

REPORT

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2004-04-15
REV.1

Reference
F408038C

Crash test according to ISO-7176-19 and ISO-10542

Assignment

Crash testing of wheelchair and locking device according to ISO-7176-19 and ISO-10542.

Test object

Wheelchair	Invacare Dragon
Serial number	
Class	B
Locking system	Unwin Gemini 3G
Dummy	Hybrid III dummy, mass 76.5 kg

Date of arrival

The test objects arrived at SP on 15 April 2004. The test objects have been selected by the client without SP's assistance. The test results showed in this report refer only to the tested objects.

Date of testing

The test was performed on 15 April, 2004.

Measuring

The deceleration was measured by two accelerometers mounted on the trolley. The test was filmed with a high-velocity camera (1000 frames a second). The measurement uncertainty when determining the deceleration was better than $\pm 5\%$ ($g = 9.81 \text{ m/s}^2$).

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2 (4)**Accuracy of measurement**

Accuracy of measurement	EXACTNESS (+/-)	INSTABILITY FACTOR
Sensor	0,50%	0,50%
Transvers.	0,80%	0,46%
Temperature	0,15%	0,09%
Power Supply	0,40%	0,23%
Gain	0,10%	0,06%
A/D- conversion	0,02%	0,01%
Zero leeway	0,10%	0,06%
	SQUARESUM	0,53%
	ROOTSQUARESUM	0,73%
	KONF. 95% (k=2)	1,46%

The reported expanded uncertainty of measurement is stated as the combined standard uncertainty of measurement multiplied by the coverage factor $k = 2$, which for a normal distribution corresponds to a coverage probability of approximately 95 %.

Temperature

Dummy	19.9
Test room	20.1

Results**Test:**

Velocity: 49.7km/h

Retardation distance: 635 mm

Retardation pulse according to acceleration curves in appendix.

Locking device Unwin Gemini G3 with wheelchair model Invacare Dragon and Hybrid III crash test dummy.

The locking device withstands the test with small deformations. The seat back of the wheelchair was bent back 5° at the rebound of the dummy. The movement of the dummy is approved according to specification in ISO-7176-19 and ISO 10542. No other fractures or apparent deformations were noted on the wheelchair or anchorage points.

The system fulfils the requirements according to ISO-10542 and ISO-7176-19.

Retardation distance:

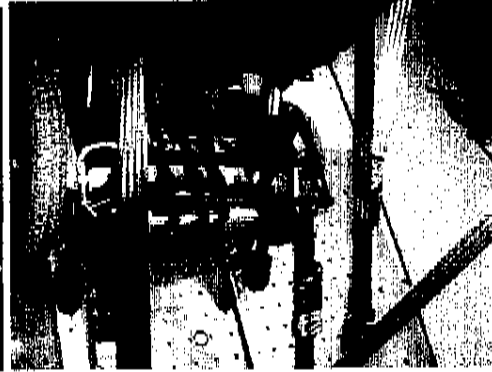
Movements of dummy	Result
Knee	180 mm
Head frontal	330 mm
Head rear	180 mm
Wheelchairpoint	200 mm
Xknee/Xwc > 1.1	1.1
Buckle opening force	26.7 N

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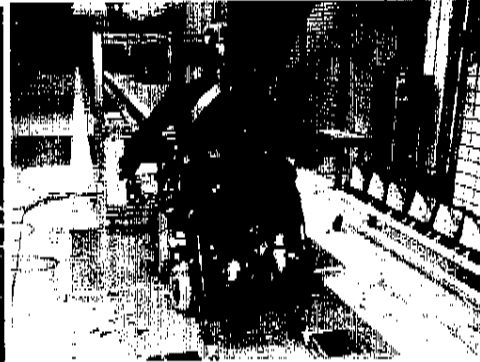
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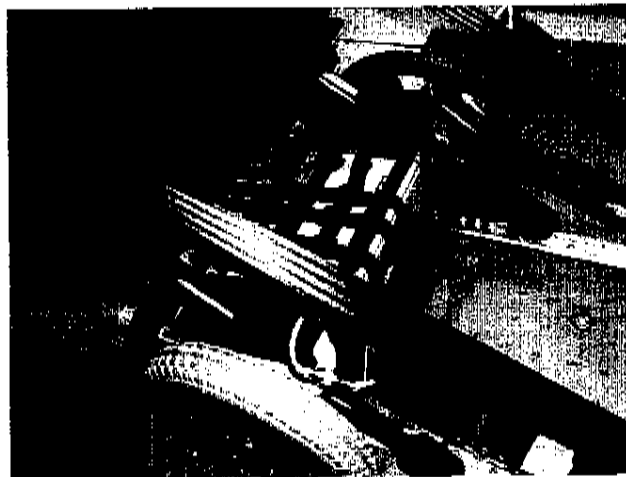
Before test



Before test



After test



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After test

Note

The following changes have been made in this Rev.1, on 17 May 2004:
Change of product name from Topan to Dragon.

SP Swedish National Testing and Research Institute
Building Technology and Mechanics - Transport and Vehicle Technology


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Appendices

Appendix Retardation pulses