Emergency shortening of MA for a specific location by the Signaller

1 Purpose and Scope

This document delivers the operational and CCS related process describing how a Signaller stops a train by shortening the Movement Authority (FS, SM, OS) in case of imminent danger or emergency situations which the CCS system cannot automatically detect and mitigate. So, there is the Signaller's task to associate the danger location with impacted trains.
This need to act by the Signaller can occur, when humans, for example the field force or train drivers, contact the Signaller indicating a danger or if other information reaches the Signaller e. g. from meteorological service and information systems including sensors, Hot Axle detectors, avalanche / falling rock detection which act not automatically and directly via the trackside CCS.

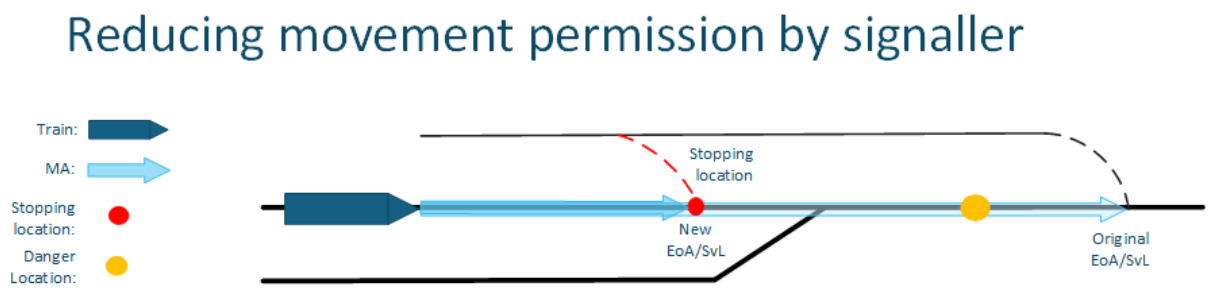


Figure: Illustration of reducing the movement permission by Signaller

In the Scope:

Stop of a train movement with MA (supervised in FS, SM, OS) before reaching a specific danger location of the infrastructure.

Out of Scope:

- Source(s) and details of the emergency alert process
- Emergency stop of trains without MA, moving in SR, SH - Mode
- Other influence on train movement, e. g. TSR or using OS in order to reduce risks (may be concerning, snow, wind, ...)
- Automated selection of impacted train(s) using incoming data about danger and danger position combined with train positions reports (see: S2 T63 307 Optimised Emergency Stop

2 Reference Information

2.1 Analysis

The following document delivers an analysis of operational solutions in different EU-member states:
S2 t62 108B Emergency shortening of MA for a specific location by Signaller action (Annex)

2.2 Actor list

See SPP-9339 - List of Operational Actors for the detailed description of all actors or open the work item.

Train Driver

Signaller

Trackside CCS

3 Station Outputs

3.1 Operational Design Decisions

3.1.1 Generic Design Decisions

3.1.2 Specific Design Decisions

3.2 Operational Requirements

3.2.1 Generic Operational Requirements

SPP-6859 - CCS shall rely on a standardized set of manual controls for degraded operations.
The standardized manual controls for degraded operations, are based on harmonised operational rules. This approach minimizes national variations in Generic Applications.

SPP-6932 - Signaller shall have a visual representation of the complete status of the operational situation
In order to react to incidents that have the potential to limit the railway safety and track capacity, the signaller shall have a visual overview of the operational status

SPP-6935 - Signaller shall have a visual representation of malfunctioning devices and their impact on the operational situation
Signaller shall have a visual representation of malfunctioning devices and their impact on the operational situation in order to initiate appropriate measures in case of equipment failure.

3.2.2 Specific Operational Requirements

SPP-27377 - Reduce the risk of tripping a train
The Trackside CCS shall provide the Signaller with commands to revoke movement authorities in a way that avoids enforced emergency braking or reduces it to an absolute minimum.

SPP-27380 - Reduce commands
To avoid mistakes, the options (commands) available to revoke a given authorisation should be as few as possible.

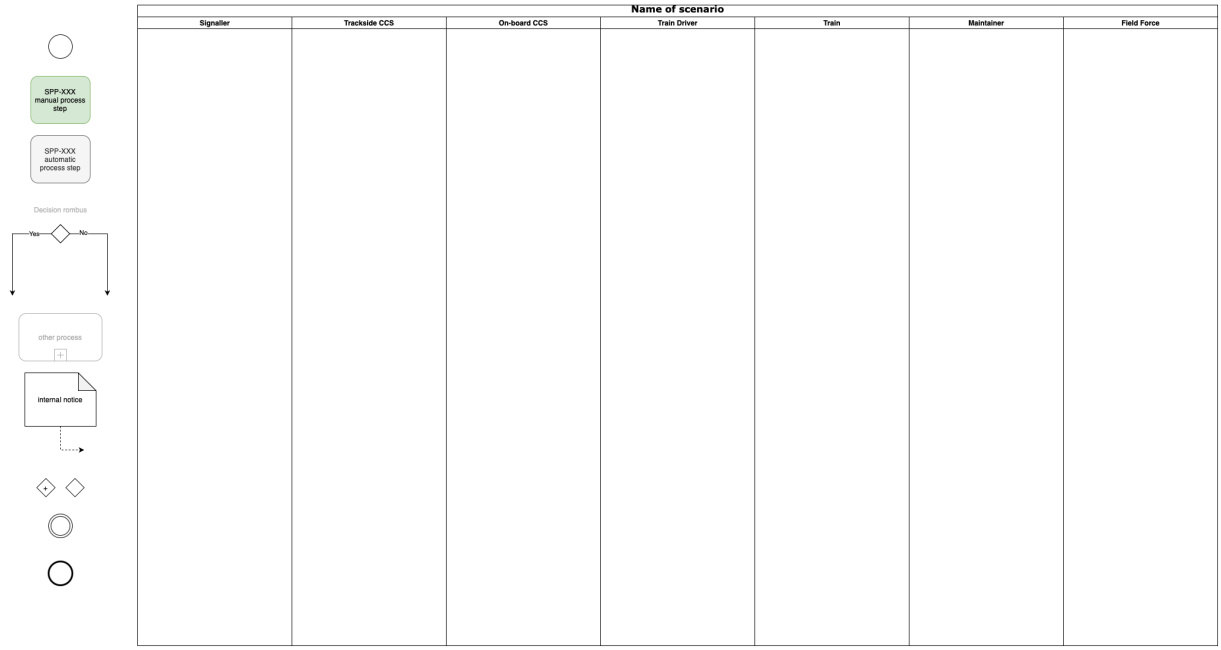
3.3 Candidate Operational Process

Emergency shortening of MA for a specific location by Signaller action

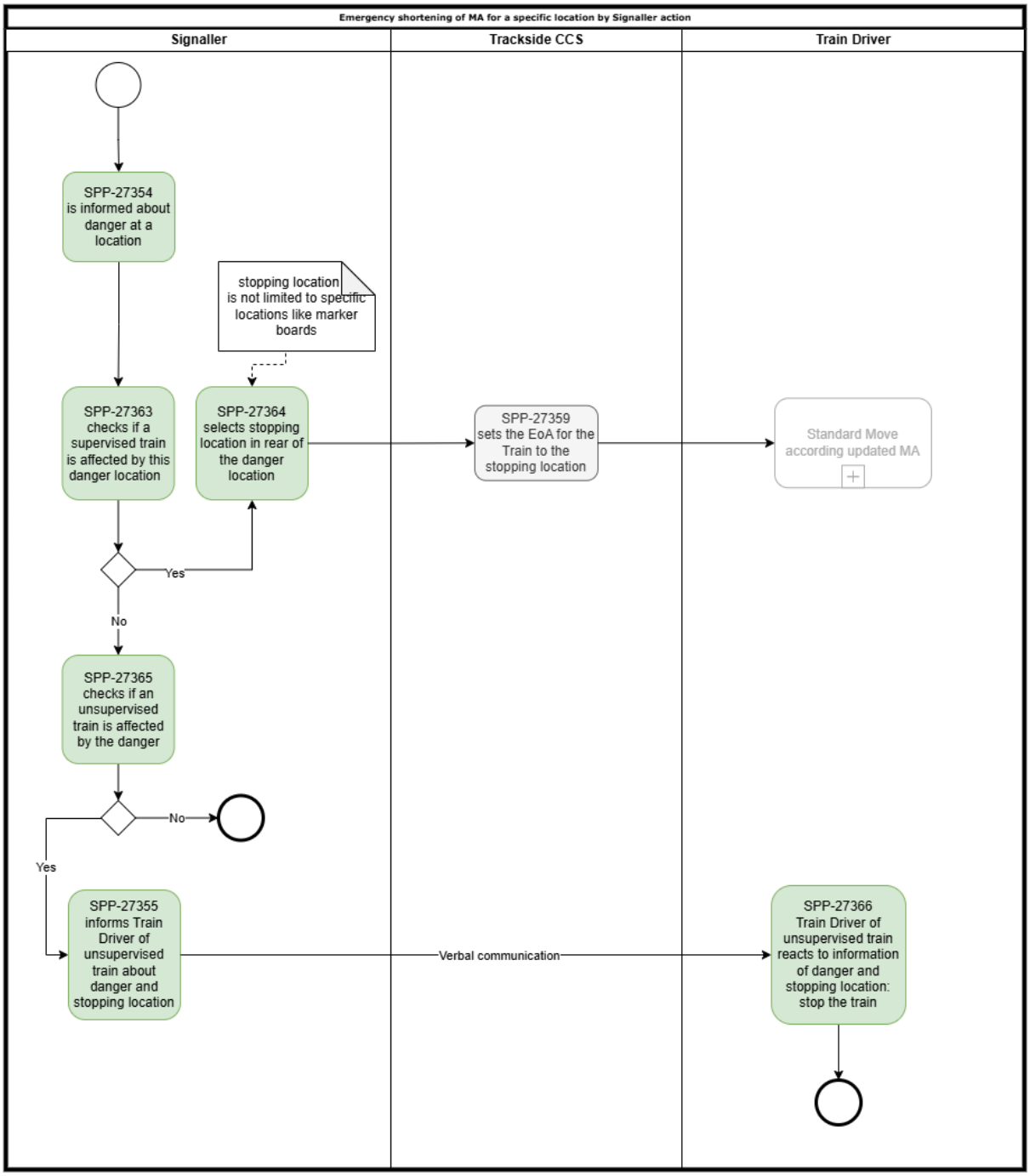
Status	In Progress
Op.Precondition	A situation has occurred that presents imminent danger for a single train at a specific location on the infrastructure, which the CCS system cannot automatically detect and mitigate.
Op.Rationale	Handling a situation that presents imminent danger for a single train at a specific location on the infrastructure, for which the signaller needs to take action.
Op.Postcondition	The train moving towards or on the affected infrastructure has been stopped.

Emergency shortening of MA for a specific location by Signaller action

Rework:



Old version: **Emergency shortening of MA for a specific location by Signaller action**



SPP-27354 - Signaller is informed about danger at a location

Signaller is informed about danger at a location.

User Needs	The Signaller receives information via different systems, screens, HMI or phone call.

SPP-27363 - Signaller checks if a supervised train is affected by this danger location

Signaller checks if a supervised train is affected by this danger location.

User Needs	The Signaller's HMI displays: • if any supervised train is potentially affected by the detected dangerous situation at a specific location. • the position of each supervised train's location, its operating mode, direction of movement, speed and the presence of a path already planned and locked between the train front and the danger location.

SPP-27364 - Signaller selects stopping location in rear of the danger location

Signaller selects stopping location at, or in rear of, the danger location

Note: Stopping location is not limited to specific locations like marker boards and can be anywhere between the front end of the train and the current EoA of the MA.

User Needs	The Signaller's HMI allows the selection of a new stopping location of the train in the rear of the danger location. The new stopping location could be, but not limited to, a marker board upstream the location of the danger. The Signaller's HMI allows to select any point between the train front and the danger location. The train shall preferably: - not get tripped - not stop in a non-stopping area

SPP-27359 - Trackside CCS sets the EoA for the train to the stopping location

Trackside CCS sets the EoA for the train to the stopping location.

Note: If the stopping location is close to the train the emergency brakes could be applied and if the EoA is passed the train is tripped.

User Needs	No derived User Need

SPP-27365 - Signaller checks if an unsupervised train is affected by the danger

The Signaller checks if an unsupervised train is affected by the danger location.

User Needs	The Signaller's HMI displays: • if any unsupervised train is potentially affected by the detected danger situation at a specific location • the position of each unsupervised train's location, its operating mode if available, its direction of movement, its speed and the presence of a path already planned and locked between the train front and the danger location.

SPP-27355 - Signaller informs Train Driver of unsupervised train about danger and stopping location

Signaller informs Train Driver of unsupervised train about the danger and stopping location.

Note: Is already harmonized and described in TSI OPE Appendix B2 13 and 14

User Needs	No derived User Need

SPP-27366 - Train Driver of unsupervised train reacts to information of danger

Train Driver of unsupervised train reacts to information of danger and stopping location: stops the train.

User Needs	No derived User Need

4 Impact on TSI OPE

5 Points of Discussion

Check if movements in SR need to be handled separately and the SR distance short... [Decided **]**

Check whether setting an SR distance is covered in one of our other processes. [Decided **]**

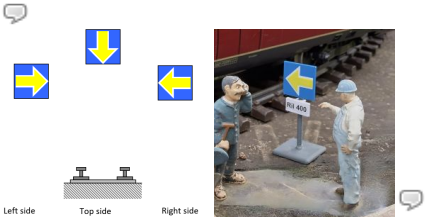
During the Rule Book station for t62 and t64, it should be clarified if the term... [Decided **]**

6 Glossary

6.1 Terms and Definitions

Term	Definition
End Of Authority	Location up to which a train or a shunting composition is authorised to proceed.
MOVEMENT AUTHORITY	Permission for a train to run to a specific location within the constraints of the infrastructure.

Term	Definition
Standstill	Standstill is when the train's speed is detected as 0 km/h by the onboard system, within the accuracy and limits of the system's detection capabilities. In context of door closing procedure there is also the limit at or below 3 km/h and no un-commanded propulsion is available. This harmonises the intent of both TSIs: it acknowledges the LOC&PAS practical threshold (due to system tolerances) but defaults to the CCS zero-movement criterion when safety functions are involved.

Term	Definition
Stop Marker Board / ETCS Stop Marker	A Harmonised trackside ETCS marker board defined in EN 16494/2015 and called "ETCS stop marker" in TSI OPE is a fixed, clearly recognisable trackside sign that indicates the location where a driver has to stop the train, if running without an MA. Further purposes: https://www.era.europa.eu/domains/technical-specifications-interoperability/operation-and-traffic-management-tsi_en --> Harmonised ERTMS Marker Boards" contenteditable="false" src="/polarion/ria/images/control/comment_resolved.png" class="polarion-dle-comment-resolved-icon"> 1. To be used to unambiguously identify an EOA which must not be overpassed without authorisation by the signaller and which may protect one or a group of safety-critical points such as a point switch, a conflicting route, an entrance of a station, junctions, etc. 2. To be used to identify specific locations on the track the train shall not overpass when an MA is not available, unless the driver has received a specific authorisation by the signaller. 3. To be used to define the location up to which the driver needs to confirm that the line is clear (e.g. for TAF function). 4. To be used to define the location up to which the driver has to drive under his/her responsibility before a possible MA in FS/OS is received. 5. ETCS Stop Marker is mandatory when ETCS is the only signalling system installed on the line, and optional when the line is equipped with ETCS together with a national/Class B signalling system.  Major: several comments: 1) unclear to me if we should state a reference to a CENELEC standard (CENELEC EN 16494:2015) which may not be directly available for some of the OD/Traffic CS members. Also I haven't found such definition in this standard, remove? 2) the reference source (SoM guideline) is probably wrong, the specific mandatory specification for Marker Boards (Engineering rules for harmonised marker boards, ref. 21E089, issue 1, note that is index#101 in B4) should be used, right? 3) unclear why the name of "stop marker board" has been used instead of "ETCS Stop Marker" that is used in the MBs spec 21E089 4) Last sentence "To be used to mark the location up to which the driver ..." should be bullet number 4 according to the Operational purpose in section 5.1 of the MBs spec 21E089" contenteditable="false" src="/polarion/ria/images/control/comment_resolved.png" class="polarion-dle-comment-resolved-icon">

Term	Definition
Stopping Location	In ETCS Level 2 railway operations, a stopping location is a precisely defined location where a train must come to a controlled standstill according to operational or signalling requirements. The stopping point can relate to different types of end locations or markers, such as the End of Authority (EoA), ETCS Stop Marker, Buffer Stops or specific platform sections with orientation markers (ensuring that the train aligns the doors with the platform topology.
Trip	Irrevocable application of the emergency brakes by ETCS until the train/shunting composition is at a standstill.
Unsupervised movement	An unsupervised movement is not under the supervision of the CCS system. There is no authorisation given by the Trackside CCS. If it is combine like this it sounds a little bit like the Signaller could be responsible for the Driving or it could be the Driver's fault if the Signaller makes a mistake while protecting the movement." contenteditable="false" src="/polarion/ria/images/control/comment_resolved.png" class="polarion-dle-comment-resolved-icon">

6.2 Abbreviations

Abbreviation	Definition
ATO	Automatic Train Operation
EOA	End Of Authority
MA	MOVEMENT AUTHORITY
SMB	Stop Marker Board / ETCS Stop Marker