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Evaluation of Equine Protective Boots

Test Report ID: R2011-115
Description: Evaluation of Equine Protective Boots
Standard: Modified CSA Z617
Client: Majyke Equine Equipe (Michael Sirjani)
Date: December 19, 2011

Test Conducted by: Michael Wonnacott

Evaluation of Equine Protective Boots

Date: December 19, 2011
Location: Biokinetics
Client: Majyke Equine Equipe (Michael Sirjani)
References: Biokinetics Proposal P11-182

Test Method and Equipment

Test Equipment

Biokinetics' twin wire drop tower was used to conduct the impacts. There are no test standards for horse protective boots, so the equipment and test procedures have been adapted from the Canadian Standards Associations (CSA) Z617 standard for Personal Protective Equipment for Blunt Trauma. The thrown edge threat from CSA Z617 was used to impact the samples as this was viewed to be the more realistic threat of the two specified in the CSA standard. The mass of the impactor is 1.465 kg. The surrogate used was the lower leg/upper arm/forearm anvil. A Kistler force transducer (model 9061A) is located under the anvil to measure the impact force. Velocity is measured using a custom single beam light gate.

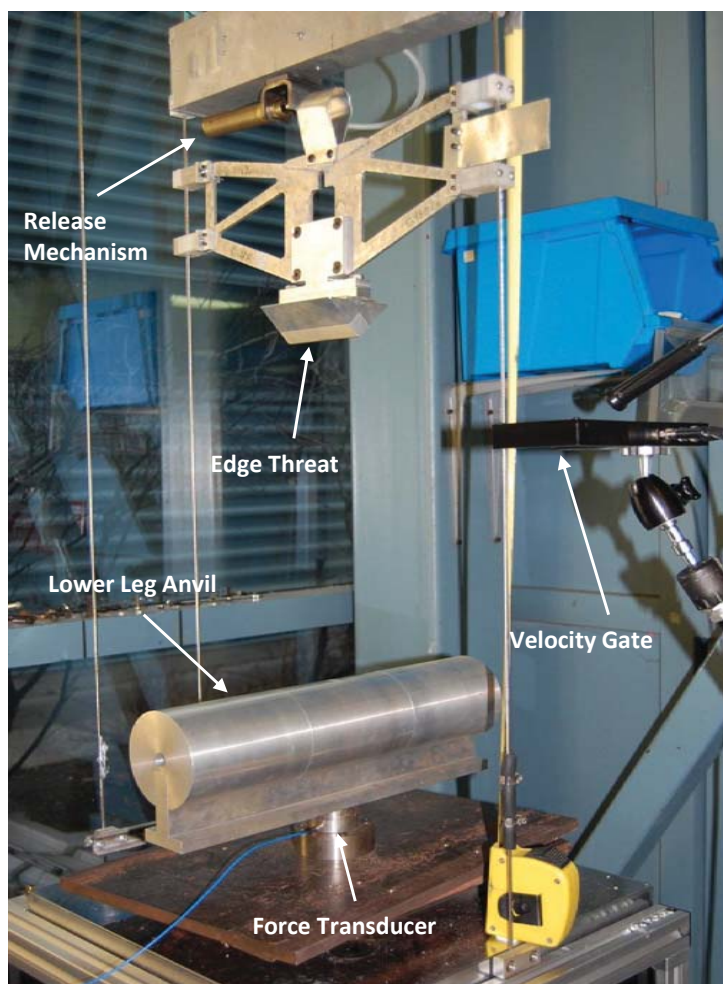


Figure 1: CSA Z617 lower leg test set-up

Test Methods

Two samples of each of the three boot models were supplied. All samples were marked with an identification letter. One sample from each model was used for the 6 J tests with the second being used for the 9 J tests. Two tests were conducted on each sample at the respective impact energy. The impact location was along the central spine of the boot, avoiding any feature which raised the boot out of contact with the anvil. The two impact sites were a minimum of 30 mm from any edge and 50 mm from the other impact location. The impact locations were marked and labeled on the samples. Tape was used to secure the boots to the anvil. The 6 J and 9 J impact energies corresponded to drop heights of .47 m and .69 m respectively.



Figure 2: Roma boot on anvil

Data Acquisition and Processing

The measurement from the force transducer is conditioned with a Kistler 5010 amplifier and the output is recorded using a National Instruments data acquisition board sampling at 10 kHz. A single beam light gate is used to measure velocity. The velocity gate triggers the data acquisition system which samples for 100 ms following a 10% pre-trigger. Post processing of the data is performed by custom Labview data collection software. Data collection meets the specifications of SAE J211 CFC600 as specified in CSA Z617.

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Test Results

Model	Sample ID	Energy	Target Velocity (m/s)	Trial	Test Velocity (m/s)	Peak Force (N)	File
Majyke	A	6 J	2.86	1	2.81	3017	a1
				2	2.78	3409	a2
				<i>Average</i>		3213	
	B	9 J	3.51	1	3.51	5417	b1
				2	3.54	5790	b2
				<i>Average</i>		5604	
Roma	C	6 J	2.86	1	2.87	5302	c1
				2	2.9	5127	c2
				<i>Average</i>		5215	
	D	9 J	3.51	1	3.55	7719	d1
				2	3.52	7539	d2
				<i>Average</i>		7629	
Eskadron	E	6 J	2.86	1	2.76	5193	e1
				2	2.83	4671	e2
				<i>Average</i>		4932	
	F	9 J	3.51	1	3.4	6403	f1
				2	3.55	6391	f2
				<i>Average</i>		6397	

Model	Energy	Spread
Majyke	6J	196
	9J	187
Roma	6J	88
	9J	90
Eskadron	6J	261
	9J	6

Average Peak Impact Force - 6J and 9J Impacts CSA Z617 Edge Impactor

