



C R A N F I E L D
I M P A C T C E N T R E

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CIC IS A LEADER IN THE FIELD OF IMPACT AND SAFETY OF STRUCTURES



CRANFIELD
IMPACT CENTRE



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CRANFIELD IMPACT CENTRE [CIC]

An internationally respected facility with expertise in vehicle crash-worthiness and occupant simulation.

Our state of the art testing laboratories feature a range of test rigs for both static and dynamic testing of structures. Tests can be carried out for certification or research purposes.

CIC is a FIA approved test house for F1 crash tests. CIC is also an approved consultancy for the Vehicle Certification Agency (VCA) for both EC Regulation R66 coach rollover Type Approval and R80.

Cranfield Impact Centre is proud to have achieved several ISO and OHSAS Standardisation awards.



ISO 9001:2015 Quality Management Systems



ISO 14001:2004 Environmental Management

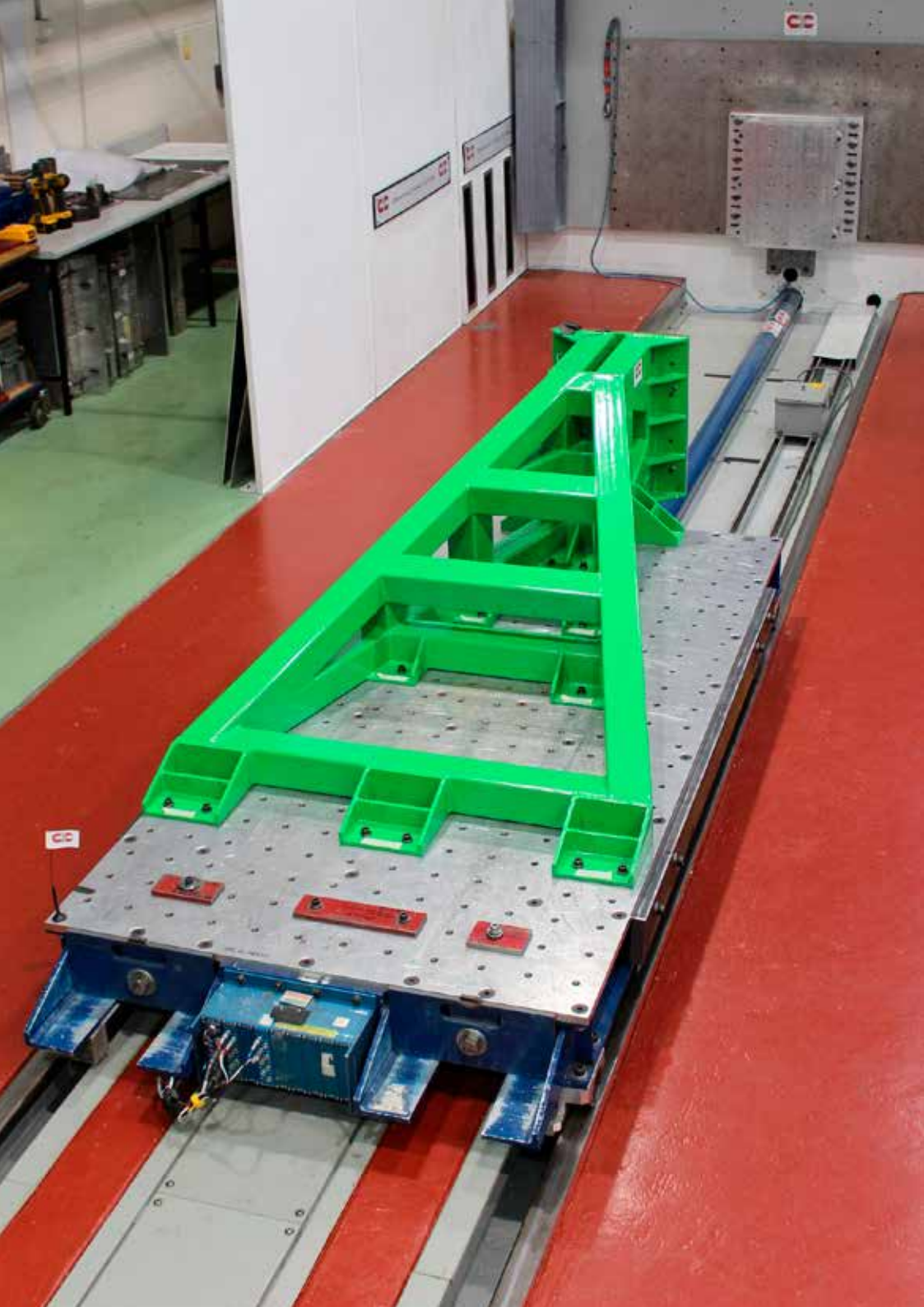


OHSAS 18001:2007 Health and Safety Management

ISO 9001: 2015 - THE QUALITY POLICY

- Cranfield Impact Centre is committed to providing a service according to client's expectations in terms of quality and reliability and will ensure that adequate resources are available to sustain our planned business objectives.





SLED IMPACT TEST FACILITY: RIGID WALL

This facility enables the dynamic testing of large sub-structures and components. It can be used to simulate crash pulses and perform rigid wall impacts.

The Sled Rig is VCA approved for EC regulation R-80, BS EN 1789 and FIA approved for F1, LMP, CN and F3 monocoque tests.

Full data acquisition is available together with the option of video and high-speed colour digital photography.

SPECIFICATIONS:

- Mass range: from 450 to 2,000kg
- Velocity range: 5 – 17m/s
- Maximum energy: 125kJ
- Sled length: 25m

TYPICAL APPLICATIONS INCLUDE:

- Rail, road, military and motorsport vehicle structures and components
- Aircraft structures and components
- Seat structures and anchorages
- Engineering structures for the nuclear and offshore oil industries
- Ambulance interiors
- Wheelchairs

www.cranfieldimpactcentre.com/sled-impact-test-facility.html





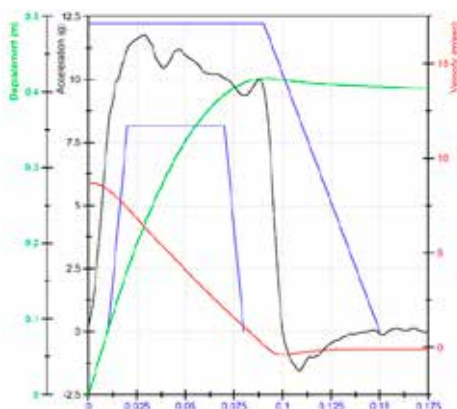
SLED IMPACT TEST FACILITY: DECELERATOR

The Decelerator facility allows the user to subject any components or dummies to pre-determined crash pulses.

The components are attached to the trolley and then propelled into a wire break system to control the rate of deceleration.

Pulses can be accurately programmed to meet legislative standards for aircraft, wheelchairs, child and adult seat requirements and ambulance components. In addition, pulses unique to the customer can be programmed with excellent repeatability.

Full data acquisition is available together with the option of video and high-speed colour digital photography.



BS EN1789 Pulse
Deceleration showing
conformity with corridor

www.cranfieldimpactcentre.com/sled-decelerator-testing.html





DROP TOWER LOW MASS

The 4-110kg Drop Tower

The key features include, the use of a bungee driven system to increase the velocity to 20m/s with a typical data capture rate of 20kHz. Items that have been tested on the drop tower include:

- Steering columns to FIA F1 testing standards
- Bearings
- Aircraft seat head rests
- Protective clothing materials
- Sports head protection
- Suspension system testing
- Damage assessment of carbon fibre specimens
- Seat belt release mechanism testing
- Suitcase material
- Automotive interiors
- Industrial head protection
- TV screens

High speed filming of tests is available with the capability to track the motion of the specimens.

IN SUMMARY THE RIG CAN OFFER:

Data capture rate:	3Ms/sec
Channels:	8 Channel Output
Impact mass range:	7-110kg
Impact velocity:	up to 20 m/s

www.cranfieldimpactcentre.com/low-mass-drop-tower.html





DROP TOWER HIGH MASS

The 50-300kg Drop Tower

CIC's 50-300kg Gravity Drop Tower Rig provides the capability to test for dynamic responses of sections and joints for both metallic and composite materials. It is particularly suited for companies who provide materials for roadside furniture.

The rig is ideal for roadside EN 1317 barrier development and certification, a compliance approach adopted by both the EU and the US Federal Highways Administration.

SPECIFICATIONS:

- Minimum carriage weight 50kg
- Maximum carriage weight 300kg
- Maximum carriage drop height 2.5m
(3.5m above ground)
- Maximum speed 8m/s

www.cranfieldimpactcentre.com/high-mass-drop-tower.html





600kN COMPRESSION RIG

CIC's rig has the capability to compress test specimens up to a force level of 600kN, with a high level of control.

The Testometric machine has a fixed lower 1m² platen, with 4 load cells providing accurate measurement of force. The upper crosshead with an identical 1m² platen, has the capability to move through 1.3m, with a 1.2m throat width. This aperture allows a diverse range of items to be mounted between the platens. The rig has been used to test a range of objects including:

- F1 carbon fibre side intrusion panels
- Aluminium honeycomb
- Gearbox and suspension struts
- Steel brackets and attachments for static test rigs
- Load cell calibration

The rig can also conduct the following types of test.

- Under-run Guard testing
- Side Intrusion testing
- Interior Vehicle component testing
- Spring Rate calibration

SPECIFICATIONS OF THE MACHINE:

Maximum load:	600kN
Platen size:	1m x 1m
Feed rate:	0.001 - 500 mm/min
Data capture rate:	12kHz

www.cranfieldimpactcentre.com/compression-rig.html





3-AXIS MOMENT OF INERTIA FACILITY

CIC's Unique Moment of Inertia Facilities

- The moments and product of inertias in three axis
- Principal inertias and their direction cosines
- Centre of gravity in three directions

This facility is key to the automotive and aerospace industries, where inertia properties have important effects on the dynamics of a vehicle, component or system.

SPECIFICATIONS:

- Mass range: from 1kg to 2500kg
- Dimension of test specimen: nominally 6500(L) x 2800(W)x 2000(H) mm max

TYPICAL APPLICATIONS INCLUDE:

- Road and racing vehicles, engines, gearboxes
- Aircraft components, air-dropped supplies, UAVs
- Helmets, NVG systems, wheels
- Sports equipment

www.cranfieldimpactcentre.com/moment-of-inertia.html





R66-02 COACH ROLLOVER RIG

15 tonnes Rollover Rig platform.

The rig consists of a tilting platform 0.8m above the ground and is used to perform full-scale bus rollover tests, which conform to the ECE regulation 66. It accommodates both whole vehicles and partial bay sections, as required by R66.

The tilting of the platform is operated using a crane, which ensures a well-controlled, smooth motion. The coach is then free to topple off the platform once its centre of gravity over-balances the pivot position.

SPECIFICATIONS:

- Maximum vehicle wheelbase: 8m
- Maximum vehicle weight: 15 tonnes

www.cranfieldimpactcentre.com/r66-rollover-rig.html





STATIC TESTING

CIC can quasi-statically test a wide range of structures using a variety of rigs including:

ROLL HOOP TEST FACILITY

- Roll hoops can be tested on a purpose built rig conforming to FIA standards.
- Typical applications include F1, F3, LMP monocoques, and F1 Halos.

ADAPTIVE T-SLOT BED

- A 3x4m T-Slot bed with M16 T-slots on 200mm centres. Various mounting brackets can be attached as supplied by CIC or the customer.
- Tension and compression testing of components with displacement controlled actuators, capable of up to 50kN with a maximum of 500mm displacement.
- Various rates can be achieved, a typical feed rate being 1mm/sec.
- Load and deflection data can be measured and analysed per customer requirement.

www.cranfieldimpactcentre.com/static-testing.html





HIGH SPEED FILMING

CIC's high-speed camera facility includes three Photron Fastcam SA3 cameras.

The facility can cover multiple views such as overhead, 45 degree side and horizontal side. Infra-red high speed cameras are available. Exporting to multiple video formats is available.

SPECIFICATIONS:

- Frame capture rates from 1,000 fps up to 120,000 fps
- Flexible crash area positioning and alignment
- Monochrome or colour
- On board or off board mounting (high G rate 100G's in any axis)
- Fast test turnaround time
- Synchronisation of test data with video
- Motion tracking of dummies or structures

HIGH SPEED FILMING SERVICE

CIC are now offering a new high speed filming service and camera hire to any location within the UK. We supply the equipment and operator at the location of your choice.



CRANFIELD IMPACT CENTRE

1985 - 2019

1985 - The Cranfield Impact Centre evolved from the School of Automotive Studies and became a Ltd company in 1985.

ORIGINAL SLED



MOMENT OF INERTIA



1989

1993

1988

1990

PENDULUM IMPACT TEST RIG



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Directed by Dr M. Naeffgen MSc, PhD



CALSPAN SIDE IMPACT MODELLING



Door-occupant interaction.

In 2005 CIC moved to it's current location on the Cranfield Campus.

TRUCK CAB TESTING

A photograph showing a white truck cab mounted on a test rig. A blue crane arm is visible on the left side of the cab.


LMP REAR CRASH BOX

A photograph of a yellow LMP rear crash box, a large, angular metal component used for vehicle safety testing.

SLED FACILITY

A photograph of a sled facility, showing a yellow metal frame structure on a test track.

NEW FACILITY

A photograph of a new facility, showing a green metal frame structure on a test track.

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