

MOTOCAP AND THE SCIENCE OF A MOTORCYCLE CRASH



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For every rider fatality injured

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15



There are 30 seriously injured



There are 74 with lesser injuries





High failure rates in crashes

Motorcycle jackets	30%
Motorcycle pants	28%
Motorcycle gloves	26%



Low usage rates in hot conditions

CRASH TYPES

Three main crash types



Low-side Casey Stoner

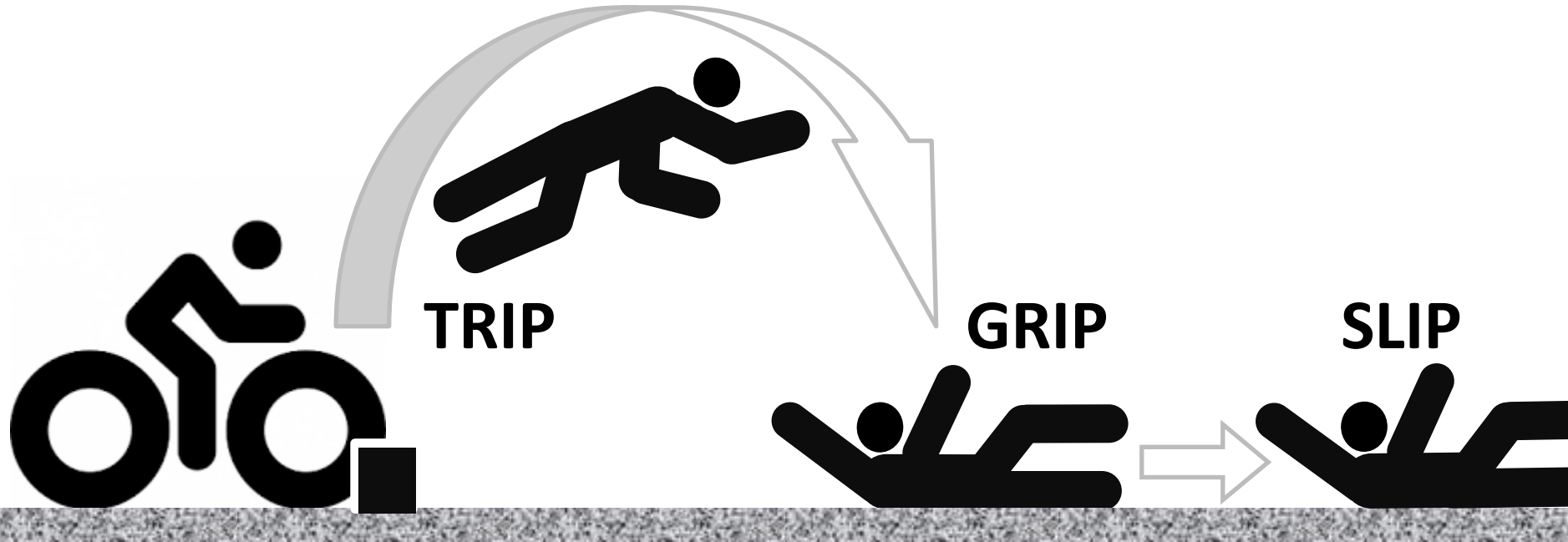


High-side Alvaro Bautista



Collision Crash test manikin

IMPACT WITH A SURFACE



- High speed – low grip and high abrasion
- Low speed – high grip and low abrasion



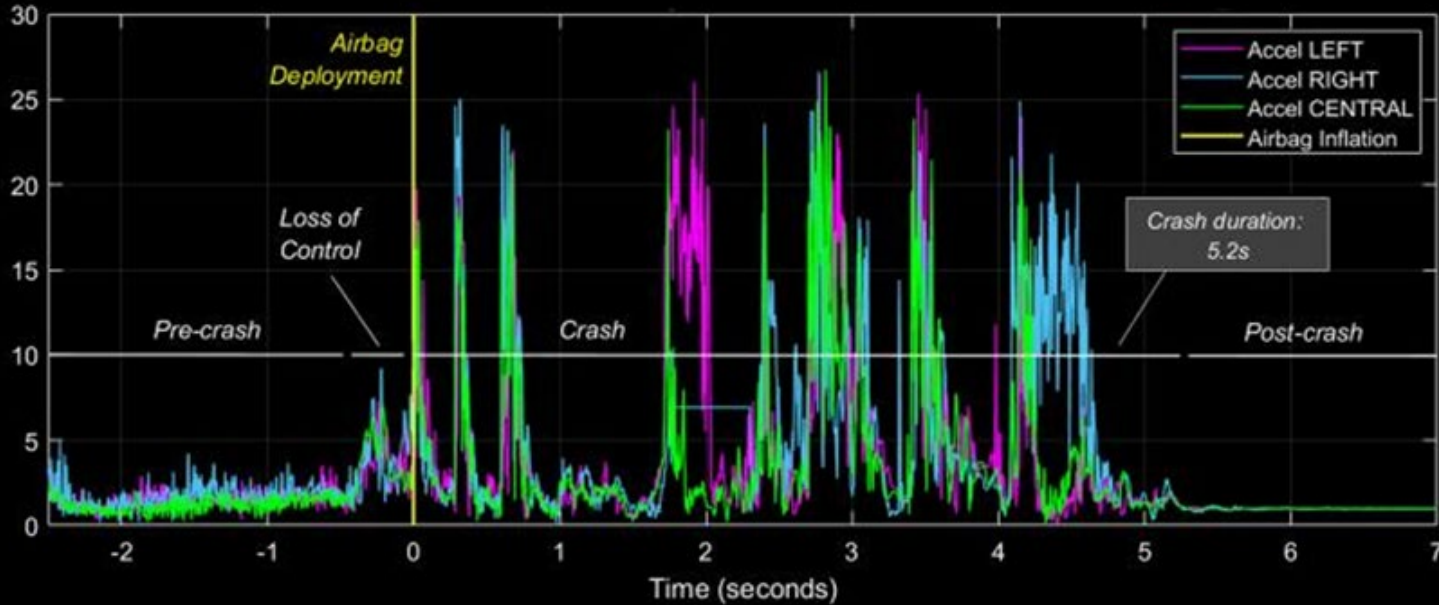
INJURY RISK



- High impact risk
- High abrasion risk
- Medium abrasion risk
- Low abrasion risk

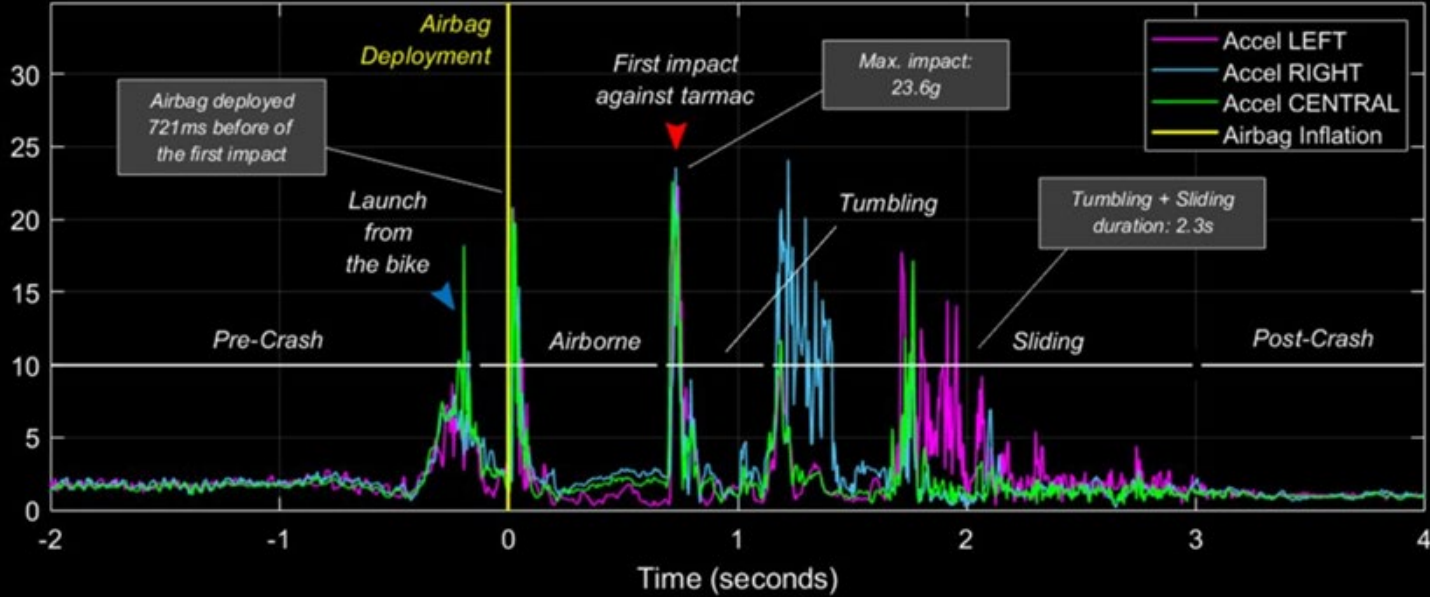
Defined by EN13595-1:2002

Jorge Martin Crash: MotoGP Portimao – FP3: Turn 7 Saturday, 17th April 2021



- 5.2 seconds crash duration
- approximately 80 meters sliding distance
- 180km/hr crash speed

Alex Marquez Crash: MotoGP Valencia – QUALIFYING: Turn 11 Saturday, 14th November 2020

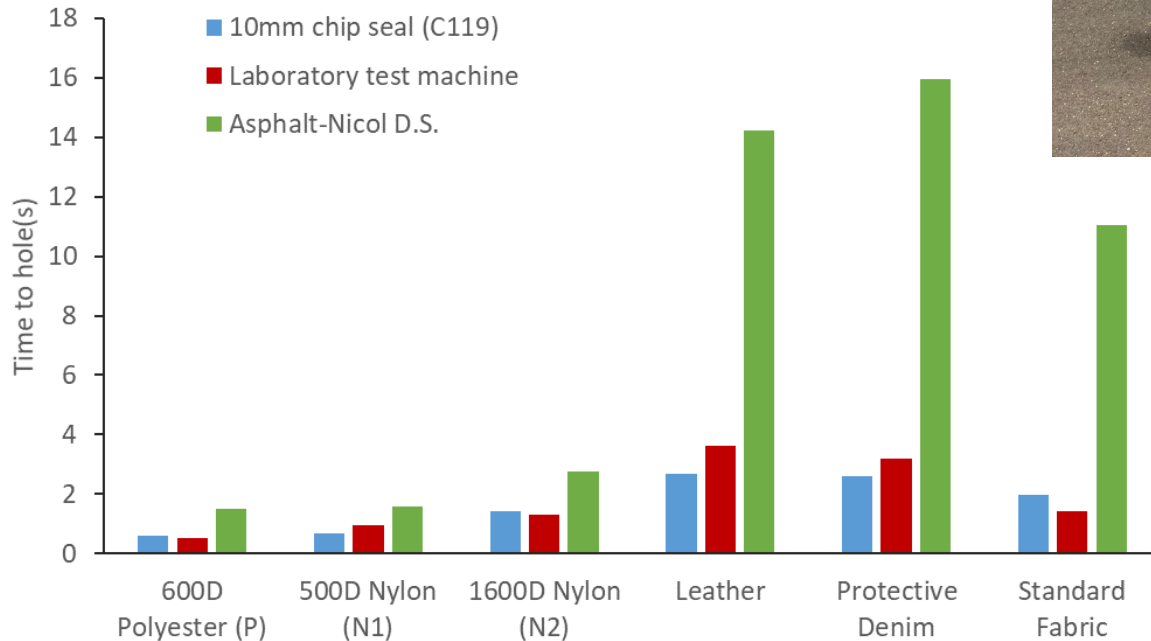


- 2.3 seconds slide duration
- approximately 25 meters sliding distance
- 100km/hr crash speed





CAMBRIDGE RESULTS



- Chip seal was similar to laboratory results
- Asphalt was 4.5 times less abrasive than chip seal



EUROPEAN STANDARD

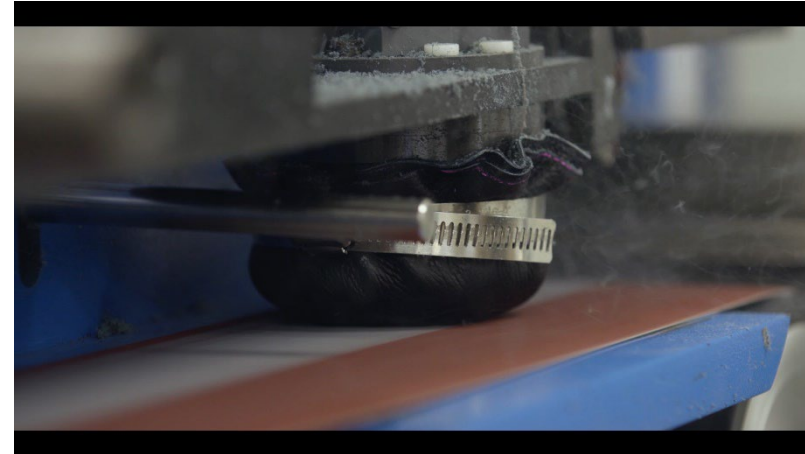
EN17092

Darmstadt Method – EN17092

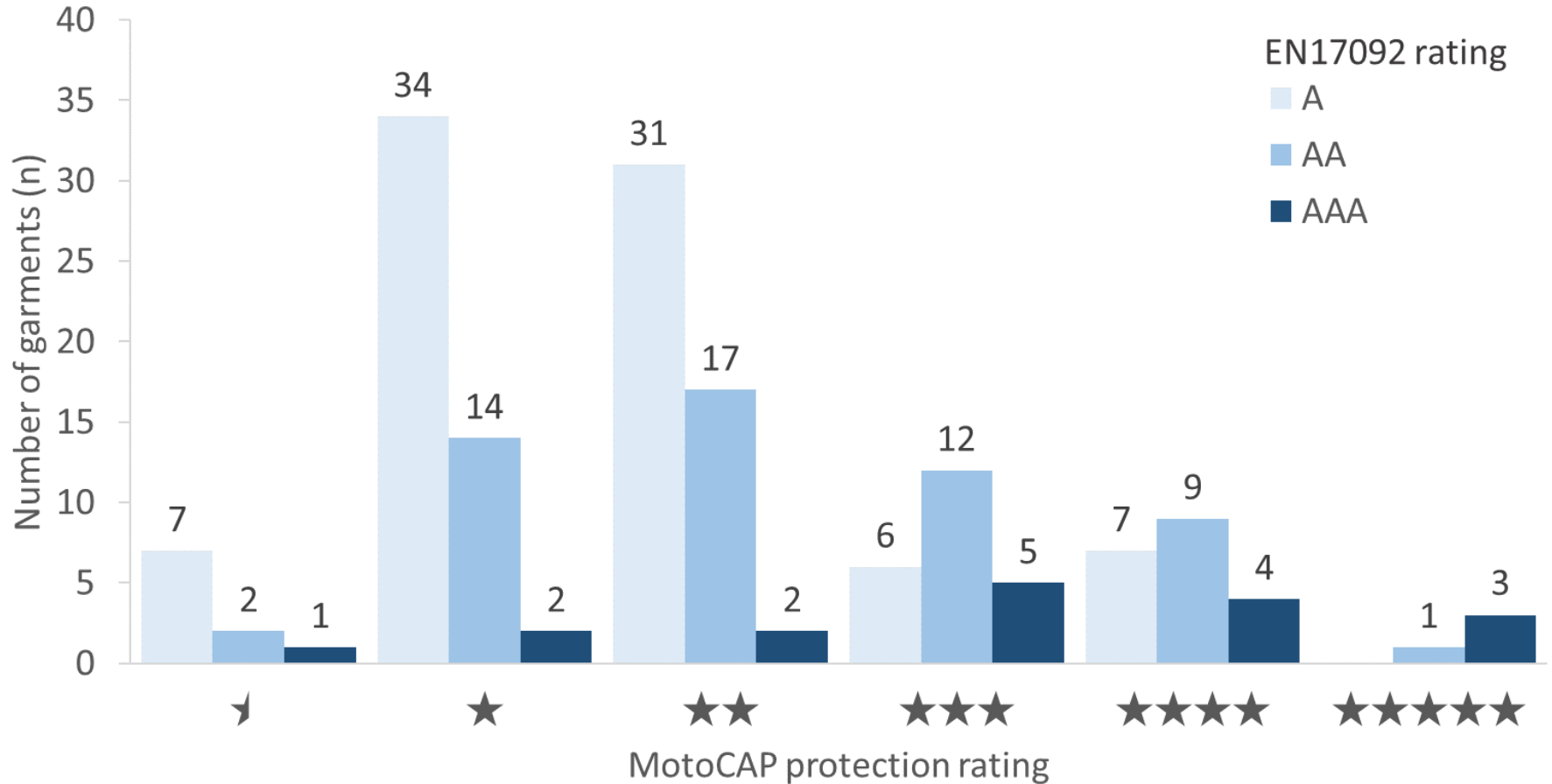
- Pass or hole
- Rotation speed rated (RPM)
- Concrete abrasion surface replicates asphalt

Cambridge Method – EN13595-2

- Time to hole
- Fixed abrasion speed
- 60 grit belt replicates chip seal
- 120 grit belt replicates asphalt



EN17092 VERSUS MotoCAP





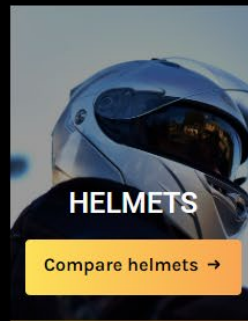
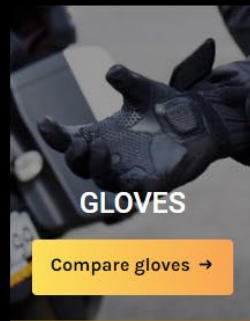
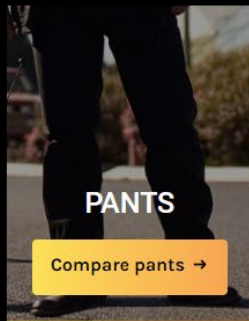
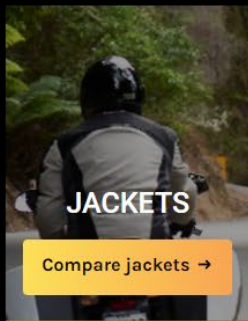
MOTOCAP SAFETY RATINGS

Choose the right gear for your ride



CHOOSE THE RIGHT GEAR FOR YOUR RIDE

Compare safety and comfort ratings



PROTECTION AND BREATHABILITY

MOTOCAP RATED JACKETS

SORT BY

HIGH SAFETY RATING



RJAYS

Calibre

\$\$

SAFETY



BREATHABILITY



Compare



ALPINESTARS

GP Plus R V2 Air Flow

\$\$

SAFETY



BREATHABILITY



Compare



IXON

Frantic

\$\$

SAFETY



BREATHABILITY



Compare

INDIVIDUAL RATINGS

RESURGENCE

WOMEN'S JEANS



MOTOCAP RATING

SAFETY



Abrasion Test



3.0

Impact Test



7.0

Burst Test

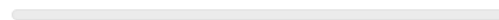


10.0

BREATHABILITY



Water Resistance (not applicable)



Thermal comfort



7.0

COMPARING 3 PRODUCTS



IXON
Fueller Air

MOTOCAP RATING

SAFETY ★★★★★

Abrasion Test 6.0

Impact Test 7.0

Burst Test 10.0

COMFORT ★★★★★

Thermal Comfort 4.0

Water Resistance (not applicable)

PRODUCT DETAILS

PRICE A\$400.00 RRP

PRIMARY MATERIAL LEATHER



MOTODRY
Airmax

MOTOCAP RATING

SAFETY ★★★☆☆

Abrasion Test 5.0

Impact Test 5.0

Burst Test 10.0

COMFORT ★★★★★

Thermal Comfort 6.0

Water Resistance 9.0

PRODUCT DETAILS

PRICE A\$250.00 RRP

PRIMARY MATERIAL TEXTILE



BMW
Tourshell

MOTOCAP RATING

SAFETY ★★★☆☆

Abrasion Test 1.0

Impact Test 9.0

Burst Test 10.0

COMFORT ★☆☆☆☆

Thermal Comfort 2.0

Water Resistance 5.0

PRODUCT DETAILS

PRICE A\$850.00 RRP

PRIMARY MATERIAL TEXTILE

INDIVIDUAL RATINGS



This MotoCAP safety rating applies to:

Brand: Richa
Model: Street Touring Gore-tex
Type: Glove - Leather
Date purchased: 4 August 2020
Sizes tested: XL and 2XL
Test glove gender: Male
Style: Tourer
RRP: \$299.00

Test Results Summary:

	Rating	Score
MotoCAP Protection Rating	★★★★	4.5
Abrasion	10/10	6.48
Seam strength	8/10	11.4
Impact	5/10	8.3
Water resistance	1/10	39.1

These gloves are fitted with impact protection for the knuckles only. There is no impact protection for the palms. There is no provision for ventilation to allow airflow movement through the glove.

Gloves - Crash Impact Risk Zones

This diagram is a pictorial representation of the crash impact risk Zones.



Impact protection

Knuckles	<input checked="" type="checkbox"/>
Palm	<input type="checkbox"/>

Zone 1
 High risk of impact
 High risk of abrasion

Zone 2
 High risk of abrasion

Zone 3
 Medium risk of abrasion



Abrasion Resistance

The gloves were tested for abrasion resistance in accordance with MotoCAP test protocols. The diagram below is a visual indication of the likely abrasion performance of the materials in each Zone calculated from the data in the table below. The colour coding is based on the worst performing material in each zone.



Abrasion Resistance Performance

Abrasion rating 10/10
 Abrasion score 6.48

Determining Criteria	Area	Good	Acceptable	Marginal	Poor
High abrasion risk	Zone 1 & 2	> 4.0	2.7 - 4.0	1.2 - 2.6	< 1.2
Medium abrasion risk	Zone 3	2.5	1.8 - 2.5	0.8 - 1.7	< 0.8

Individual Abrasion Resistance Results: - The table below shows the test results for time to abrade through all layers of the materials. Calculated for each sample by Zone, type and area coverage of each material as a proportion of that Zone. Abrasion times are capped at a maximum of 10.00s.

Abrasion time for each test (seconds)

Zones	Coverage (%)	Sample 1	Sample 2	Sample 3	Sample 4	Sample 5	Sample 6	Average
Zone 1	Material A	55%	10.00	10.00	10.00	10.00	10.00	10.00
	Material B	45%	8.17	3.51	2.44	7.28	3.57	5.81
Zone 2	Material C	15%	4.94	5.18	10.00	6.17	7.89	8.85
	Material B	85%	8.17	3.51	2.44	7.28	3.57	5.81
Zone 3	Material C	10%	4.94	5.18	10.00	6.17	7.89	8.85
	Material B	90%	8.17	3.51	2.44	7.28	3.57	5.81

Details of materials used in glove - derived from manufacturer provided information

Material A Hard-shell armour over leather shell, water-resistant layer and fabric inner liner
 Material B Leather shell, water-resistant layer and fabric inner liner
 Material C Leather and foam patch over leather shell, water-resistant layer and fabric inner liner



TAKE AWAY MESSAGE

- Not all road surfaces are created equally.
- Crashes in an urban environment have different injury risks to those in a rural setting.
- The European standard EN17092 should not be relied on for buying clothing for riding in New Zealand.
- Recommend MotoCAP to riders buying clothing.



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Thank you