Data for Road Safety Consortium

Self-Declaration for Temporary Slippery Road Warning Data

Document Version Control

Version	Date	Authors	Comments
1.0	20/10/2023	Group C	First Issue

Introduction

The mission of the European Data for Road Safety is to improve road safety by maximizing the reach of safety-related traffic information powered by safety data generated by vehicles and infrastructure.

The consortium consists of National Road Authorities, Vehicle Manufacturers and data providers.

The consortium members have signed a MULTI PARTY AGREEMENT to share data on a reciprocal basis to comply with the EU Directive 886/2013, which gives the following 8 data categories:

Unprotected accident area

Exceptional weather conditions

Animal, people, obstacles, debris on the road (broken - down vehicle)

Short - term road works

Temporary slippery road

Wrong - way driver

Reduced visibility

Unmanaged blockage of a road

The purpose of this self-declaration is to give publishers of the temporary slippery road warning data guidance about expected quality levels and label their data as such. Consumers of the data can then easily perceive the expected quality level.

Definitions

Event – Anomaly that has material impact on traffic. Attributes include timeliness and location (including start and end point and lane position). Start point for safety, end point for ADAS functions, lane position to help with exact position on carriageway.

Message – Single object that creates, updates or terminates an event.

Use Case Definition

"Temporary slippery road" means any unforeseen condition of the road surface which makes it slippery for a certain amount of time, causing low adherence of the vehicle to the road."

- (EC Delegated Regulation No 886/2013)

The following messages belong to the category "Temporary slippery road":

Flooding

Danger of aquaplaning

Surface water hazard

Slippery road

Mud on road

Loose chippings

Oil on road

Petrol on road

Ice

Black ice

Snow drifts

Icy patches

(Safety related message sets – Selection of DATEX II Situations, DENM and TPEG2-TEC Causes and TMC Events for EC high level Categories)

Quality Level

For each triggered event there should be two quality levels attached (A = Certain, B = Probable). See each triggering section for the mapping of the quality levels.

Triggering Conditions

Vehicle triggered events

Triggering conditions

On the basis of positive acceleration:

a. On the basis of Anti-Slip Regulation (ASR), throttle position, vehicle acceleration and vehicle velocity. An ASR-request is active for at least 200 ms (as for other safety functions depending on ASR). The throttle position is pressed on average more than 30 % of the max value while ASR intervention is active. The (filtered) acceleration of the vehicle is less than 40 % of the vehicle acceleration on µ-High (dry asphalt 0,85) at the same start speed and driving manoeuvre (No detailed values have been put here to cover different drive configurations, e.g. two-wheel vs. four-wheel drive)

b. On the basis of ASR, throttle position, vehicle acceleration and vehicle velocity. An ASR-request is active for at least 200 ms. The throttle position is pressed on average more than 30 % of the max value while ASR intervention is active. The (filtered) acceleration of the vehicle is less than 20 % of the vehicle acceleration on µ-High (dry asphalt 0,85) at the same start speed and driving manoeuvre

c. On the basis of ASR, throttle position, vehicle acceleration and vehicle velocity. An ASR-request is active for at least 200 ms. The throttle position is pressed on average more than 30 % of the max value while ASR intervention is active. The (filtered) acceleration of the vehicle is less than 10 % of the vehicle acceleration on µ-High (dry asphalt 0,85) at the same start speed and driving manoeuvre

d. On the basis of ASR and throttle position. An ASR-request is active for at least 200 ms. The throttle position is pressed on average less than 30 % of the max value (so as not to cause an ASR intervention on ground with high friction value) while ASR intervention is active;

On the basis of negative acceleration (deceleration):

e. On the basis of Anti-lock Braking System (ABS), braking pressure and deceleration. ABS intervention is active for more than 200 ms (according to other safety functions depending on ABS). Braking pressure is more than 20 % of maximum capable braking pressure. The (filtered) deceleration of the vehicle is less than 50 % of the vehicle deceleration on µ-high (dry asphalt 0,85) at the same start speed and driving manoeuvre

f. On the basis of ABS, braking pressure and deceleration. ABS intervention is active for more than 200 ms. Braking pressure is more than 20 % of maximum capable braking pressure. The (filtered) deceleration of the vehicle is less than 25 % of the vehicle deceleration on µ-high (dry asphalt 0,85) at the same start speed and driving manoeuvre

g. On the basis of ABS, braking pressure and deceleration. ABS intervention is active for more than 200 ms. Braking pressure is more than 20 % (so as not to cause an ABS intervention on ground with high friction value) of maximum capable braking pressure. The (filtered) deceleration of the vehicle is less than 10 % of the vehicle deceleration on µ-high (dry asphalt 0,85) at the same start speed and driving manoeuvre

h. On the basis of ABS and braking pressure. ABS intervention is active for more than 200 ms. Braking pressure is less than 20 % of maximum capable braking pressure;

On the basis of friction coefficient estimation

i. The friction coefficient is less than 0,3 for at least 5 s (the friction coefficient of ice is < 0,2; for snow and loose chippings, it is approx. 0,4. The friction coefficient needs to be detected for a certain period)

j. The friction coefficient is less than 0,2 for at least 5 s.

- (Based on Car2Car Communication Consortium Basic System Profile – Adverse Weather Conditions)

Quality Level mapping

Level A:	Level B:
Certain – triggering condition **a)** - **j)** for multiple vehicles in a close proximity and limited timeframe is fulfilled.	**Probable** – triggering condition **a)** - **j)** for a single vehicle is fulfilled.

Traffic management triggered events

Triggering Conditions

Road Authorities direct sources, crowd sourced or other third-party data that a Road Authority processes to use in their traffic management data including but not limited to the following:

a. Reports from public via telephone or crowd sourced information

b. Reports by representative of Road Authorities or trusted authority (e.g. police, fire service, road maintenance service)

c. Identified by a monitoring camera

d. Appropriate measurements from roadside meteorological equipment (e.g. temperatures, precipitation, ice detection sensors)

e. Estimations from a meteorological service

Quality Level mapping

Level A:	Level B:
Certain – Triggering condition **b), c)** or **d)** is fulfilled.	**Probable** – If only triggering condition **a)** or **e)** alone is fulfilled. Combined with other data sources, those triggering conditions might be considered as Level A quality.

Traffic management generated warnings are assumed to be Level A at all times, unless otherwise specified.

Quality Attributes

Whenever an event related to a temporary slippery road occurs, indicated by the triggering conditions listed above, the following quality attributes should apply:

- Maximum delay between event start and message publishing must be
  - less than 180 seconds (Level A)
  - within 1 hour (Level B)
- Location of start- and endpoint should have a maximum offset of
  - 500m (Level A)
  - 5km (Level B) - For events without a defined start- and endpoint, the affected stretch of the road should be published (e.g. black ice)
- 95% of the time the location should be accurate
- Published event should include the affected lanes and if hard shoulder is affected as well

Termination Conditions

Whenever an event related to a temporary slippery road is terminated, indicated by a complete removal of all items, the following termination criteria should apply:

- Maximum delay until termination message is published
  - 180 seconds (Level A)
  - 1 hour (Level B)

Updates

Whenever an event related to a temporary slippery road is updated e.g. location is changed, the following update criteria should apply:

- Maximum delay until update message is published
  - 180 seconds (Level A)
  - 1 hour (Level B)

Message parameters

Every published message requires the following message parameters:

- Locations of temporary slippery road events should be published as openLR line strings or openLR point along line
- Timestamps should follow the common DATEX II standard
- "probabilityOfOccurence" parameter should be always populated (following section 3)

References

TISA, DFRS, DATEXII, C2CC (2021), "Safety related message sets – Selection of DATEX II Situations, DENM and TPEG2-TEC Causes and TMC Events for EC high level Categories", ITSTF20001 v1.5 https://tisa.org/wp-content/uploads/ITSTF20001_SafetyrelatedMessage-Sets-DATEXII_DENM_

Car2Car Communication Consortium Basic System Profile – Adverse Weather Conditions https://www.car-2-car.org/fileadmin/documents/Basic_System_Profile/Release_1.6.4/C2CCC_RS_2002_AdverseWeather.pdf

WSP has been acting as Tech Group Chair and coordinator for DFRS at the time of authoring this publication, as such WSP has provided the template for this publication.