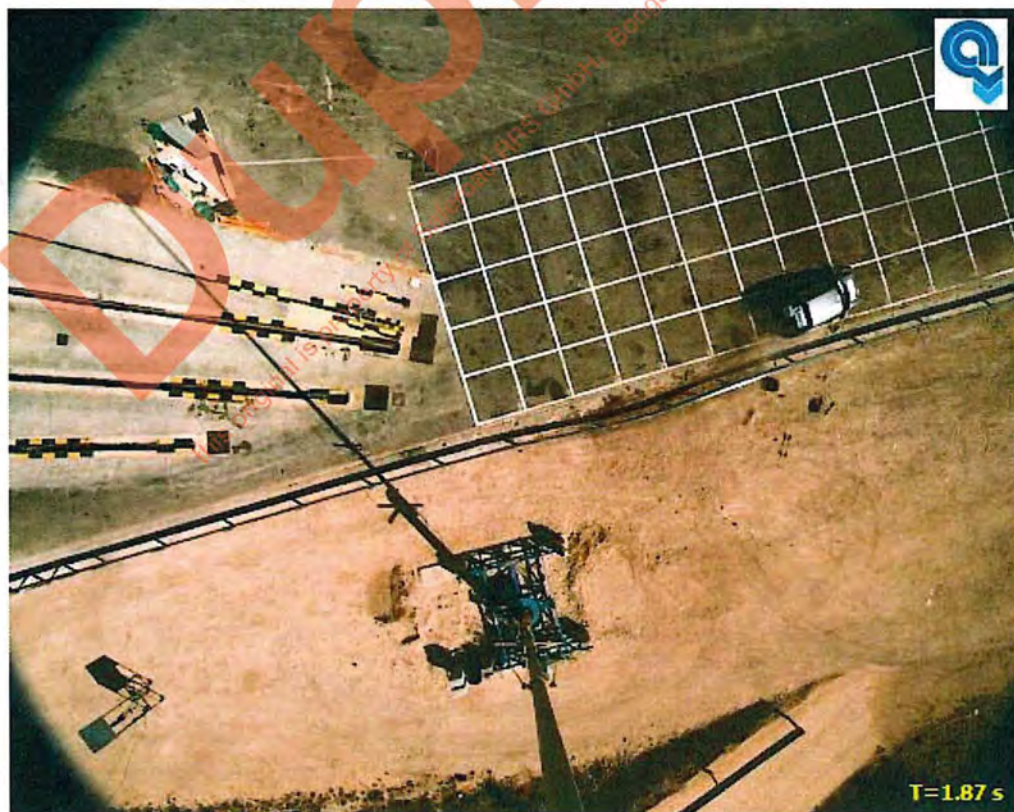
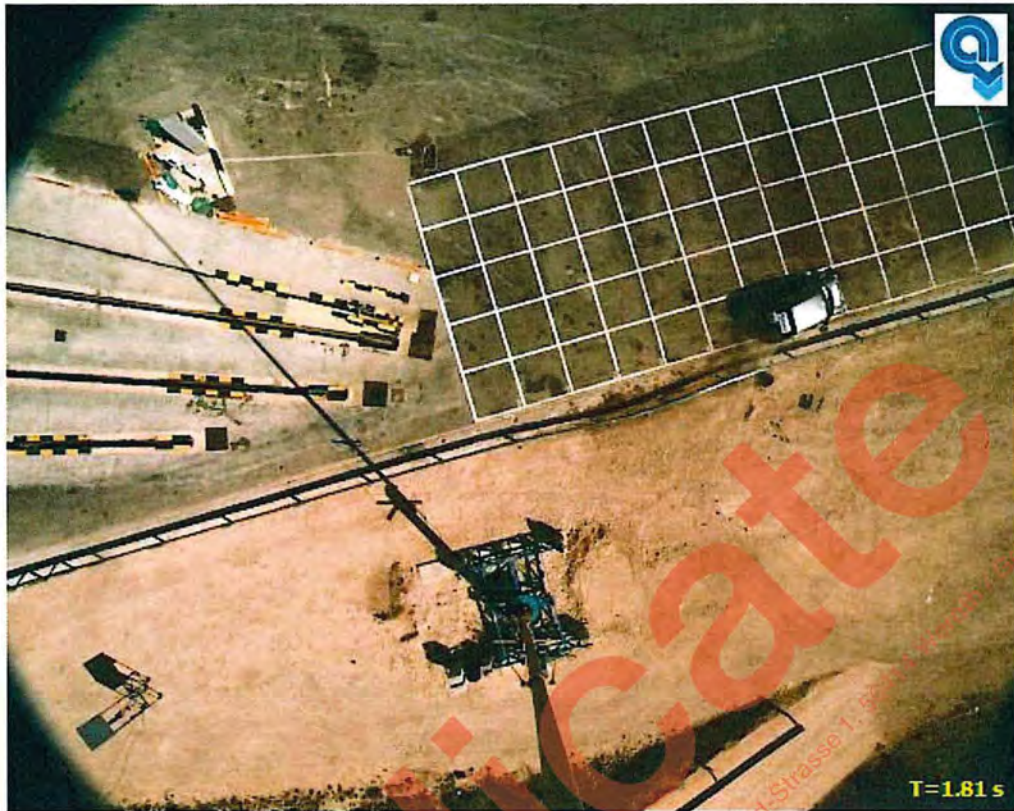


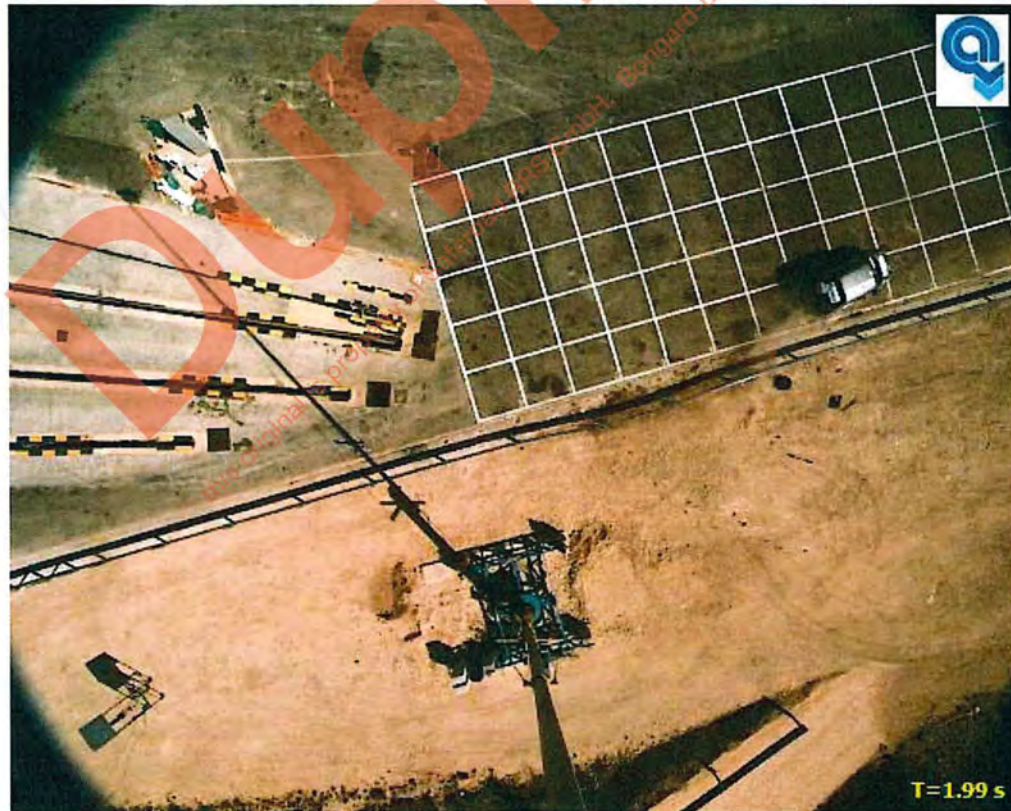
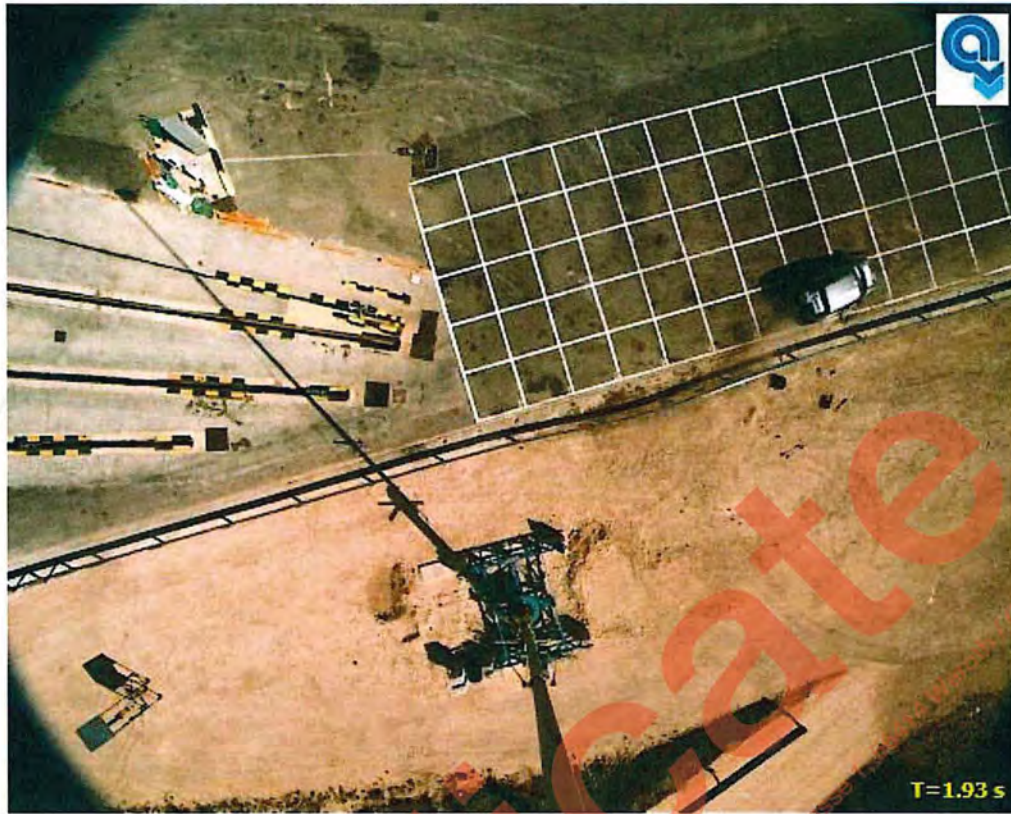


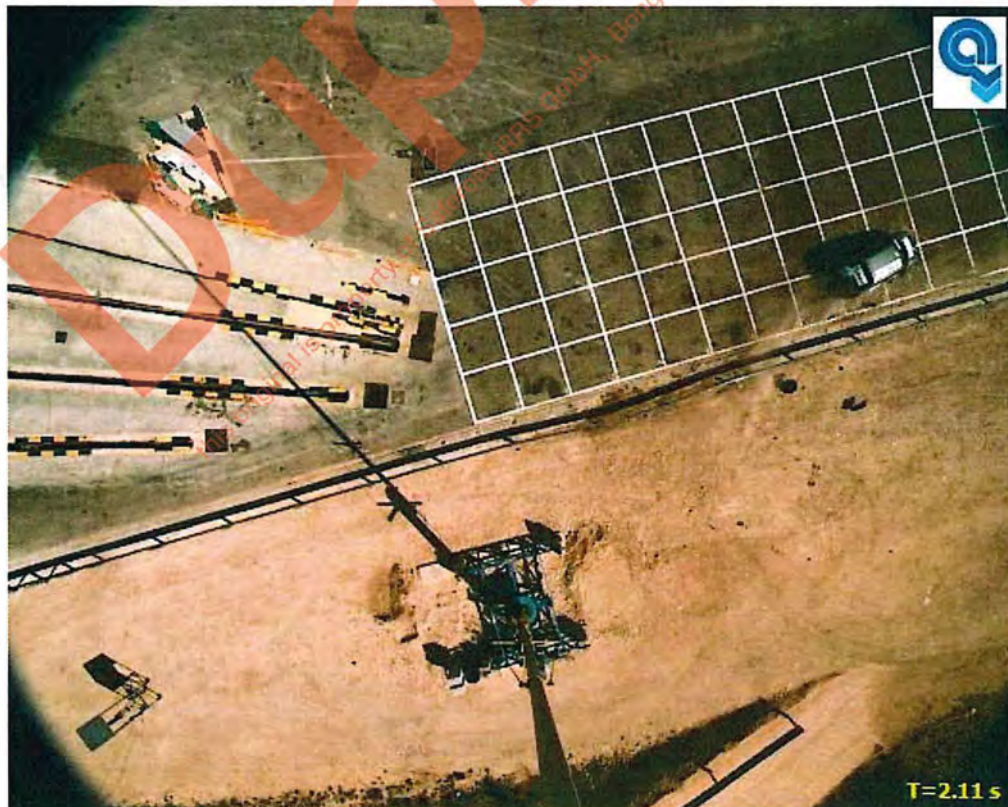
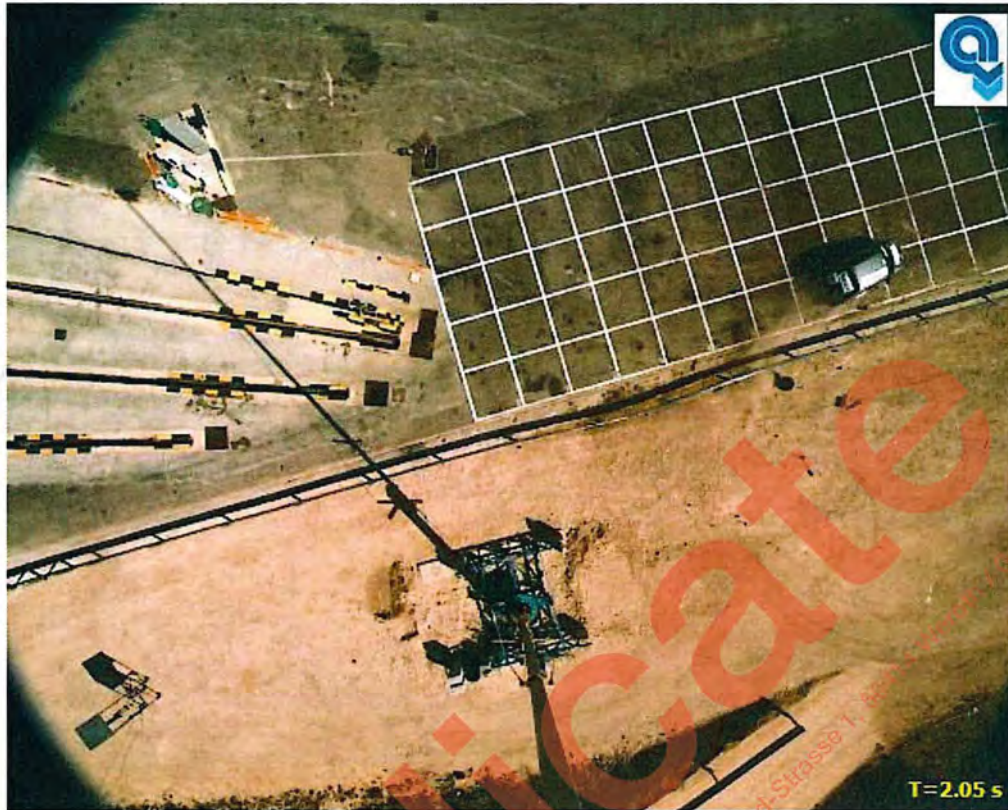


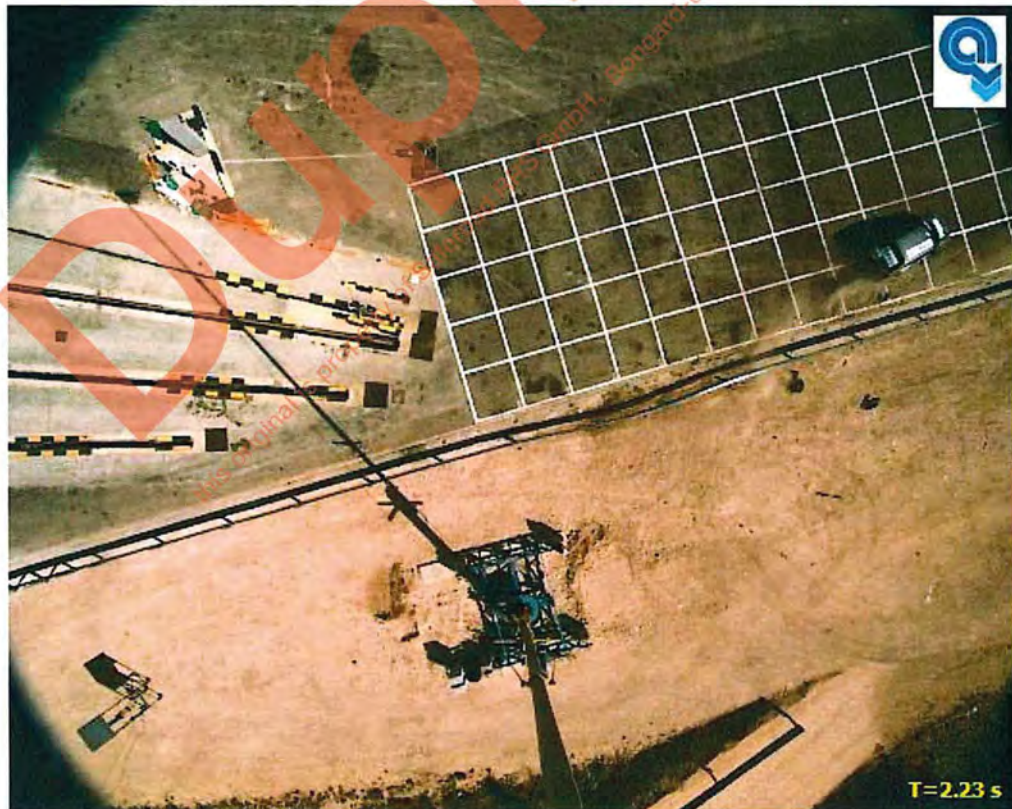
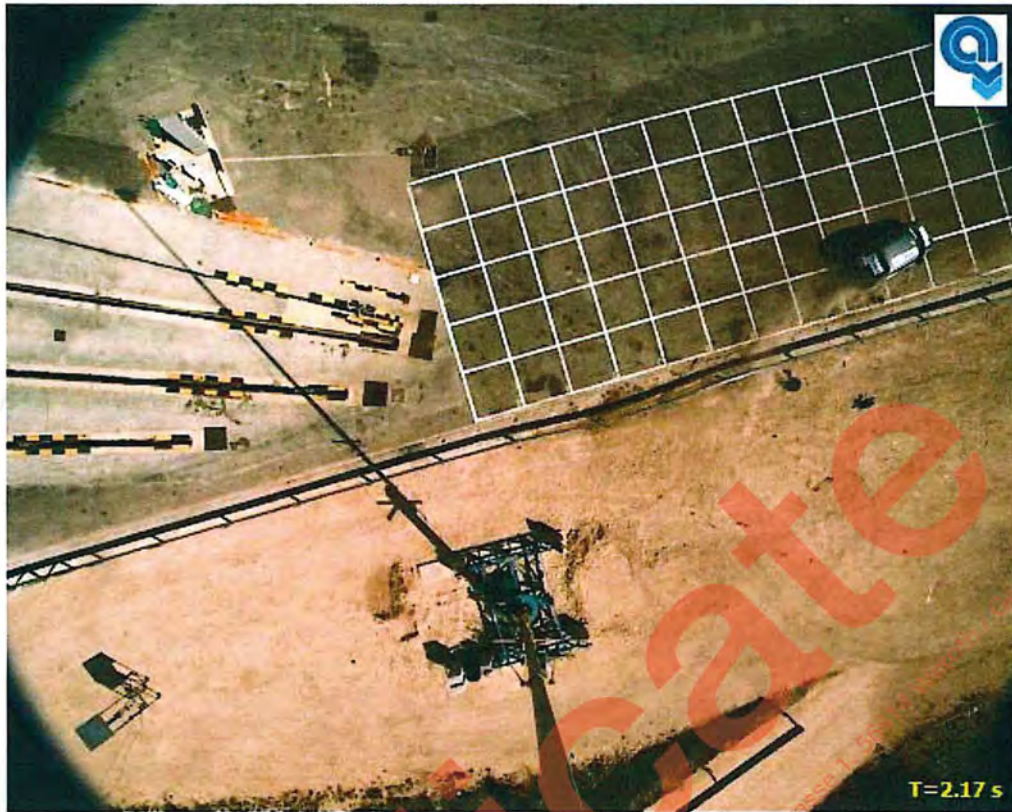












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ALLEGATO C6 - ANNEX C6

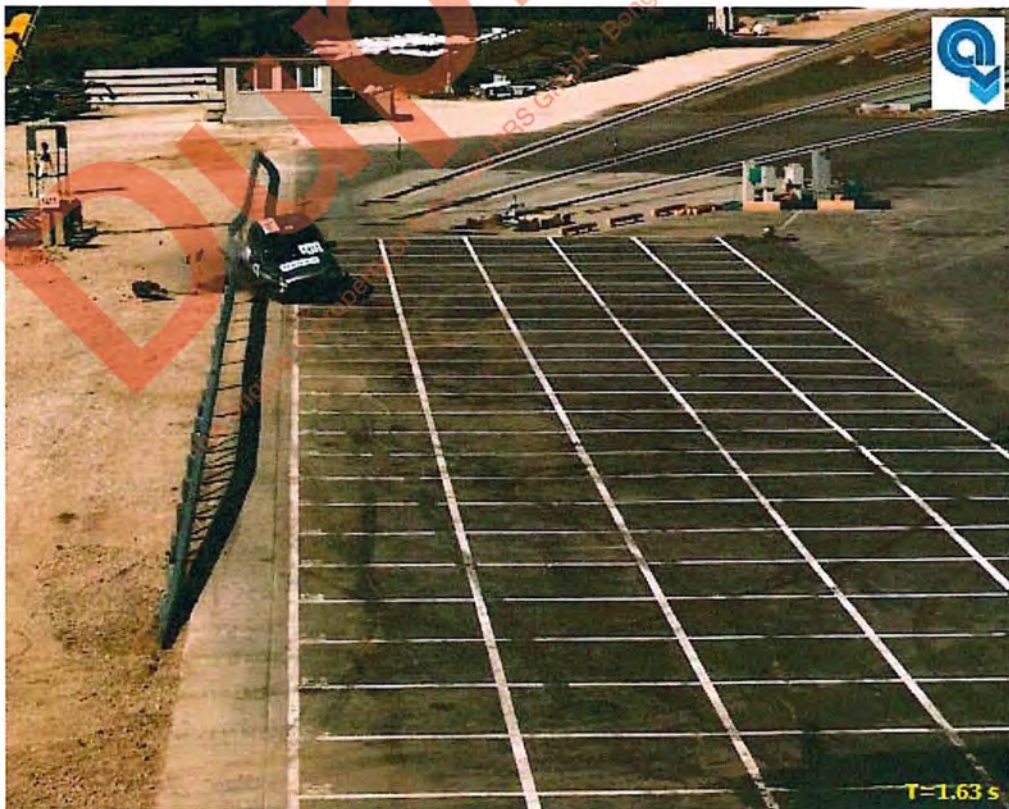






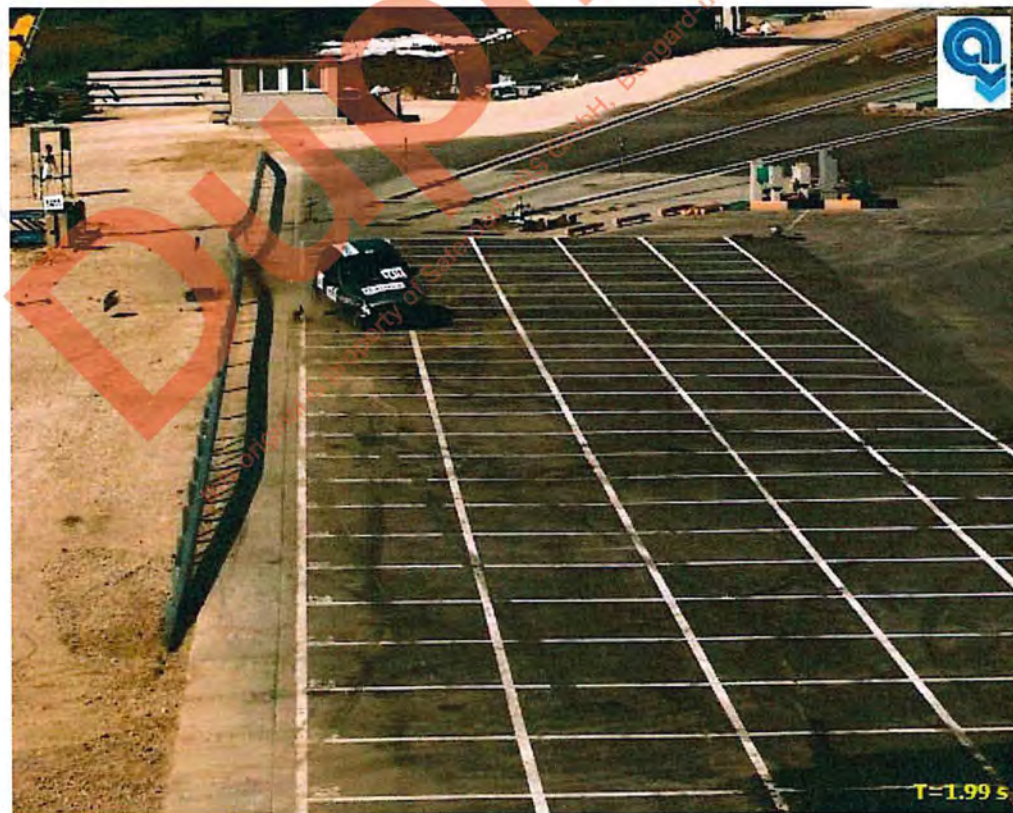




















Test 1411

2016 ,12th July



CLIENT: Saferoad RRS GmbH

IMPACT TEST: TB 11



Test 1411 2016, 12th July - IMPACT TEST TB 11 - Saferoad RRS GmbH

Test 1411

2016 ,12th July

- DVD A**
Crash Videos
1.1 Above
1.2 Front
1.3 Rear
1.4 Lateral
1.5 On Board
1.6 Rear B
1.7 Axial

- Vehicle and Device**
2.1 Vehicle Pre-Crash
2.2 Vehicle Post-Crash
2.3 Device Pre-Crash
2.4 Device Post-Crash

- DVD B**
High Frame Rate Videos
1.1 Front
1.2 Above
1.3 Rear
1.4 Axial
1.5 Rear B

High Definition Photos



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ALLEGATO E - ANNEX E

SOGEA srl
 Via Casalmonferrato 2E - ROMA
 tel. 067016809 - fax 067011625
Laboratorio geotecnico

 AZIENDA CON
 SISTEMA DI GESTIONE QUALITA'
 UNI EN ISO 9001:2008
 CERTIFICATO DA CERTIQUALITY

 Certificazione Ufficiale - Settore « A » - Prove di laboratorio sulle terre
 AUTORIZZAZIONE MINISTERO INFRASTRUTTURE E TRASPORTI
 Decreto 57027/5-11-2007 - Art. 59 DPR 380/2001 - Circolare 7618/STC/2010

COMMITTENTE: AISICO srl
RIFERIMENTO: Nuovo impianto Crash - Pereto (AQ)
SONDAGGIO: _____ CAMPIONE: C PROFONDITA': m

MODULO RIASSUNTIVO
CARATTERISTICHE FISICHE

Umidità naturale	%
Peso di volume	kN/m ³
Peso di volume secco	kN/m ³
Peso di volume saturo	kN/m ³
Peso specifico	
Indice dei vuoti	
Porosità	%
Grado di saturazione	%
Limite di liquidità	%
Limite di plasticità	%
Indice di plasticità	%
Indice di consistenza	
Passante al set. n° 40	
Limite di ritiro	%
Classif. CNR-UNI	

ANALISI GRANULOMETRICA

Ghiaia	55,4	%
Sabbia	30,8	%
Limo-Argilla	13,8	%
D 10		mm
D 50	2,702633	mm
D 60	4,742840	mm
D 90	12,416730	mm
Passante set. 10	44,6	%
Passante set. 40	22,9	%
Passante set. 200	13,8	%

PERMEABILITA'

Coefficiente k	cm/sec
----------------	--------

COMPRESSIONE

σ	kPa	σ_{Rim}	kPa
----------	-----	----------------	-----

SCISSOMETRO

τ	kPa	τ	kPa
--------	-----	--------	-----

TAGLIO DIRETTO

Prova consolidata-lenta			
c	kPa	ϕ	°
c Res	kPa	ϕ_{Res}	°

COMPRESSIONE TRIASSIALE

C.D.	c_d	kPa	ϕ_d	°
C.U.	c'_{cu}	kPa	ϕ'_{cu}	°
	c_{cu}	kPa	ϕ_{cu}	°
U.U.	c_u	kPa	ϕ_u	°

PROVA EDOMETRICA

σ kPa	E kPa	Cv cm ² /sec	k cm/sec

Ghiaia sabbiosa, in matrice limoso argillosa, di colore nocciola.

 1
 27398

SGEO - Laboratorio 3.0 - 2012

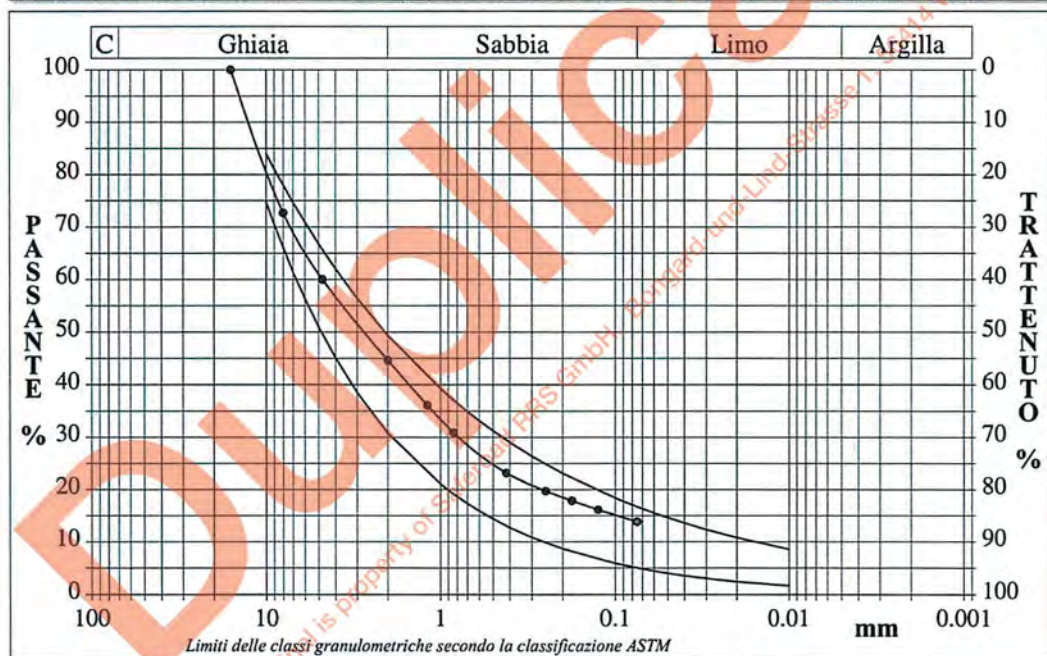
CERTIFICATO DI PROVA N°: 06043	Pagina 1/1	DATA DI EMISSIONE: 10/06/13	Inizio analisi: 30/05/13
VERBALE DI ACCETTAZIONE N°: 111 del 30/05/13		Apertura campione: 30/05/13	Fine analisi: 03/06/13

COMMITTENTE: AISICO srl
RIFERIMENTO: Nuovo impianto Crash - Pereto (AQ)
SONDAGGIO: CAMPIONE: C PROFONDITA': m

ANALISI GRANULOMETRICA

Modalità di prova: Norma ASTM D 422

Ghiaia	55,4 %	Passante setaccio 10 (2 mm)	44,6 %	D10	---	mm
Sabbia	30,8 %	Passante setaccio 40 (0.42 mm)	22,9 %	D30	0,77633	mm
Limo-Argilla	13,8 %	Passante setaccio 200 (0.075 mm)	13,8 %	D50	2,70263	mm
				D60	4,74284	mm
				D90	12,41673	mm
Coefficiente di uniformità	---	Coefficiente di curvatura	---			



Diametro mm	Passante %	Diametro mm	Passante %	Diametro mm	Passante %	Diametro mm	Passante %	Diametro mm	Passante %
16,0000	100,00	0,8410	30,89	0,0750	13,84				
8,0000	72,66	0,4200	23,19						
4,7500	60,03	0,2500	19,69						
2,0000	44,65	0,1770	17,85						
1,1900	36,14	0,1250	16,13						

Ghiaia sabbiosa, in matrice limoso argillosa, di colore nocciola.

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27398

SGEO - Laboratorio 3.0 - 2012

Lo sperimentatore
Dott. Ankeia Serepanti

Il direttore del laboratorio
Dott. Sergio Rabottino

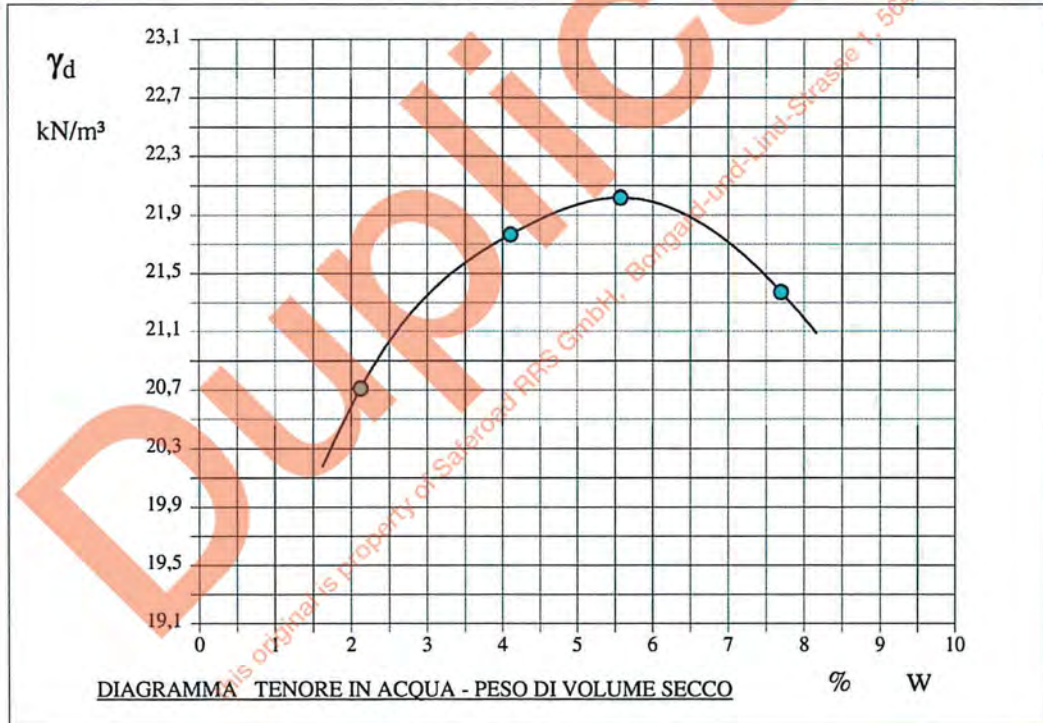
CERTIFICATO DI PROVA N°: 06042	Pagina 1/1	DATA DI EMISSIONE: 10/06/13	Inizio analisi: 04/06/13
VERBALE DI ACCETTAZIONE N°: 111 del 30/05/13		Apertura campione: 30/05/13	Fine analisi: 10/06/13

COMMITTENTE: AISICO srl
RIFERIMENTO: Nuovo impianto Crash - Pereto (AQ)
SONDAGGIO: CAMPIONE: C PROFONDITA': m

PROVA DI COSTIPAMENTO AASHTO MODIFICATA

Modalità di prova: Norma ASTM D 1557

Tenore in acqua ottimo (%): 5,6	Provino n°	Umidità %	Peso di volume umido kN/m³	Peso di volume secco kN/m³
Peso di volume secco massimo (kN/m³): 22,0	1	2,1	21,15	20,71
	2	4,1	22,66	21,77
	3	5,6	23,25	22,02
	4	7,7	23,02	21,37
	----	----	----	----
	----	----	----	----
	----	----	----	----
	----	----	----	----
Materiale con Ø > 20,00 mm (%): -				
Volume della fustella (cm³): 944				



Ghiaia sabbiosa, in matrice limoso argillosa, di colore nocciola.

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27398

SGEO - Laboratorio 3.0 - 2012

Lo sperimentatore
Dott. Fabrizio Rabottino

Il direttore del laboratorio
Dott. Sergio Rabottino

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ALLEGATO F - ANNEX F**CERTIFICATO DI ACCREDITAMENTO**
*Accreditation Certificate*Accreditamento n° **0424**
Accreditation n°Rev. **5**Si dichiara che
We declare that**AISICO S.R.L.**

Appartenente all'ente:

AISICO S.R.L.

Sede:

S.P. 27 del Cavaliere Loc. Salone Km 2,500 - 67064 Pereto AQ

è conforme ai requisiti
della normaUNI CEI EN ISO/IEC 17025:2005 "Requisiti generali per la competenza dei
Laboratori di prova e taratura"meets the requirements
of the standard*EN ISO/IEC 17025:2005 "General Requirements for the Competence of Testing
and Calibration Laboratories" standard*

quale

Laboratorio di Prova

as

Testing Laboratory

L'accreditamento attesta la competenza tecnica del Laboratorio relativamente allo scopo riportato nelle schede allegate al presente certificato. Le schede possono variare nel tempo. I requisiti gestionali della ISO/IEC 17025:2005 (sezione 4) sono scritti in un linguaggio idoneo all'attività dei Laboratori di Prova, sono conformi ai principi della ISO 9001:2008 ed allineati con i suoi requisiti applicabili.


Il presente certificato non è da ritenersi valido se non accompagnato dalle schede allegate e può essere sospeso o revocato in qualsiasi momento nel caso di inadempienza accertata da parte di ACCREDIA.

La validità dell'accreditamento può essere verificata sul sito WEB (www.accredia.it) o richiesta direttamente ai singoli Dipartimenti.

The accreditation certifies the technical competence of the laboratory limited to the scope detailed in the attached Enclosure. The scope may vary in the time. The management system requirements in ISO/IEC 17025:2005 (Section 4) are written in a language relevant to Testing Laboratories operations and meet the principles of ISO 9001:2008 and are aligned with its pertinent requirements.

The present certificate is valid only if associated to the annexed schedule, and can be suspended or withdrawn at any time in the event of non fulfilment as ascertained by ACCREDIA.

The in force status of the accreditation may be checked in the WEB site (www.accredia.it) or on direct request to appointed Department.

Data di 1^a emissione
1st issue date
2002-10-16Data di modifica
Modification date
2014-10-22Data di scadenza
Expiring date
2018-10-17
Il Direttore Generale
The General Director
(Dr. Filippo Trifiletti)
Il Direttore di Dipartimento
Department Director
(ad Interim Dr. Filippo Trifiletti)
Il Presidente
The President
(Cav. del Lav. Federico Grazioli)



AISICO S.R.L. S.P. 27 del Cavaliere Loc. Salone Km 2,500 67064 Pereto AQ	Numero di accreditamento: 0424 Sede A
	Revisione: 15 Data: 31/07/2015
	Scheda 1 di 3 PA487AR15.pdf

ELENCO PROVE ACCREDITATE - CATEGORIA: 0

Acciai al carbonio e bassoalegati
Carbon and low alloy steel

Denominazione della prova / Campi di prova

Metodo di prova

Composizione chimica del materiale.
Chemical composition of the material.
Aluminum 0-0.075%
Carbon 0-1.1%
Chromium 0-2.25%
Manganese 0-2.0%
Phosphorous 0-0.085%
Silicon 0-1.15%
Sulfur 0-0.055%
Copper 0-0.045%

ASTM E415-08

Alluminio e leghe di alluminio
Aluminium and aluminium alloy

Denominazione della prova / Campi di prova

Metodo di prova

Composizione chimica del materiale.
Chemical composition of the material.
(Si%, Mn%, Cu%, Cr%, Al%, Fe%, Mg%, Ni%, Zn%, Ti%)

UNI EN 14726:2005

Dispositivi di sicurezza - barriere, attenuatori d'urto, terminali, transizioni e TMA.
Safety Device - barriers, crash cushion, final elements, transitions and TMA

Denominazione della prova / Campi di prova

Metodo di prova

Indici biomeccanici; Deformazioni del dispositivo; (OIV= m/s ORA =g)
Determination of biomechanical indices; deformation of the device (OIV = m/S ORA= g)

AASHTO - Manual for Assessing Safety Hardware:
2009 + NCHRP Report 350:1993

Materiali metallici
Metallic Materials

Denominazione della prova / Campi di prova

Metodo di prova

Prova di durezza Rockwell.
Rockwell hardness test. (HR)

UNI EN ISO 6508-1:2006

Trazione a temperatura ambiente: Carico unitario di snervamento, Carico unitario a rottura, Allungamento percentuale.
Tensile test at room temperature: yield stress, Ultimate Tensile stress, percentage extension.

UNI EN ISO 6892-1:2009

Sistemi di ritenuta stradali per motociclisti
Motorcyclist road restraint systems

Denominazione della prova / Campi di prova

Metodo di prova

Determinazione degli indici biomeccanici; Larghezza operativa del dispositivo (HIC= m2/sec4)
Determination of biomechanical indices; Working width of the device

UNE 135900-1:2008 + UNE 135900-2:2008

Indici biomeccanici; Larghezza operativa del dispositivo (HIC= m2/sec4)
Determination of biomechanical indices; Working width of the device

UNI CEN/TS 1317-8:2012

Sistemi di ritenuta stradali: attenuatori d'urto
Safety Device - Crash cushion

Denominazione della prova / Campi di prova

Metodo di prova

Severità dell'urto (Indici ASI - THIV - VCDI); Deformazione dell'attenuatore d'urto; Proiezione e distribuzione dei frammenti del veicolo di prova e dell'attenuatore d'urto, angolo d'urto, velocità impatto, Traiettoria del veicolo; Tempo di volo. Temperatura ambientale.
Severity of impact (indices ASI - THIV - VCDI); Deformation of the crash cushion; Projecting and distribution of the fragments of the test vehicle and crash cushion, impact angle, impact speed, trajectory of the vehicle; Flight Time, ambient temperature.

UNI EN 1317-1:2010 + UNI EN 1317-3:2010

Sistemi di ritenuta stradali: barriere di sicurezza
Safety Device: barriers

Denominazione della prova / Campi di prova

Metodo di prova



AISICO S.R.L. S.P. 27 del Cavaliere Loc. Salone Km 2,500 67064 Pereto AQ	Numero di accreditamento: 0424 Sede A
	Revisione: 15 Data: 31/07/2015
	Scheda 2 di 3 PA487AR15.pdf

Severità dell'urto (Indici ASI - THIV - VCDI); Deformazione della Barriera; Deflessione dinamica; Larghezza operativa; intrusione del veicolo; angolo d'urto, Velocità di impatto e di uscita; Spazio libero in metri; Traiettoria del veicolo; Tempo di volo. Severity of impact (indices ASI - THIV - VCDI); Deformation of the barrier; Dynamic deflection; Working width; impact angle, vehicle intrusion; impact velocity and exit speed Free space in meters; Trajectory of the vehicle; Flight Time.	UNI EN 1317-1:2010 + UNI EN 1317-2:2010
Sistemi di ritenuta stradali: terminali di barriere di sicurezza Road restraint systems - Part 7: Performance classes, impact test acceptance criteria and test methods for terminals of safety barriers	
<i>Denominazione della prova / Campi di prova</i>	<i>Metodo di prova</i>
Comportamento del dispositivo; Comportamento del veicolo di prova; Indici di severità (ASI - THIV- PHD- VCDI). Behavior of the device; Behavior of the test vehicle; Severity Indices (ASI - THIV- PHD- VCDI).	UNI EN 1317-1:2010 + DIN EN 1317-7:2012
Sistemi di ritenuta stradali: terminali e transizioni Safety Device - terminal elements and transition of the safety barriers	
<i>Denominazione della prova / Campi di prova</i>	<i>Metodo di prova</i>
Comportamento del dispositivo; Comportamento del veicolo di prova; Indici di severità (ASI - THIV- PHD- VCDI). Behavior of the device; Behavior of the test vehicle; Severity Indices (ASI - THIV- PHD- VCDI).	UNI EN 1317-1:2010 + UNI ENV 1317-4:2003
Strutture di sostegno per attrezzature stradali Support structures for roads equipments	
<i>Denominazione della prova / Campi di prova</i>	<i>Metodo di prova</i>
Comportamento del veicolo; Indice di severità ASI; Velocità d'impatto teorico della testa THIV; Velocità d'impatto; Velocità d'uscita; Angolo d'impatto. Behavior of the vehicle; Severity Index ASI; Theoretical impact velocity of the head THIV; Impact velocity; Output rate; Angle of impact.	UNI EN 1317-1:2010 + UNI EN 12767:2008
Vehicle security barrier systems	
<i>Denominazione della prova / Campi di prova</i>	<i>Metodo di prova</i>
Prestazioni dei VBS (vehicle security barriers) e loro classificazione. Performance of VBS (vehicle security barriers) and their classification (kg-km/h 1500/16 - 30000/80).	PAS 68:2013 + Pas 69:2013, ASTM F2656/F256M-15, ISO-IWA14-1:2014, ISO-IWA14-2:2014



AISICO S.R.L. S.P. 27 del Cavaliere Loc. Salone Km 2,500 67064 Pereto AQ	Numero di accreditamento: 0424 Sede A
	Revisione: 15 Data: 31/07/2015
	Scheda 3 di 3 PA487AR15.pdf

ELENCO PROVE ACCREDITATE - CATEGORIA: III

Dispositivi per la riduzione del rumore da traffico ferroviario Devices for the reduction of noise from rail traffic

Denominazione della prova / Campi di prova	Metodo di prova
Dispositivi per la riduzione del rumore da traffico ferroviario Devices for the reduction of noise from rail traffic	prEN16272-6:2012 + prEN16272-3-2:2012 + UNI CEN/TS16272-5:2014

Dispositivi per la riduzione del rumore da traffico stradale

Denominazione della prova / Campi di prova	Metodo di prova
Prestazione acustica: Valori in situ della riflessione sonora e dell'isolamento acustico per via aerea (100 Hz - 5 KHz).	UNI CEN/TS 1793-5:2006
Prestazione acustica: Valori in situ della diffrazione sonora (100 Hz - 5 KHz).	UNI CEN/TS 1793-4:2004

Dispositivi per la riduzione del rumore da traffico stradale Devices for the reduction of noise from road traffic

Denominazione della prova / Campi di prova	Metodo di prova
Prestazione acustica: Valori in situ della riflessione sonora e dell'isolamento acustico per via aerea (100 Hz - 5 kHz). termination of the acoustic performance. Acoustic performance - in situ values of sound reflection and airborne sound insulation (100 Hz - 5 kHz).	UNI CEN/TS 1793-5:2006
Prestazione acustica: Valori in situ della diffrazione sonora (100 Hz - 5 kHz). Determination of the acoustic performance. Acoustic performance - in situ values of sound diffraction (100 Hz - 5 kHz).	UNI CEN/TS 1793-4:2004

Legenda

DM: Decreto Ministeriale
 GU: Gazzetta Ufficiale
 UNI: Ente Nazionale Italiano di Unificazione
 EN: Norme Europee elaborate dal Comité Européen de Normalisation
 ISO: International Organization for Standardization

ACCREDIA
 Il Direttore del Dipartimento
 (Dr.ssa Silvia Tramontin)

Firmato digitalmente da
SILVIA TRAMONTIN

ALLEGATO G - ANNEX G
Test materials – Crash Test # 1410-1411-1412

<i>ELEMENT</i>	<i>TEST REFERENCE</i>	TEST		
		<i>Tensile strength</i>	<i>Rockwell Hardness</i>	<i>Chemical analysis</i>
<i>Two wave beam</i> Fascia 2 onde	Prova n° 1410-1411-1412 A	x		x
<i>C post</i> Palo C	Prova n° 1410-1411-1412 B	x		x
<i>Post reinforcment</i> Rinforzo palo	Prova n° 1410-1411-1412 C		x	
<i>M16 holed plate</i> Piastrina M16	Prova n° 1410-1411-1412 D		x	
<i>M16x27 screw</i> Vite M16x27	Prova n° 1410-1411-1412 E		x	
<i>M16x45 screw</i> Vite M16x45	Prova n° 1410-1411-1412 F		x	
<i>M16 nut</i> Dado M16	Prova n° 1410-1411-1412 G		x	
<i>M16 washer</i> Rondella M16	Prova n° 1410-1411-1412 H		x	

All the sizes are in mm

Duplicate
 this original is property of Saferoad RRS GmbH, Bongard-und-Lind-Strasse 1, 56414 Werolte / Germany

TEST REPORT n° PM0830/16 - Pag.1/1

Tests n°: AT 2429-2430-2431
V.A. n°: 256

of: 2016, 29th August
of: 2016, 12th July

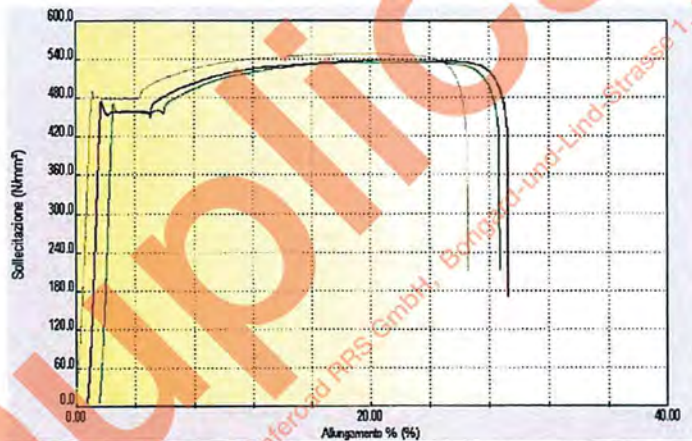
INFORMATION PROVIDED BY THE CLIENT

Client	Saferoad RRS GmbH	Crash test:	1410-1411-1412
Origin of samples:	CENTRO PROVE AISICO	Laboratory of test:	LABORATORIO AISICO
Receipt date of samples:	2016, 12 th July	Element:	Fascia due onde - Two wave beam

LABORATORY DATA

N°	Sample code	SAMPLE				TENSILE DATA				
		Parallel length L _c (mm)	Thickness a ₀ (mm)	Width b ₀ (mm)	Cross-section S ₀ (mm ²)	R _{p0.2} (N/mm ²)	R _{el} (N/mm ²)	R _{eH} (N/mm ²)	R _m (N/mm ²)	A ₁₁ (%)
1	1410-1411-1412 A n°1	140	2.53	19.98	50.55	479.68	476.42	490.44	547.34	28.56
2	1410-1411-1412 A n°2	142	2.51	19.92	50.00	462.68	448.28	474.31	537.68	29.13
3	1410-1411-1412 A n°3	140	2.54	19.99	50.77	459.11	452.74	469.94	534.42	29.08
Average						467.16	459.15	478.23	539.81	28.92

¹Original gauge length: 80 mm for thick. < 3.0 mm, 5.65√S₀ for thick. ≥ 3.0 mm



- NOTE
- REFERENCE STANDARD: UNI EN ISO 6892-1:2009
 - SAMPLES PROVIDED BY THE CLIENT TESTING
 - TEST REPORT ONLY REFERS TO THE PROVEN SAMPLE TEST
 - TEST REPORT CAN NOT BE REPRODUCED IN PART WITHOUT PERMISSION OF THE TEST CENTER AISICO
 - CALCULATION OF UNCERTAINTY: LEVEL OF CONFIDENCE = 95%, COVER FACTOR = 2
 - N.D. = DATA NOT DECLARED

TEST TEMPERATURE BETWEEN 10 °C and 35 °C

SI	NO
X	

2016, 29th August

Head of test
Eng. Alessandro Ippoliti

Head of laboratory
Eng. Stefano Frascchetti

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TEST REPORT n° CH0658/16 - Pag.1/1

 Test n°: 658
 V. A. n°: 256

 del: 2016-08-29
 del: 2016-07-12

INFORMATION PROVIDED BY THE CLIENT

Client Saferoad RRS GmbH
Origin of samples CENTRO PROVE AISICO - Pereto (AQ)
Receipt date of samples 12 July 2016
Type of material Steel
Laboratory test LABORATORIO AISICO - Pereto (AQ)
More data ELEMENTS OF ROAD SAFETY BARRIERS

LABORATORY DATA

Notes	Mark pointed out	CHEMICAL ANALYSIS					
		C%	Si%	Mn%	P%	S%	
Sample A	Fascia due onde Two wave beam	Results	0.169	0.027	1.375	0.011	0.006
	Crash test 1410-1411-1412		Cu%	Cr%	Al%	Fe%	
Results		0.022	0.024	0.045	98.228		

TEST METHOD: OPTICAL EMISSION SPECTROSCOPY - ASTM E415-14

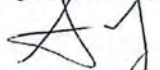
TEST TEMPERATURE BETWEEN 10 °C and 35 °C

YES	NO
X	

NOTES: - SAMPLES PROVIDED BY THE CLIENT TESTING
 - THE SAMPLE OF TEST ONLY REFERS TO THE PROVEN SAMPLE TEST
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 - CALCULATION OF UNCERTAINTY: LEVEL OF CONFIDENCE = 95%, COVER FACTOR = 2
 - N.D. = DATA NOT DECLARED

Rome, 29 August 2016

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 Eng. Alessandro Ippoliti



 Head of laboratory
 Eng. Stefano Frascchetti



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TEST REPORT n° PM0831/16 - Pag.1/1

Tests n°: AT 2432-2433-2434
V.A. n°: 256

of: 2016, 29th August
of: 2016, 12th July

INFORMATION PROVIDED BY THE CLIENT

Client	Saferoad RRS GmbH	Crash test:	1410-1411-1412
Origin of samples:	CENTRO PROVE AISICO	Laboratory of test:	LABORATORIO AISICO
Receipt date of samples:	2016, 12 th July	Element:	Palo C - C post

LABORATORY DATA

N°	Sample code	SAMPLE				TENSILE DATA				
		Parallel length L _c (mm)	Thickness a ₀ (mm)	Width b ₀ (mm)	Cross-section S ₀ (mm ²)	R _{p0.2} (N/mm ²)	R _{eL} (N/mm ²)	R _{eH} (N/mm ²)	R _m (N/mm ²)	A ⁽¹⁾ (%)
1	1410-1411-1412 B n°1	140	4.01	20.06	80.44	441.27	421.06	447.95	506.79	33.43
2	1410-1411-1412 B n°2	139	4.02	20.09	80.76	435.01	425.51	444.87	501.85	28.46
3	1410-1411-1412 B n°3	141	3.96	20.10	80.79	438.48	418.88	445.36	499.35	32.63
Average						438.25	421.82	446.06	502.66	31.51

⁽¹⁾Original gauge length: 80 mm for thick. < 3.0 mm, 5.65√S₀ for thick. ≥ 3.0 mm



- NOTE:
- REFERENCE STANDARD: UNI EN ISO 6892-1:2009
 - SAMPLES PROVIDED BY THE CLIENT TESTING
 - TEST REPORT ONLY REFERS TO THE PROVEN SAMPLE TEST
 - TEST REPORT CAN NOT BE REPRODUCED IN PART WITHOUT PERMISSION OF THE TEST CENTER AISICO
 - CALCULATION OF UNCERTAINTY: LEVEL OF CONFIDENCE = 95%. COVER FACTOR = 2
 - N.D. = DATA NOT DECLARED

TEST TEMPERATURE BETWEEN 10 °C and 35 °C

SI	NO
X	

2016, 29th August

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Head of laboratory
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LAB N° 0424

TEST REPORT n° CH0659/16 - Pag.1/1

Test n°: 659

del: 2016-08-29

V. A. n°: 256

del: 2016-07-12

INFORMATION PROVIDED BY THE CLIENT

Client Saferoad RRS GmbH
Origin of samples CENTRO PROVE AISICO - Pereto (AQ)
Receipt date of samples 12 July 2016
Type of material Steel
Laboratory test LABORATORIO AISICO - Pereto (AQ)
More data ELEMENTS OF ROAD SAFETY BARRIERS

LABORATORY DATA

Notes	Mark pointed out	CHEMICAL ANALYSIS					
		C%	Si%	Mn%	P%	S%	
Sample B	Palo C C post	Results	0.141	0.022	1.383	0.013	0.006
	Crash test 1410-1411-1412	Cu%					
		Results	0.020	0.024	0.041	98.248	

TEST METHOD: OPTICAL EMISSION SPECTROSCOPY - ASTM E415-14

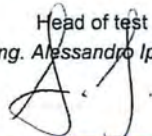
TEST TEMPERATURE BETWEEN 10 °C and 35 °C

YES	NO
X	

NOTES: - SAMPLES PROVIDED BY THE CLIENT TESTING
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 - CALCULATION OF UNCERTAINTY: LEVEL OF CONFIDENCE = 95%, COVER FACTOR = 2
 - N.D. = DATA NOT DECLARED

Rome, 29 August 2016

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LAB N° 0426

TEST REPORT n° HD1651/16 - Pag.1/1

Test n°: 1651

of: 2016-08-23

V. A. n°: 256

of: 2016-07-12

INFORMATION PROVIDED BY THE CLIENT

Client Saferoad RRS GmbH
Origin of samples CENTRO PROVE AISICO - Pereto (AQ)
Receipt date of samples 12 July 2016
Type of material Steel
Laboratory test LABORATORIO AISICO - Pereto (AQ)
More data ELEMENTS OF ROAD SAFETY BARRIERS

LABORATORY DATA

Notes	Mark pointed out	Test n.	HARDNESS ROCKWELL		
			HR Scala: B	Equivalence UTS [N/mm ²]	Equivalence Brinell scale
Sample C	Post reinforcement Rinforzo palo	1	79.2	492.0	≅ 144
		2	84.2	541.0	≅ 160
		3	65.7	399.9	≅ 115
	Crash test 1410-1411-1412	4	64.5	391.9	≅ 108
		5	78.0	480.0	≅ 140
		6	78.8	488.0	≅ 143
		MEDIA	75.1	465.5	135

TEST METHOD: UNI EN ISO 6508-1:2006
TEST TEMPERATURE BETWEEN 10 °C and 35 °C

YES	NO
X	

NOTES:
 - SAMPLES PROVIDED BY THE CLIENT TESTING
 - THE SAMPLE OF TEST ONLY REFERS TO THE PROVEN SAMPLE TEST
 - THE TEST REPORT CAN NOT BE REPRODUCED IN PART WITHOUT PERMISSION OF THE TEST CENTER AISICO
 - CALCULATION OF UNCERTAINTY: LEVEL OF CONFIDENCE = 95%, COVER FACTOR = 2
 - N.D. = DATA NOT DECLARED

Rome, 23 August 2016

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LAB N° 0424

TEST REPORT n° HD1652/16 - Pag.1/1

Test n°: 1652

of: 2016-08-23

V. A. n°: 256

of: 2016-07-12

INFORMATION PROVIDED BY THE CLIENT

Client Saferoad RRS GmbH
Origin of samples CENTRO PROVE AISICO - Pereto (AQ)
Receipt date of samples 12 July 2016
Type of material Steel
Laboratory test LABORATORIO AISICO - Pereto (AQ)
More data ELEMENTS OF ROAD SAFETY BARRIERS

LABORATORY DATA

Notes	Mark pointed out	Test n.	HARDNESS ROCKWELL		
			HR Scala: B	Equivalence UTS [N/mm ²]	Equivalence Brinell scale
Sample D	Piastrina M16 M16 holed plate	1	78.2	482.0	≅ 141
		2	63.7	386.5	≅ 106
		3	74.0	461.0	≅ 131
	Crash test 1410-1411-1412	4	74.8	463.4	≅ 133
		5	64.4	391.2	≅ 108
		6	65.0	395.3	≅ 109
		MEDIA	70.0	429.9	121

TEST METHOD: UNI EN ISO 6508-1:2006
TEST TEMPERATURE BETWEEN 10 °C and 35 °C

YES

NO

X

NOTES:
 - SAMPLES PROVIDED BY THE CLIENT TESTING
 - THE SAMPLE OF TEST ONLY REFERS TO THE PROVEN SAMPLE TEST
 - THE TEST REPORT CAN NOT BE REPRODUCED IN PART WITHOUT PERMISSION OF THE TEST CENTER AISICO
 - CALCULATION OF UNCERTAINTY: LEVEL OF CONFIDENCE = 95%, COVER FACTOR = 2
 - N.D. = DATA NOT DECLARED

Rome, 23 August 2016

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TEST REPORT n° HD1653/16 - Pag.1/1

 Test n°: 1653 of: 2016-08-23
 V. A. n°: 256 of: 2016-07-12

INFORMATION PROVIDED BY THE CLIENT

Client Saferoad RRS GmbH
Origin of samples CENTRO PROVE AISICO - Pereto (AQ)
Receipt date of samples 12 July 2016
Type of material Steel
Laboratory test LABORATORIO AISICO - Pereto (AQ)
More data ELEMENTS OF ROAD SAFETY BARRIERS

LABORATORY DATA

Notes	Mark pointed out	Test n.	HARDNESS ROCKWELL		
			HR Scala: 8	Equivalence UTS [N/mm ²]	Equivalence Brinell scale
Sample E	Vite M16x27 M16x27 screw Crash test 1410-1411-1412	1	84.5	544.0	≅ 161
		2	81.3	512.7	≅ 150
		3	86.0	559.0	≅ 166
		4	86.1	560.9	≅ 166
		5	87.2	580.0	≅ 171
		6	86.5	568.5	≅ 168
		MEDIA	85.3	554.2	164

TEST METHOD: UNI EN ISO 6508-1:2006

TEST TEMPERATURE BETWEEN 10 °C and 35 °C

YES	NO
X	

NOTES:

- SAMPLES PROVIDED BY THE CLIENT TESTING
- THE SAMPLE OF TEST ONLY REFERS TO THE PROVEN SAMPLE TEST
- THE TEST REPORT CAN NOT BE REPRODUCED IN PART WITHOUT PERMISSION OF THE TEST CENTER AISICO
- CALCULATION OF UNCERTAINTY: LEVEL OF CONFIDENCE = 95%. COVER FACTOR = 2
- N.D. = DATA NOT DECLARED

Rome, 23 August 2016

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TEST REPORT n° HD1654/16 - Pag.1/1

 Test n°: 1654
 V. A. n°: 256

 of: 2016-08-23
 of: 2016-07-12

INFORMATION PROVIDED BY THE CLIENT

Client	Saferoad RRS GmbH
Origin of samples	CENTRO PROVE AISICO - Pereto (AQ)
Receipt date of samples	12 July 2016
Type of material	Steel
Laboratory test	LABORATORIO AISICO - Pereto (AQ)
More data	ELEMENTS OF ROAD SAFETY BARRIERS

LABORATORY DATA

Notes	Mark pointed out	Test n.	HARDNESS ROCKWELL		
			HR Scala: C	Equivalence UTS [N/mm ²]	Equivalence Brinell scale
Sample F	Vite M16x45 M16x45 screw Crash test 1410-1411-1412	1	21.1	807.1	≅ 231
		2	25.0	873.0	≅ 253
		3	18.3	752.0	≅ 217
		4	22.0	822.3	≅ 236
		5	26.2	907.4	≅ 260
		6	25.0	873.0	≅ 253
		MEDIA	22.9	839.1	242

TEST METHOD: UNI EN ISO 6508-1:2006
TEST TEMPERATURE BETWEEN 10 °C and 35 °C

YES	NO
X	

NOTES:

- SAMPLES PROVIDED BY THE CLIENT TESTING
- THE SAMPLE OF TEST ONLY REFERS TO THE PROVEN SAMPLE TEST
- THE TEST REPORT CAN NOT BE REPRODUCED IN PART WITHOUT PERMISSION OF THE TEST CENTER AISICO
- CALCULATION OF UNCERTAINTY: LEVEL OF CONFIDENCE = 95%, COVER FACTOR = 2
- N.D. = DATA NOT DECLARED

Rome, 23 August 2016

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TEST REPORT n° HD1655/16 - Pag.1/1

 Test n°: 1655
V. A. n°: 256

 of: 2016-08-23
of: 2016-07-12

INFORMATION PROVIDED BY THE CLIENT

Client: Saferoad RRS GmbH
Origin of samples: CENTRO PROVE AISICO - Pereto (AQ)
Receipt date of samples: 12 July 2016
Type of material: Steel
Laboratory test: LABORATORIO AISICO - Pereto (AQ)
More data: ELEMENTS OF ROAD SAFETY BARRIERS

LABORATORY DATA

Notes	Mark pointed out	Test n.	HARDNESS ROCKWELL		
			HR Scala: C	Equivalence UTS [N/mm ²]	Equivalence Brinell scale
Sample G	Dado M16 M16 nut	1	11.3	659.0	≅ 186
		2	12.2	667.9	≅ 190
		3	13.1	674.6	≅ 194
		4	12.8	670.8	≅ 192
	Crash test 1410-1411-1412	5	11.7	662.0	≅ 188
		6	16.7	728.0	≅ 210
		MEDIA	13.0	677.1	193

TEST METHOD: UNI EN ISO 6508-1:2006
TEST TEMPERATURE BETWEEN 10 °C and 35 °C

YES	NO
X	

NOTES:

- SAMPLES PROVIDED BY THE CLIENT TESTING
- THE SAMPLE OF TEST ONLY REFERS TO THE PROVEN SAMPLE TEST
- THE TEST REPORT CAN NOT BE REPRODUCED IN PART WITHOUT PERMISSION OF THE TEST CENTER AISICO
- CALCULATION OF UNCERTAINTY: LEVEL OF CONFIDENCE = 95%, COVER FACTOR = 2
- N.D. = DATA NOT DECLARED

Rome, 23 August 2016

 Head of test
Eng. Alessandro Ippoliti

 Head of laboratory
Eng. Stefano Frascchetti

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TEST REPORT n° HD1656/16 - Pag.1/1

 Test n°: 1656 of: 2016-08-23
 V. A. n°: 256 of: 2016-07-12

INFORMATION PROVIDED BY THE CLIENT

Client	Saferoad RRS GmbH
Origin of samples	CENTRO PROVE AISICO - Pereto (AQ)
Receipt date of samples	12 July 2016
Type of material	Steel
Laboratory test	LABORATORIO AISICO - Pereto (AQ)
More data	ELEMENTS OF ROAD SAFETY BARRIERS

LABORATORY DATA

Notes	Mark pointed out	Test n.	HARDNESS ROCKWELL		
			HR Scala: B	Equivalence UTS [N/mm ²]	Equivalence Brinell scale
Sample H	Rondella M16 M16 washer	1	92.4	661.0	≅ 194
		2	93.1	668.9	≅ 198
		3	76.6	468.8	≅ 137
	Crash test 1410-1411-1412	4	77.1	471.0	≅ 138
		5	79.8	498.0	≅ 146
		6	70.4	425.0	≅ 122
		MEDIA	81.6	532.1	156

TEST METHOD: UNI EN ISO 6508-1:2006
TEST TEMPERATURE BETWEEN 10 °C and 35 °C

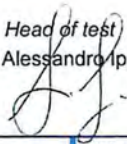
YES	NO
X	

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