Water Crossing for Light Vehicles Guideline

Revision History

Version	Date	Amendments
1.0	22.07.2021	First issue for use

Feedback and Enquiries

Safer Together welcomes feedback and enquiries on this Specification:
land.transport@safertogether.com.au

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Foreword

This Guideline was developed by the Land Transport Working Group of the Queensland Natural Gas Exploration and Production Industry Forum (Safer Together). Following agreement of the relevant sub-team and approval by the Land Transport Working Group, the Safer Together Safety Leaders Group agreed to the publication of this Guideline by Safer Together.

The information provided in this Guideline is based on the following sources:

1. Australian Rainfall & Runoff – Revision Projects
   Engineers Australia – Water Engineering
   Project 10 – Appropriate Safety Criteria for People
   Literature Review
   Stage 2 Report
   P10.S2/020
   February 2011
   ISBN: 978-0-85825-948-5
   Contractor Reference Number: 10023.01 (Water Research Laboratory)
   Authors: T D Shand, R J Cox, M J Blacka and G P Smith

2. International Journal of Disaster Risk Reduction 17 (2016) 77-84
   Safety criteria for the trafficability of inundated roads in urban flooding
   Issued by the Institute for Modelling and Environmental Systems, University of Stuttgart, Germany
   Authors: M Kramer, K Terheiden, S Wieprecht

3. Vehicle Stability Testing for Flood Flows
   Water Research Laboratory
   UNSW Australia
   WRL Technical Report 2017/07
   WRL Project Number 2016003
   May 2017
   Authors: G P Smith, B D Modra, T A Tucker and R J Cox

1 Purpose

The purpose of this Guideline is to provide information to assist Qld CSG Industry personnel to safely traverse flooded waterways.

2 Scope

This Guideline is intended for use by all companies involved in supply chain activities that support the Qld CSG Industry. It covers Light Vehicle transport in times of flood events leading to water levels increasing across causeways or otherwise unrestricted roads becoming flooded due to overland flow of flood waters.

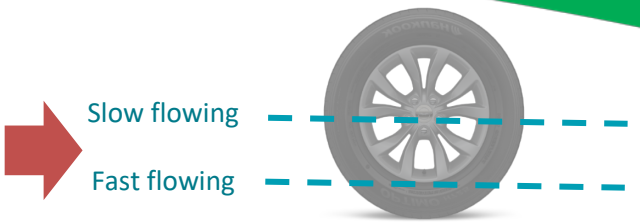
3. Guidance

3.1 Context

- Driving across running water is one of the most dangerous activities that a worker in the CSG industry can undertake.
  - Between 2001 and 2017, **96** people died in Australia trying to drive through floodwater, and hundreds more were rescued from their vehicles.
  - **50%** of all flood fatalities in Australia are vehicle related.
  - The CSG industry has had **4** significant water crossing incidents since 2019.
- Why? People consistently **underestimate** the force of moving water, and **overestimate** the ability of their vehicle to withstand these forces.
- The Queensland Government provides a consistent message of avoidance for drivers ('If It's Flooded, Forget It', and 'Back It Up') and this remains the best advice in most scenarios. In the CSG industry, however, drivers occasionally face situations where this is not practical, due to issues of geography and access.
- **The intent of this guidance is to provide drivers with simple and safe rules for crossing water when avoidance is not practicable**

- *This guidance is only for standard Light Vehicles. It does not apply to Heavy Vehicles and non-standard/heavily modified Light Vehicles.*
- *For passenger comfort, modern vehicles are reasonably airtight which actually makes them more susceptible to the risks associated with crossing water.*

3.2 Fundamental Guidance for Water Crossing



The decision about whether to attempt a water crossing rests upon the judgement of the driver and includes consideration of numerous situational factors. The following guidance is intended to help the driver make that decision.

- A driver must only consider driving through water if:
  - there is no practical alternative
  - they have confidence that the road surface is intact; and
  - they have confidence that the water depth and speed are safe:
    - **Fast-flowing water** (i.e. above normal walking speed) must be no deeper than a height equivalent to the **bottom rim** of the wheel.
    - **Slow-flowing** or still water (i.e. below normal walking speed) must be no deeper than a height equivalent to the **wheel hub.**
- **If there is any doubt about suitability of surface, depth and speed for a safe crossing, drivers must consider the crossing high risk and must not cross without further assessment. In most cases, flood waters recede rapidly, so waiting is usually the best option.**

- *Drivers must use their observations to judge road surface and depth:*
  - *Are there depth markers?*
  - *Is the road surface visible through the water?*
  - *Is there evidence that the water has been higher (i.e.. receding floodwaters) and the road may be damaged?*
  - *What is the surface material and condition on either side?*
  - *Can you observe other vehicles crossing?*
  - *Does road geography and geometry suggest a dip?*
  - *Does the nature of the water flow change as it crosses the road, suggesting damage to the surface underneath?*
- *Drivers should be aware of psychological factors that could affect their judgement. Are they tired, hungry etc.*
- *Drivers must never enter water to try and determine depth?*
- *Normal walking speed = approx. 1.5m/s*
- *These indicative markers are provided to help drivers make a judgement of depth. It is not intended that drivers drive their vehicles into water to measure depth.*

3.3 Additional Controls for High Risk Scenarios

- Drivers must call their Line Manager/Supervisor and have a conversation about the risk before attempting a high-risk crossing. The following Scenarios are considered high-risk:
  - It is night time
  - The width of the water is more than 5m (excepting designated concrete causeways with flood markers and no signs of recent heavy flooding):
  - The driver has not driven the road within the previous 3 months:
  - The driver is not confident in their assessment of the depth, speed of water or road surface conditions of the crossing; or
  - Water at the crossing exceeds height/speed limits but there is an emergency situation which required a vehicle to cross.
- The following crossing scenarios are not considered high risk:
  - The crossing is under active control of Emergency Services and/or Main Roads; or
  - The crossing has been declared open by one of the Major CSG Operators
- Line Managers/Supervisors must:
  - Use a point-of-risk tool (e.g. Take 5, Step 7) to discuss the risk and the controls the driver will use before, during and after the crossing;
  - Discuss how the driver determined the speed and depth of the water;
  - Challenge drivers on the need to cross. Are there alternative routes, or can they wait?; and
  - Establish contact with the driver once they have crossed
- If you have any doubt about the risk, you must not let them cross

3.4 Guidance for Driving Through Water

If you have determined that it is safe to drive through water:

- **Before**
  - Select low-range 4WD and choose a low gear
  - Lower windows to provide an escape route
  - Only one vehicle at a time!
- **During**
  - Approach the water at slow speed and don't brake as you enter the water
  - Drive in the middle of the road where the crown is highest
  - Drive at a steady speed and do not change gears
- **After**
  - Once you are out of the water, gently apply the brake pedal with your left foot as you accelerate out of the crossing to dry the brakes

→ *Electrical systems, including door locks and windows, frequently become inoperable when a vehicle is flooded. You need to have an escape route identified before you enter the water surface and depth.*

→ *Driving into water too fast can cause hydroplaning, a separate and equally dangerous condition. Vehicles can hydroplane in as little as 3mm of water.*