Queensland Historic Motoring Council Inc.

1376 Old Cleveland Road, Carindale Qld 4152
Phone: 07 3260 6197 a/hours
Mobile: 0419 789 151
Email: president@qhmc.org.au
Web: www.qhmc.org.au

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D SHACKLES FOR SAFETY CHAINS

To: ***QHMC Club Delegates and Affiliated Clubs***

Subject: ***D Shackles for Safety Chains***

There have been emails flying around regarding D Shackles for Safety Chains and below is the QHMC response from Russell Manning, QHMC Vice-President.

Queensland legislation doesn't mention the load of shackles but it does cover the methods for attaching safety chains to the trailer, the strength of the chain and the strength of the attaching point on the tow bar. How you attach the chain to the tow bar of the car is the missing link (pun intended). The logical view is that whatever you use should have adequate strength to retain the trailer in the event of a disconnection, but the legislation doesn't actually say that.

I spoke to someone I know in TMR 12th August 2014 (we're all getting these enquiries and he tells me they've had 12,000 hits on their Facebook page since Friday) and he explained that it looks like some sort of Facebook hoax. They've checked and couldn't find a TMR booking for this since 2010. The way it was explained to me was that the shackle doesn't have to be marked but it does have to be suitable for the application i.e. it needs to be strong enough to retain the trailer in the event of a disconnection (with a margin for dynamic loads, hence the requirement below for a factor of 1.5 times the trailer's ATM).

The recommendation is to use a load rated shackle because that way you know what it's rated for. Anything else is a bit of a guess. Also many of the shackles on the market meet the load requirements but aren't marked (as outlined below) in accordance with the Australian Standard. It's also important to note that the Australian Standard referred to relates to lifting equipment, not towing equipment.

From my point of view, it's probably better to get a rated and marked shackle because that way you know exactly what you have and it's easy to demonstrate that you've taken all reasonable steps to ensure it's appropriate for the job. If you use something else, in the event of a problem, you may have to show that what you did was acceptable, possibly in court.

QPS have also put up a Facebook post http://mypolice.qld.gov.au/townsville/2014/08/08/myth-changes-requirements-shackles-used-towing-trailer/ which distances them from the issue.

The following extract is from the DTMR brochure, All about safe towing. Note the word 'recommends'. This is not in legislation.

Safety Chain Connections (Shackles, Pins or Bolts)

The Department of Transport and Main Roads recommends that the shackles used should meet Australian Standard AS 2741-2002 "*Shackles*", or another equivalent recognised standard, and have a break load limit of the shackle is rated at least 1.5 times greater than the ATM of the trailer. You can easily identify a shackle that meets AS 2741-2002 "*Shackles*" because they will be permanently marked with the following information:

- The manufacturer's name or trademark
- Quality grade of the shackle, e.g. ("M" or "4", "S" or "6")
- Working Load Limit (WLL) or Rating; and
- Identification marking in order to correlate shackle to test certificate

Diameter (mm)	WLL (kg)	Quality Grade Marking
6	250	"M" or "4"
	500	"S" or "6"
8	750	"S" or "6"
10	500	"M" or "4"
	1000	"S" or "6"
11	1500	"S" or "6"
13	750	"M" or "4"
	2000	"S" or "6"

Diameter (mm)	WLL (kg)	Quality Grade Marking
16	1500	"M" or "4"
	3200	"S" or "6"
19	2000	"M" or "4"
	4700	"S" or "6"
22	3000	"M" or "4"
	6500	"S" or "6"
25	3800	M or 4
	8500	"S" or "6"
29	5000	M or 4
	9500	"S" or "6"

Table 3 - Safety Chain Shackle Matrix (Guide only)

Note:

- Rated bolts, chain shackles or other suitable fittings (i.e. hammerlocks) may be used as devices for connection on safety chains providing the break load limit of the device is at least 1.5 times greater than the ATM of the trailer
- Generally, the break load limit of a rated shackle will be six times greater than its work load limit.
- Pin diameter of shackle will be greater than the diameter of the main shackle body.
- Same size shackles of different quality grades will have a different WLL (i.e. 6mm "S" grade shackle has a greater WLL than a 6mm "M" grade shackle).
- Stainless steel shackles are unsuitable for trailer use due to the material's general low resistance to bending stresses.
- S" or "6" grade "D" Shackles bear similar characteristics to "S" or "6" grade Bow Shackles
- Bow shackles provide for greater angular usage compared with "D" shackles.

Note the reference to break load limit above. BLL is about six times the WLL. This is important because if it was based on WLL, a 2 tonne ATM trailer would require a three tonne shackle, which would be huge. However rated shackles are only marked with their WLL so to determine an appropriate shackle for the application it is necessary to do a calculation. This is my simplified explanation of it.

As an example, for a trailer with an ATM of 2575kg the calculation would be (ATM X 1.5) ÷ 6 = required WLL of shackle (2575 X 1.5) ÷ 6 = 643.75

From the chart provided above the minimum Working Load Limit of a shackle appropriate for this application would be satisfied by an 8mm S or 6 shackle (which has a WLL 750 kg). Obviously there are other alternatives however some would be unworkable as the pin diameter would be too large to fit the tow bar.

The following simplified guide, based on Aggregate Trailer Mass, will assist in selecting an appropriate shackle.

ATM (kg)	Shackle pin size	Grade markings	Alternative
Up to 4500	11mm	S' or '6'	
Up to 4000	10mm	'S' or '6'	
Up to 3000	8mm	'S' or '6'	13mm 'M' or '4'
Up to 2000	6 mm	S' or '6'	10mm 'M' or '4'
Up to 1000	6mm	'M' or '4'	

If all this gets too hard, just go to a towbar or caravan dealer and tell them the ATM of the trailer and they will sell you an appropriate shackle.