AWARENESS BRIEFING
Risk of Structural Failure to Brick Farm Access Bridges

The intention of this briefing note is to raise awareness amongst bridge users of how this type of damage occurs and how it can be prevented in future, and this ensuring your safe use.

Network Rail has recently experienced several incidents which have resulted in substantial damage to brick farm access bridges due to vehicles that are too wide to use the bridge safely. Although there have been no direct consequences to this kind of incident, each one had the potential to cause a serious accident.

Figure 1 – Damage to farm access bridge at Chester

Many landowners who access their property over a brick built arch railway bridge, which may have been there for over 150 years, may consider that the bridge is strong enough to carry all the vehicles which they need, to undertake their business. However, there is a real risk of bridge failure which is not normally recognised and this can arise from the width of a vehicle; not just its weight.

Figure 2 – Damage to farm access bridge in Kent

Heavy vehicles now routinely use farms access roads for delivery of feed and collection of produce. In addition, in recent times, agricultural vehicles and machinery has become larger, heavier and can move at greater speeds whether on or off road.

Common damage

Brick farm access bridges over the railway can be severely damaged by regularly being crossed by heavy and/or wide vehicles. The most common problem associated with heavy and wide vehicles is the damage that can be caused to parapets and the brickwork below the parapets, the 'spandrel' walls, as shown in figures 3 and 4.

Figure 3 – Typical movement to parapet

As the parapet is forced outwards it commonly results in severe cracking around the arch barrel as can be seen in the photograph on the right and in the diagram below.

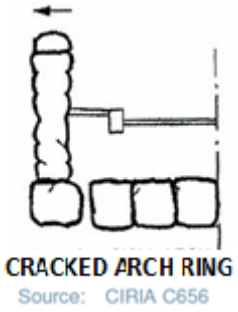

Diagram 1 – Typical Failure Mode

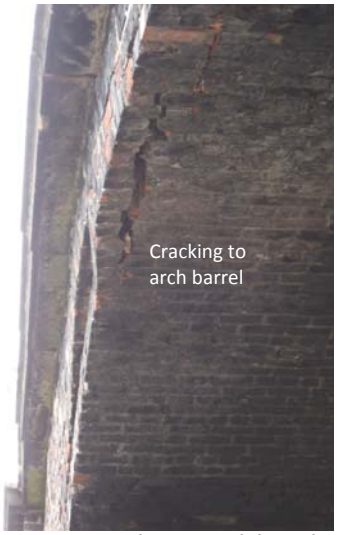

Figure 4 – Cracking around the arch

Many farm access bridges originally had un-paved road surfaces taking horse drawn traffic. Where surfaces were paved they were typically much narrower than today. The edges of today's road surfaces are now covering what was previously the verge and these areas can therefore be softer.

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Figure 5 – Cracking and depressions to road surfacing

In Figure 5, depressions and cracking can be seen in the road surfacing where the soil beneath has been compressed by heavy wheel loads. The proximity of the increased loads to the parapet wall led to the damage shown in Figure 2.

On un-paved rutted surfaces where large off road tyres on machinery such as tele-handlers, can force the side of the ruts outwards (Figure 6), the same detrimental effects described above can occur and were a contributory factor to the failure shown in Figure 1.

What Bridge Users Can Do

The reasons why the failures described occur are simple and damage can be prevented by careful driving and positioning of vehicles so that the wheels are not too close to the parapets.

Be vigilant for changes in use

Farm access bridge users should also be vigilant for any changes in the types of vehicles being used over vulnerable structures. Typical changes include:

- Changes in vehicle width; please be vigilant if vehicles are passing very close to parapets. The damage to the structure shown in Figure 1 was caused by a new tractor the farmer purchased, which although could still pass between the parapets, was wider heavier. Excessively wide vehicles where there is only a matter of inches clearance between both parapets should not be taken over.

- Change in vehicle weights – the damage to Figure 2 was caused by a milk tanker that changed its collection sequence. It previously used the bridge at the start of its collection round when it was empty but subsequently changed to the last pick-up of the day when it was full. The increased weight caused the damage.

- Changes of tyre type; large balloon tyres passing close to parapets may also overload the parapet walls.

Figure 6 – Typical wheel ruts forcing parapet wall outwards

Adhere to existing weight restrictions

Please obey weight restrictions on structures to prevent potential damage. Vehicles exceeding the maximum gross weight indicated are prohibited from crossing the structure.

Maximum gross weight limits are typically 3T, 7.5T, 10T, 13T, 18T, 26T and 33T.

Figure 7 – Typical Maximum Weight restriction Signs

Network Rail would encourage farm access bridge users to contact their local Structures Engineers should they have any concerns relating to:

- possible bridge damage,
- to discuss safe bridge loadings, or
- report incidents.

Please use the contact details:

Network Rail National Helpline

03457 11 41 41

Our contact centre is open 24 hours a day, 365 days a year

Online

Use online forms to report issues with structures via:

http://www.networkrail.co.uk/