

INSTALLATION & MAINTENANCE
INSTRUCTIONS

JJ Hooks[®]

Concrete Safety Barriers

from

AUSTRALIAN
ROAD BARRIERS

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Midland, Virginia, USA.

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Revision History

Revision	Amendments	Authorised
	Initial Release.	L.McKenna
April 2006	1. QLD Department of Main Roads approval letter added. 2. Miscellaneous minor corrections.	J.Govan
August 2006	1. SA Department of Transport, Energy and Infrastructure approval letter added. 2. Section 3.3 Estimated Deflections	J.Govan
July 2008	1. Major Revision. 2. Layout and Format Changes. 3. Information added regarding lifting and slinging, installation procedure and delineation requirements.	J.Govan
April 2009	1. Section 2.1 Site Conditions 2. Section 2.8 Delineation 3. Important Notes	J Govan

IMPORTANT NOTES

1. This manual must be read in conjunction with the Road Authorities guidelines, the site specific risk assessment and the traffic management plan for the worksite.
2. The road authorities in each state reserve the right to approve, reject or restrict the use of specific products within the road reserve. If you are unsure of the current status of any products within this manual please contact Australian Road Barriers on 1800 003 826.
3. J-J Hooks[®] Safety Barriers are not warranted to prevent any injury or loss due to any accident howsoever caused but may significantly reduce the consequences of such an accident.
4. It is the responsibility of the end user to assess the risks associated with the use of (or the failure to use) a safety barrier system tested in accordance with the NCHRP Report 350 test methods, and with the particular site and traffic conditions for which barriers are being considered.

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1. INTRODUCTION

The purpose of this document is to provide the end user of J-J Hooks® Safety Barrier Systems with installation and maintenance instructions to enable the barriers to be used safely and in accordance with the Australian and New Zealand Standard AS/NZS 3845:1999 – Road Safety Barrier Systems, and with the requirements of the local road authority.

The J-J Hooks® Concrete Safety Barrier from Australian Road Barriers Pty Ltd is a precast reinforced concrete barrier incorporating the patented J-J Hooks® connection system. The barriers when placed on site form a continuous chain of positively interlocked safety barriers capable of accommodating varying horizontal and vertical alignments.

The J-J Hooks® Safety Barrier system has been tested to Test Level 3 (TL-3) of the United States National Cooperative Highway Research Program (NCHRP) Report 350 and complies with the manufacturer's requirements of AS/NZS 3845.

It is recognised that in many instances where a safety barrier system is being considered, full TL-3 compliance may not be warranted. Examples include worksites where the traffic speeds are significantly less than 100 kph or where the possible angle of a crashing vehicle to the barrier is significantly less than 25°. For this reason the use of J-J Hooks® barriers in configurations other than those replicating the test configuration are not precluded by these instructions provided an appropriate hazard assessment has been performed by the end user.



2. DESIGN

Prior to the installation of any safety barrier system the end user should give consideration to a range of items, including, but not limited to:

- Site conditions, geometry and working width;
- The length of barrier to be installed and the safe termination of the system;
- Site access requirements, including emergency access;
- Any requirements for site screens, delineation, signage, etc.; and
- The results of any Risk Assessments undertaken for the project.

VicRoads and WorkSafe Victoria have jointly developed a checklist for temporary safety barriers, titled 'Roadside Worksite Traffic Management Checklist Temporary Safety Barriers' (refer Appendix B). While the checklist is primarily designed for use as an on-site inspection tool, Australian Road Barriers recommends that reference to the document is made at the design stage.

2.1 Site Conditions

J-J Hooks[®] Barriers must be placed on a flat, stable and compacted surface capable of being trafficked by road vehicles for short periods. The crossfall must not exceed 6%. Unstable surfaces such as deep mud, uncompacted sand or excessively wet surfaces are considered inappropriate. Ideally the surface should be paved and must be free of swales, ditches or other irregularities. The minimum width of stable ground behind the barriers must not be less than the expected deflection of the barrier system (refer 4.3 below).

Barriers must be placed at the same level as the travelled lane and must not be placed in front, behind or on top of kerbing.



2.2 Site Geometry

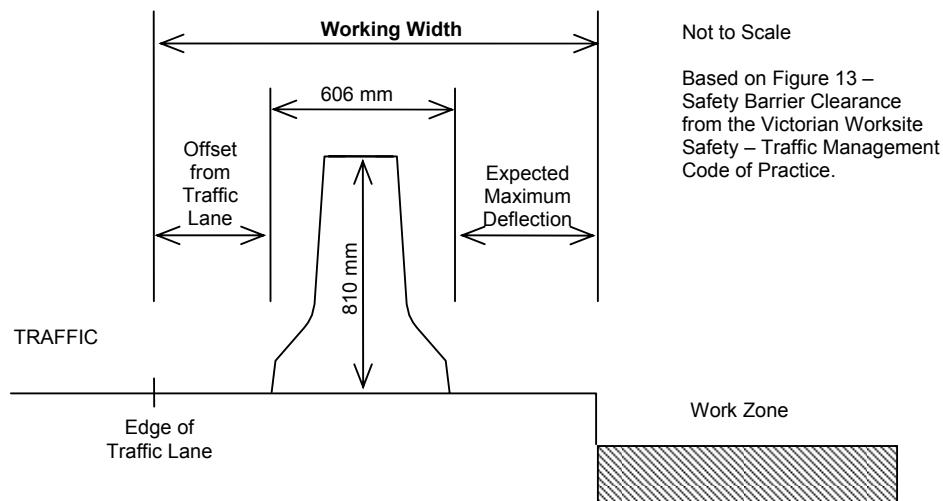
Barriers should (where practicable) be placed parallel to the travelled lane and as far away from the travelled lane as possible.

J-J Hooks[®] barriers are capable of a horizontal curvature of approx. 30 metres radius (left or right), and a vertical curvature of 30 metres radius in sag and 53 metres on a crest.

Barriers should be placed at the same level as the travelled lane and should not be placed in front, behind or on top of kerbing.

2.3 Working Width

The minimum working width required for the J-J Hooks[®] Barriers is the total of the width of the base of the barrier (being 606mm) plus the expected maximum deflection (refer 4.3 below) and the required offset from the edge of the traffic lane.



2.4 Atmospheric Conditions

J-J Hooks[®] barriers are suitable for use in all atmospheric conditions normally encountered on Australian roads without any reduction in effectiveness.

2.5 Emergency Access

Emergency access through J-J Hooks[®] barriers can be achieved by simply lifting the appropriate number of barriers vertically from the line and placing them to one side behind the remaining barriers. If the emergency opening is to be left open, appropriate measures must be taken to treat the exposed ends of the barriers.

2.6 Minimum Length

Given an appropriate hazard assessment, J-J Hooks® barriers can be installed in any length.

In order to replicate the TL-3 test conditions a minimum of 21.6 metres of barrier should be laid upstream and downstream of the point at which the test deflection is to be achieved.

Note: some of the State Road Authorities specify a minimum installation length which may be greater than that recommended above.

2.7 Terminating the Safety Barrier

The ends of safety barriers must be appropriately treated to avoid creating additional hazards.

A separate end treatment is not required if the line of the barriers can be flared so that the exposed end is located outside the clear zone for the particular site. The width of the clear zone shall be as recommended by the local road authority and is dependant on the traffic speed and (sometimes) on the traffic volume. The flare rate should be not steeper than 10 to 1.

Each type of end treatment has its own advantages and disadvantages and in some circumstances, new hazards may be created through their use. It is the responsibility of the user to assess the suitability of any end treatment to the site conditions. End treatments recommended by Australian Road Barriers are described in Appendix 1.

Users should be aware that on a two lane two way carriageway, the departure end of a barrier system may require end treatment as it may be considered an approach end to the opposing traffic.

2.8 Delineation

Consideration should be given to the visibility of the barrier system during all climatic conditions. The provision of any one, or combination, of the following may assist in the delineation of both the barrier system and the travelled path:

- Pavement markings including but not limited to edge/fog line markings and painted lateral shift arrows;
- Raised Reflective Pavement Markers (RRPMs);
- Corner cube reflectors; and
- Signage.

Australian Road Barriers is able to supply, upon request, either corner cube reflectors or temporary raised reflective markers which can be attached to the J-J Hooks® Barriers. The selection and spacing of the delineation should be in accordance with the Road Authorities guidelines, the site specific risk assessment and the traffic management plan for the worksite.

3. INSTALLATION

3.1 Resources Required

The following are the minimum resources required for the safe installation of J-J Hooks[®] barriers:

- 2 x 2.5 Tonne Swiftlift lifting clutches or equivalent for the 3.6m units
or
2 x 5.0 Tonne Swiftlift lifting clutches or equivalent for the 6.0m units;
- 1 x chain sling – ideally a 2 leg Grade 80, 10 mm chain sling;
- Tag/Control line (Optional at discretion of dogman giving consideration to site layout, lifting procedure, etc.);
- 1 x Crane, Crane Truck or plant with a certified lifting point capable of safely lifting the barrier at the required offset (standard 3.6 m barrier is 2.5 tonne, standard 6.0 m barrier is 4.3 tonne), capable of a vertical lift of 1 metre and with a clearance from hook to ground of at least 3.8 metres;
- Crane or plant operator;
- Dogman or crane chaser equipped with safety boots, gloves and any other PPE required at the particular site;
- Traffic control as appropriate to the site and as required by the local road authority.

3.2 Lifting Procedure

3.2.1. Pre Lift Inspection

Prior to lifting a J-J Hooks[®] Barrier the following items must be inspected:

- Lifting anchors for wear, corrosion, deformation or cracking.

The lifting anchors are located in the top surface of each barrier, ¼ of the length of the barrier in from each end.

Do not lift barriers using the swift lifts if wear or corrosion exceeds 10%, or if the swift lift is deformed or cracked.

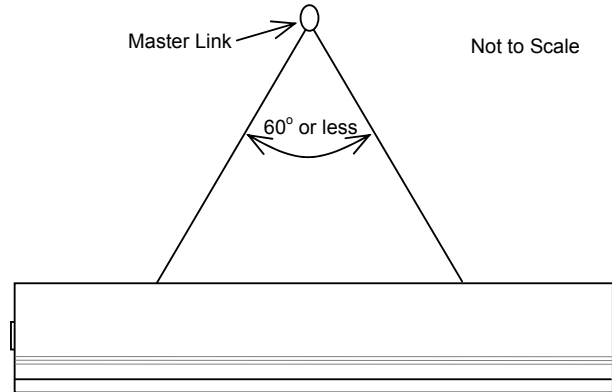
- The J-J Hooks[®] Barrier for structural damage, signs of impact or cracking (excluding shrinkage cracks).
Exercise due care when lifting barriers which show evidence of structural damage.

Note: J-J Hooks[®] Barriers contain SL718 reinforcing mesh in each face providing a fully reinforced concrete product. Shrinkage cracking is normal and will not reduce the serviceability of the barrier or increase the risks associated with lifting the barrier.

- For barriers currently connected the joint must be checked for debris and cleaned if necessary to minimise the risk of snagging during the lifting process.

3.2.2. Sling Angle

The lifting anchors used in all Australian produced J-J Hooks® barriers have been designed for a maximum sling angle of 60°.



The easiest way to ensure that the sling angle is not exceeded is to make sure that each leg of the chain sling is longer than the distance between the lifting anchors. Alternatively you can measure from the top of the barrier to the underside of the Master Link prior to lifting the barrier. The minimum heights should be 1600mm for a 3.6m barriers and 2.6m for the 6.0m barriers.

3.2.3. Lifting

It is essential that:

- The lifting clutches, chains, etc. are attached by suitably trained and experienced operators and/or personnel.
- Only one barrier is lifted at a time.
- The tabs of the lifting clutches are aligned with the chain sling.
- The lifting point of the crane is positioned over the centre of the barrier prior to commencing the lift.
- Barriers are lifted evenly and remain horizontal.
- Barriers are lifted and positioned as smoothly as possible to avoid barrier damage and impact loading the lifting apparatus and crane.
- If the connection snags, stop the lift and either remove the debris causing the snag or adjust the chain sling.

Tag/control lines are optional and should be used whenever the dogman determines that the risks associated with rotation of the barriers outweigh those introduced by the use of a line.

3.3 Installation Sequence

Working in the direction of the adjacent traffic, commence the installation of the barriers at the approach end of the system and work through to the departure end.

Barriers should be installed sequentially to ensure that the correct installation spacing is achieved. If a gap is required within a run of barriers the barriers should be installed through and past the gap and then removed. This will ensure that the barriers adjacent to the gap are appropriately spaced.

End treatments on the approach side of barriers should be installed as soon as practicable after the first barrier(s) are being placed.

Barriers should be removed in the reverse order.

3.4 Installation Procedure

- Ensure that appropriate temporary traffic management is in place for the barrier installation process. This may include, temporary road or lane closures, speed restrictions, etc.
- Set/mark out the barrier alignment;
- Attach lifting clutches to the lifting anchors cast in the top of the barriers;
- Attach a suitable chain sling to the lifting clutches and position the crane or lifting plant so that the hook or lifting point is directly above the centre of the barrier;
- Lift the first barrier into position;
- **Work from the non-trafficked side of the barrier(s) wherever possible;**
- Lift each subsequent barrier into position - each barrier must be lifted high enough so that the bottom of the engaging hook is above the top of the hook on the preceding barrier (approx 320 mm above the ground). The chaser or dogman should first guide the engaging hook into the adjacent rebate and then move to the other end of the barrier to ensure the desired alignment is achieved.
- Barriers should be placed at their maximum separation to replicate test conditions;
- Visually inspect each installation ensuring there are no objects or ground conditions that cause the barrier joints to be uneven or twisted.

3.5 Site Screens

Site screens can be attached to J-J Hooks® Safety Barriers. It is strongly recommended that any screen attached to the barriers have no horizontal compression members and that the screen be offset from the rear of the barrier to allow an errant vehicle to slide along the top of the barrier unencumbered.



It is the user's responsibility to assess any site screen for compliance with local regulations or road authority requirements.

The RTA of NSW does not allow the use of site screens unless they have been crash tested and assessed. The Site Screens offered by Australian Road Barriers have not yet been crash tested.

3.6 Maintenance

Under normal operating conditions J-J Hooks® barriers require no maintenance other than regular inspections for damage, removal of any litter or debris built up around the barriers and occasional cleaning if the visibility of the barriers is affected.

Where the barriers are placed for extended periods in locations where they are exposed to sea water, sea air or in areas where salt is used to control snow, the steel hooks should be regularly cleaned and inspected for signs of corrosion. Hooks showing signs of corrosion (other than surface discoloration) must be reported to Australian Road Barriers so that the barriers can be assessed and replaced as necessary.

3.7 Incident Reporting

Incidents that result in significant damage to individual barriers or to the barrier system as a whole must be reported to Australian Road Barriers for investigation and/or replacement. Significant damage would include concrete spalls larger than fist size, deformation of the hooks, any damage to the end treatments or cracking (excluding shrinkage cracks).

4. COMPLIANCE ISSUES

4.1 Crash Test

The J-J Hooks[®] barrier system has been tested to the requirements of the NCHRP Report 350 Test Level 3 (TL-3) test 3-11. In the test, a 2050 kg vehicle travelling at 101 kph was crashed into a straight line of J-J Hooks[®] barriers at an angle of 25° to the line of the barriers. The barriers deflected laterally 1.3 metres. The tested barrier system consisted of 16 interlocked barriers which were struck at barrier 7 (numbered 1 to 16, approach to departure). The tested barriers were free standing on a concrete pavement and were not attached to the pavement in any way. The barrier system contained and redirected the vehicle, the vehicle did not penetrate, under-ride, nor override the installation.

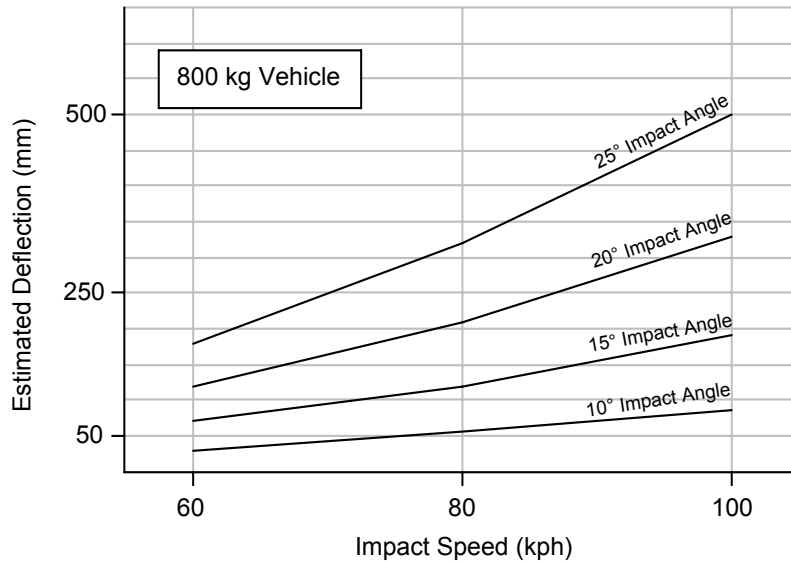


4.2 Australian Standards

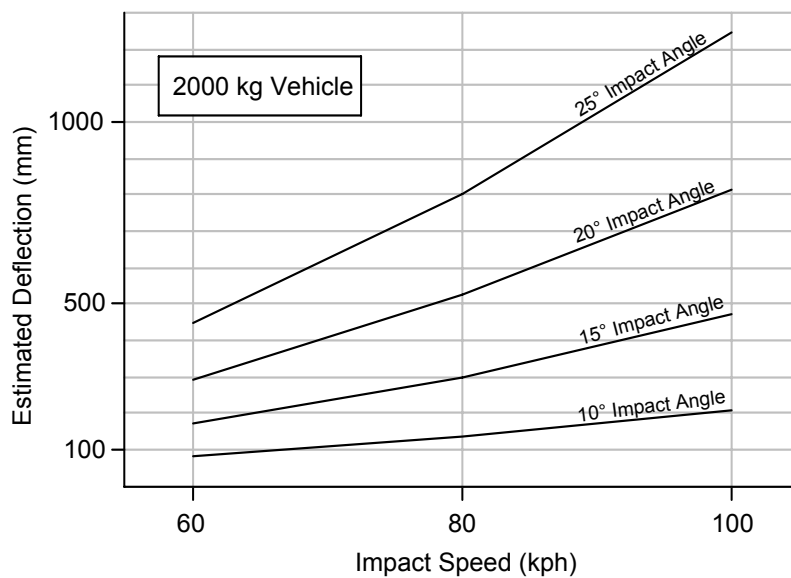
The J-J Hooks[®] barrier system complies with the manufacturers requirements of the Australian Standards AS 1742.3:2002 Manual of Uniform Traffic Control Devices, Part 3: Traffic Control Devices for Works on Roads, and AS/NZS 3845:1999 Road Safety Barrier Systems.

4.3 Estimated Deflections

In order to assist users in making an informed assessment of the hazards associated with the deflections of J-J Hooks[®] barrier systems, the estimated deflections in Graph 4.3.1 and Graph 4.3.2 are provided. **The values are estimates only. They are based on the test data and the calculated impact severity as defined in Clause 3.3.1 of the NCHRP Report 350. The values do not represent actual test deflections but are estimates of deflections for idealised conditions. The minimum length specified in Clause 2.6 is assumed in the calculations.**



Graph 4.3.1 – 800 kg Vehicle



Graph 4.3.2 – 2000 kg Vehicle

APPENDIX 1. OPTIONAL END TREATMENTS



Barrier Ends Flared Beyond the Clear Zone

Wherever possible, the ends of the barrier system should be flared to place the blunt end beyond the clear zone. The width of the clear zone should be as recommended by the local road authority. The flare rate should be a minimum of 10:1 or as recommended by the local road authority.

Proprietary End Treatments

Where it is not possible or practical to remove a blunt end beyond the clear zone, a proprietary end treatment such as the ABSORB 350 by Barrier Systems Inc. (pictured) should be installed. Any proprietary system used should be attached to the J-J Hooks[®] concrete barriers via an adaptor supplied by the manufacturer of the end treatment.



Proprietary end treatments fall essentially into two categories, gating and non-gating. A gating end treatment allows a vehicle impacting the nose or the side of the unit at an angle near the nose to pass through the device. Where a gating system is used, allowance must be made for a runoff area behind the device for any vehicle passing through the device. A non-gating or redirective device is capable of redirecting an errant vehicle along the line of the concrete barriers.

Gating systems tend to be cheaper to hire or purchase, and cheaper and easier to install. They are often water filled barriers that sit freely on the pavement with the concrete barriers.

Non gating redirective systems are more substantial and are often required to be pinned or bolted to the pavement or a footing. Some systems can be supplied with a precast concrete footing that requires excavation to install.

Any proprietary end treatment system used with the J-J Hooks[®] Barrier System must be specifically designed or adapted for use with AASHTO "F" shape barriers and must be installed and maintained strictly in accordance with the manufacturer's instructions.

APPENDIX 2. WORKSAFE / VICROADS SAFETY BARRIER CHECKLIST



ROADSIDE WORKSITE TRAFFIC MANAGEMENT CHECKLIST TEMPORARY SAFETY BARRIERS

Date		Time	
Employer			
Location of work site			
Activity being undertaken			
Health & Safety Representative		Worksite Manager	

Issue	Yes	No	N/A
PLANNING			
1. Has a worksite risk assessment been conducted? Note: Assessments completed by VicRoads contractors must be documented.			
2. Has the assessment been conducted in consultation with affected employees, subcontractors and OHS representatives? This is a requirement of the Occupational Health and Safety Act 2004, Part 4.			
3. Has a documented traffic management plan been prepared? This is a requirement of the Road Management Act. Ensure that the safety barrier details and location are indicated on the plan.			
4. Has an MOC been obtained from the Coordinating Road Authority? A written memorandum of consent is required to vary major traffic controls, such as speed limits.			
5. Has the TL (test level) of the units been correctly specified? Worksite speed: km/h Test level: TL - Recommended worksite speeds from AS 1742.3: TL-1 up to 50 km/h* (40 km/h recommended); TL-2 up to 70 km/h* (60 km/h recommended); TL-3 up to 100 km/h. *The code recommends that vehicles speeds 10 km/h less than this value are used.			
6. Are posted speed limits appropriate to the worksite risk assessment? Is the speed limit compatible with the barrier design deflection and available 'no-go' zone provided such that the barriers are unlikely to penetrate the actual work zone if struck by an errant vehicle?			
7. What no-go zone distance is specified by the manufacturer? metres Does the site layout allow for the required 'no go' zone distance and for works to be completed? The appropriate clearance behind the barriers needs to allow for dynamic barrier deflection if it is struck by a vehicle. The presence of heavy vehicle traffic and excavations behind the barriers should also be considered when this distance is specified.			
BARRIER UNITS			
8. Have the appropriate TL (test level) units been installed?			
9. Is a VicRoads approved design in use? Check VicRoads Accepted Safety Barrier Products in road design note 9-12A, or detailed in Bridge Technical Note 2005/008.			
10. Is only one type of barrier in use? If there is more than one type of barrier unit connected to each other, manufacturers' approval for joining different types must be obtained, and noted in technical literature.			
11. Does the barrier system comply with AS/NZS 3845? The barriers should be marked with an inscription "This road safety barrier complies with AS/NZS 3845". Alternatively, technical literature supplied with the barrier system shall confirm compliance. If the barriers have been retrofitted, they should be marked with the relevant VicRoads retrofit drawing number and date of retrofit.			
12. Are the units in good condition? Damaged barriers are to be removed from service. Maintenance and surveillance details are contained in AS/NZS 3845 section B2.5 and B2.6.			
13. Is the face of the barrier smooth with no protrusions? There should be no protrusions present on the barrier face (> 20 mm) that could snag on the body of a vehicle.			
14. Is there a system in place to store, transport, stack, handle and install barriers to prevent damage?			
BARRIER INSTALLATION AND REMOVAL			
15. Are manufacturer's technical details and assembly instructions available on site? Check that this information has been provided by the supplier of the barrier system, together with details of approved end treatments and interface devices as necessary for both restricted and non-restricted clearway beside the road.			
16. Has the barrier system been installed in accordance with the manufacturer's instructions? The technical literature and assembly instructions should be referred to as necessary. Items to check include the positioning of the barrier units (eg level requirements), that they are on a suitable ground surface and anchored if required. If required as part of the design, check water levels are to the required level.			

	Issue	Yes	No	N/A
17.	Is there a procedure / work sequence for the installation and removal of barriers? There is a procedure for the installation and removal of barriers which includes the use of experienced persons, traffic controls in place, and equipment to be used.			
18.	Are units interconnected in accordance with the manufacturer's requirements? Temporary barriers are designed to function as a system with all barrier units connected together. All units are to be positively connected with manufacturer approved connection devices (which may include pins or wire ropes). Barriers butted together without positive connection are not acceptable. Where crash attenuators are required to be connected to barriers for safe end termination the appropriate securing devices are to be in place.			
19.	Is the barrier correctly located with respect to traffic clearance? Where traffic is parallel to the barriers there should be a horizontal clearance (300mm minimum, but 1metre desirable). Speed limits may need to be reduced where there is no clearance between the edge line and the safety barrier. When the work area is below the road, consideration should be given to increasing the clearance between the safety barrier and the work area.			
20.	Are water filled barriers correctly filled with water? Check water levels are as specified by the manufacturer. Note that in the design of some barrier systems the first unit may not be required by the manufacturer to be filled with water.			
21.	Has the minimum length of safety barrier been installed? Concrete barriers – greater of 30 metres or minimum length specified by the safety barrier manufacturer. VicRoads retrofit barriers – 36 metres. Steel & plastic barriers - as specified in the manufacturer's installation manual and depends on speed and end treatment applied (anchored or freestanding).			
22.	Are the barriers correctly positioned with regard to kerb and channel? Where possible barriers should be located in front of the kerb and channel to avoid errant vehicles being 'launched' over the barrier. If it is not practicable to do this then the barriers must be located less than 500 mm behind the kerb OR between 3 metres and 4 metres behind the kerb, unless low speed limits and increased traffic clearances are in place to facilitate vehicle recovery before contact with kerb.			
23.	Are all barrier attachments authorised? No attachments (eg delineators, screens, signs, light posts, etc) should be attached to the barrier unless approved by the manufacturer / designer. They also need to comply with Section 61 of the WS-TM Code and AS/NZS 3845 Section 2.3 13.			
24.	Are appropriate end treatments in use? Have the ends of the barrier system been terminated with an approved crashworthy terminal treatment in accordance with NCHRP 350 or properly tapered in accordance with AS/NZS 3845? End treatments shall comply with barrier manufacturer's specifications. Also check that the end treatments are included in VicRoads Accepted Safety Barrier Products, road design note 9-12A.			
25.	Is clear delineation provided for motorists passing the barriers? Approved retroreflective delineators are required where barriers are located close to traffic.			
26.	Have adverse environmental conditions been considered? If the barrier is set up in a worksite prone to adverse environmental conditions, including flooding or ice/snow, special consideration of barrier type and set up needs to be undertaken.			
WORK AREA				
27.	Is the 'no go' distance being maintained? Are workers prevented from working within the 'no-go' zone as noted in AS 1742.3? Engineering controls such as lightweight plastic modules, cones, bollards, or parawebbing fencing may be used in combination with an administrative procedure.			
28.	Is there a procedure for emergencies (particularly for very long barriers)? Is there a plan to provide fast emergency access / removal of the barrier with required tools at hand? Could overlaps be provided to allow for vehicle access?			
REFERENCES				
Occupational Health and Safety Act 2004				
Road Management Act 2004		VicRoads Road Design Note 9-12a, Accepted Safety Barrier Products		
Worksite Safety - Traffic Management Code of Practice 2004		AS/NZS 3845: 1999 – Road safety barrier systems		
VicRoads Bridge Technical Note 2005/008, Temporary Precast Concrete Barriers for TL-3 Loading (Retrofit of VicRoads Barriers for Pin and Loop Connection and alternative designs)		AS/NZS 1742.3:2002 – Manual of uniform traffic control devices, part 3: Traffic control devices for works on roads		
No.	NOTES / ITEMS TO BE RECTIFIED	Who	By	Done
20	Barriers at eastern end need more water.	Contractor	Today	Initials

APPENDIX 3. ROAD AUTHORITY APPROVALS

Victoria, VicRoads , 14 July 2003 (ref: TM 050 29)	3-1
New South Wales, RTA , 19 December 2003 (ref: OIM/5896.1).....	3-2
Queensland, Department of Main Roads , 3 March 2006 (ref: 870/811)	3-4
South Australia, Department of Transport Energy and Infrastructure , 18 July 2006 (ref: 2005/09058)	3-6



Contact : John Byrden
Telephone : (03) 9811 8201
Fax : (03) 9811 8329
Date : 14 July 2003
Ref : TM 050 29

Laurie McKenna
Technical Manager
Australian Road Barriers Pty Ltd
P O Box 32
WENDOUREE VIC 3355

Dear Sir

RE: JJ HOOKS CONCRETE SAFETY BARRIER PRODUCT APPROVAL

I refer to your submission to VicRoads requesting confirmation of VicRoads approval to the use of JJ Hooks Concrete Safety Barrier.

I am pleased to inform you that subject to the conditions listed below being met, there is no objection to the use of JJ Hooks Concrete Safety Barrier on contracts for VicRoads funded works.

- a) that JJ Hooks Concrete Safety Barrier shall comply with specifications set out in reports:
 - i. NCHRP – 350
 - ii. AS/NZS 3845:1999
- b) that on any particular contract, installation of JJHooks Concrete Barrier shall be subject to the approval of the Superintendent of works.

The product will now be placed on the VicRoads Design Product Register. Please note that a product may be removed from the register if:

- a) the product ceases to meet registration requirements;
- b) the registration requirements are changed; or
- c) the product no longer meets in-service requirements.

Yours faithfully

A handwritten signature in black ink, appearing to read "John Byrden".

John Byrden
Principal Road Design Engineer

Our Ref: OIM/5896.1
Contact: John Vickery
Tel: (02) 8814 2194



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Mr Laurie McKenna
Australian Road Barriers Pty Ltd
RMB H535
BALLARAT VIC 3352

19th December 2003

J-J HOOKS CONCRETE BARRIER

Dear Mr McKenna,

I refer to your correspondence requesting the RTA to accept the J-J Hooks Concrete Barrier for use on classified roads in NSW. The J-J Hooks Concrete Barrier consists of precast, reinforced concrete Type F units, interlocked by the patented J-J Hooks connection system.

A review has been carried out of technical data provided for the J-J Hooks Safety Barrier including-

- Letter from the Federal Highways Administration (FHWA), dated 26th March 1999, confirming a successful test program of the 3.6m long Type F shape with a base width of 600mm in accordance with NCHRP 350, TL3 guidelines.
- Letter of review from the Federal Highways Administration (FHWA), dated 8th December 2000, based on previous test program of the 3.6m long Type F shape, that 6m units with the J-J Hook connection would likely satisfy NCHRP 350, TL3 guidelines.
- Letter from Robert Pyke & Associates, Metallurgical and Technical Consultants, dated 15th May 2003, confirming that Australian grade 250 and 300 steel to AS/NZS 1594, exceeds the minimum tensile requirements of ASTM A36 (as tested)
- Letter from Smorgon Reinforcing, dated 28th May 2003, confirming that reinforcement bar D500N, exceeds the yield strength requirements of ASTM A706.
- Test Report 400001 from Texas Transportation Institute (TTI), dated 2nd May 1999 confirming a successful longitudinal barrier test ES/1 in accordance with NCHRP 350.
 - Test 400001-ES/1 applied NCHRP 350 test 3-11, involved a 101.0km/h, 25 degree angle of impact with a 2,000kg test vehicle, resulting in a system deflection of 1.30m.

From this review, it is noted that:

- The J-J Hooks Concrete Barrier has been successfully tested at 100km/h.
- System deflection is 1.3m when impacted at 100km/h
- Unit lengths of 3.6m and 6.0m are available.
- Interconnected units are self aligning

The RTA agrees that the J-J Hooks Concrete Barrier supplied by Australian Road Barriers meets the relevant standards, and accepts the system for use as a temporary safety barrier on classified roads in New South Wales subject to the following conditions –

1. RTA acceptable temporary terminal treatments are to be installed on the ends of the system flared to place the blunt ends outside the applicable clear zone.
2. That any installation on the NSW classified road network will be restricted to the Type F, 600 wide interconnected units
3. That any installation on an RTA road is to result in a performance level equivalent to the system as tested.
4. Minimum horizontal radius for an installation is to be 30m.

The RTA intends to undertake a Product Audit of the J-J Hooks Concrete Barrier. Please provide detailed manufacturing drawings and associated documentation of the manufactured/distributed product for this procedure to be implemented. Advice is also required when/where the initial product has been installed in NSW.

The above conditions are to be stipulated in the manufacturers/distributors installation manual as RTA requirements. A copy of the installation manual is to be forwarded to Mr John Vickery of the RTA's Road & Bridge Technology Section, with a copy of the installation manual also provided with each delivery of the system, to be retained by the RTA and/or its contractors.

Yours faithfully



Don Carter
Manager, Road and Bridge Technology
Asset Management

cc **General Manager, Road Safety Strategy**
 General Manager, Asset Management
 Road Design Development Manager

3 March 2006

Department of Main Roads

Australian Road Barriers P/L
RMB H535
Ballarat
VIC 3352

Attn: Mr Laurie McKenna

Dear Laurie,

I refer to your meeting with Mr Noel Dwyer on 1 March 2006 and your submission for acceptance of the JJ Hooks concrete barrier system.

The following information has been received:

- Letter from the Federal Highways Administration (FHWA) dated 26 March 1999, confirming a successful test program of the 3.6m long Type F shape with a base width of 600mm in accordance with NCHRP Report 350, test level TL3.
- Letter of review from the Federal Highways Administration (FHWA) dated 8 December 2000, based on previous test program of the 3.6m long Type F shape, that 6m units with the JJ Hook connection would satisfy NCHRP Report 350, TL3.
- Material report number 0303 from Robert Pyke & Associates dated 15 May 2003, confirming that Australian grade 250 and 300 steel to AS/NZS 1594, exceeds the minimum tensile strength requirements of ASTM A36.
- Letter from Smorgon Reinforcing, dated 28 May 2003, confirming that reinforcement bar D500N, exceeds the yield strength requirement of ASTM A706.
- Test report 40001 from the Texas Transport Institute (TTI), dated 2 May 1999 confirming successful testing with NCHRP Report 350, test level TL3.
- JJ Hooks Installation and Maintenance Instructions Manual.

Of note is the deflection of the system of 1.3m when impacted at 100km/h.

ABN 57 836 727 711

Our ref 870/811
Your ref
Enquiries Noel Dwyer
Telephone +61 7 3834 2913
Facsimile +61 7 3834 2201
Website www.mainroads.qld.gov.au

Further to the testing requirements, for the JJ Hooks system to meet AS3845: 1999 Section 1.6 "GENERAL REQUIREMENTS FOR ROAD SAFETY BARRIER SYSTEMS" it shall be:

- (a) supported by technical literature and assembly instructions that clearly illustrate the essential mode of operation and prominently show the test level achieved in crash testing that has been carried out in accordance with this Standard;
- (b) selected and located in accordance with a recognized design procedure that is professionally applied. This procedure shall take account of risk management techniques that address the community of road users and neighbours, which may be affected by the installation;
- (c) erected in accordance with the manufacturer's instructions;
- (d) maintained in a manner that reflects the specified requirements;
- (e) returned into service following a crash only after professional evaluation and execution of repairs; and
- (f) fitted with end treatments and interface devices that are appropriate to the system being used.

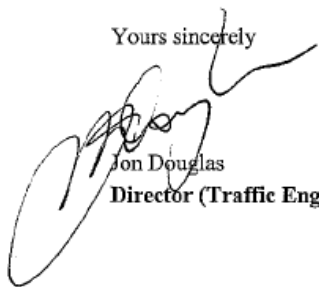
The barrier ends are required be suitably flared so that the exposed end is located outside the clear zone. If this is not possible, an AS3845: 1999 compliant crash attenuator must be used. Flared ends for temporary installations are to be installed on transverse slopes no steeper than 1 on 10 for all speed zones. In determining the clear zone width, the speed value selected must be consistent with the 24-hour operation of the road and not to just satisfy temporary speed zone while work is in progress. The clear zone is to be calculated in accordance with Part 8 of the Queensland Road Planning and Design Manual which is available online (www.mainroads.qld.gov.au).

Any changes to the JJ Hooks product that may adversely affect its in-service performance, durability or maintenance requirements shall be subjected to reassessment by Main Roads prior to installation on the Queensland state road network.

This department reserves the right to rescind the acceptance of your product based on in-service performance information and/or an independent assessment of the crash test results.

Based on the information provided, the JJ Hooks concrete barrier is accepted as an AS3845 compliant system making it eligible for use on the Queensland state-controlled road network, when installed in accordance with the requirements of AS/NZS 3845: 1999 for test level 3.

Yours sincerely



Jon Douglas
Director (Traffic Engineering & Road Safety)

In reply please quote 2005/09058
Enquiries to Vince Varricchio
Telephone 08 8343 2214

18 JUL 2006

Julian Govan
Australian Road Barriers Pty Ltd
RMB H535
Ballarat
Victoria 3352

RECEIVED
21 JUL 2006
BY:.....



**Government
of South Australia**

Department for Transport,
Energy and Infrastructure

**TRANSPORT SERVICES
DIVISION**
33-37 Warwick Street
Walkerville SA 5081

PO Box 1
Walkerville SA 5081

Telephone: 08 8343 2222
Facsimile: 08 8343 2585

ABN 92 366 288 135

Dear Julian,

**JJ HOOKS CONCRETE SAFETY BARRIERS
ACCEPTANCE FOR USE IN SOUTH AUSTRALIA**

I refer to your correspondence dated 13 April 2006, regarding product acceptance of the JJ Hooks Concrete Safety Barrier for use in South Australia.

As part of the Department for Transport, Energy and Infrastructure's assessment, the information as provided by Australian Road Barriers dated 13 April 2006, titled JJ Hooks Concrete Safety Barrier from Australian Road Barriers was reviewed.

The Department for Transport, Energy and Infrastructure is satisfied that the product meets the requirements of NCHRP report 350 and AS 3845 and as such accepts the use of the JJ Hooks Concrete Safety Barrier as a TL-3 barrier on the following conditions:

- Any installations will be restricted to the Type F 600 wide interconnected concrete barrier units.
- The minimum horizontal radius for an installation is to be 30m.
- Installations must be designed and located to accommodate the system dynamic deflection, clear of the hazardous area behind.

- The end of the barrier is to be flared as per AS/NZS 3845 to the outside of the appropriate clear zone or protected by a crashworthy end treatment to at least the same test level. A ramped end unit is not considered to be a crashworthy end treatment and shall not be used.
- The JJ Hooks Concrete Safety Barrier must be used and installed in accordance with manufacturer's specification and with the conditions listed in this acceptance letter. This acceptance letter and an installation and design manual, shall be provided with all JJ Hooks Concrete Safety Barrier units sold or hired out and shall be made available at each installation site. The installation and design information is also to be made available at the distributor's website.
- Any changes made to the JJ Hooks Concrete Safety Barrier system as currently assessed will require a new acceptance letter.

The Department for Transport, Energy and Infrastructure reserves the right to rescind or modify at any time, the product acceptance of the JJ Hooks Concrete Safety Barrier.

Yours sincerely,



Steve Clark
A/Manager Traffic and Access Standards Section

July 2006