Capture your Safety Critical Components!
Improve your barriers!

2 June 2023

14.30 [CEST]

Welcome! Webinar to start soon!

#ERAwebinars

EUROPEAN UNION AGENCY FOR RAILWAYS

EUROPEAN UNION AGENCY FOR RAILWAYS

Speakers

Josef Doppelbauer

Executive Director | ERA

Nathalie Duquenne

Project Officer | ERA

Jean-Marie Dechamps

Team Leader | **ERA**

Giuseppe Ragusa

Maintenance Engineering **Project Officer** | Trenitalia

Leonardo Cozza

Rolling Stock Maintenance Engineer | **Trenitalia TPER**

Raymond Groves

Operational Safety Director | **Alstom**

AGENDA

- Results of the survey
- Definition and methodology
- Feedback from a RU/ECM
- Feedback from a Manufacturer/ECM

And ……answers to your questions

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Answers received

- ECM managers
- Railway undertakings
- Quality managers
- Spare parts for RS manager
- NSA
- Mechanical laboratory
- Consultant

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- What is your feeling about the definition of “safety critical” (serious accident, single failure, credible potential)?

  Definition is OK but understanding is sometimes challenging. Need for more explanation on meaning of ‘critical’ , ‘single failure’ and difficulties to not take into account the safety mitigation measures already in place

- What is your comprehension about the definition of “component” related to the vehicle structure?

  Problem of software component
  Confusion with other components (IC, spare parts....)
  Definition needs to be improved

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- Did you experience any new SCC discovered “during maintenance“ monitoring both for new and existing vehicle? If yes, did you ask for SCC identification confirmation to the vehicle Manufacturer?

  No but there are in some cases good cooperations with the manufacturers
  Sometimes there are still difficulties to obtain the list of SCC from manufacturers

- Did you develop any specific procedure in your management system related to SCCs processes both for new and existing vehicles?

  Yes via internal engineering procedures or specifically for ECMs relevant exchange between maintenance delivery function and maintenance development function

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- What about the collaboration between Keeper/RU/IM/ECM/Manufacturer/Holder of vehicle authorization (exchange of information about maintenance including on SCC)?

  Difficult to get information from other parties even if it is clearly stated in the contract

- Do you know the CEN Technical Report 17696 “Guide for identification and management of SCCs for railway vehicles”? If yes, do you use it in the processes of your management system or in general what is feeling using the CEN TR 17696?

  Yes for the majority of respondents, they use this standard to build the process for identification of SCC

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- Do you know the SAIT (Safety Information Tool by Agency)?

Yes , but it needs to be more advertised, disseminated and explained .
The sector doesn't know really what to record inside.

- Has any Assessment Body ever commented in the contents of the SCC list (give details)?

No on the list but there is sometimes an assessment concerning the process used for the elaboration of the list

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Problem statement

For Many years

Recurrently, stakeholders and authorities wanted lists of safety critical components. Also, after catastrophic accidents.

But:

No consensus on the meaning of ‘CRITICAL’

Different attempts led to lists covering …ALL COMPONENTS of vehicle with the result of “if all is Critical, nothing is Critical”

Consensus on Criticality of components linked to vehicle movement (axle, wheel,…), but substantially “obvious”. No added value

However:

Everyone conscious that CRITICAL components mean strengthened rules for operation and maintenance.

Criticality depends on the vehicle design and the context of operations.

Example: An external door locking system may be critical in a specific design and not in another one depending on reliability, availability or maintainability and operational context.

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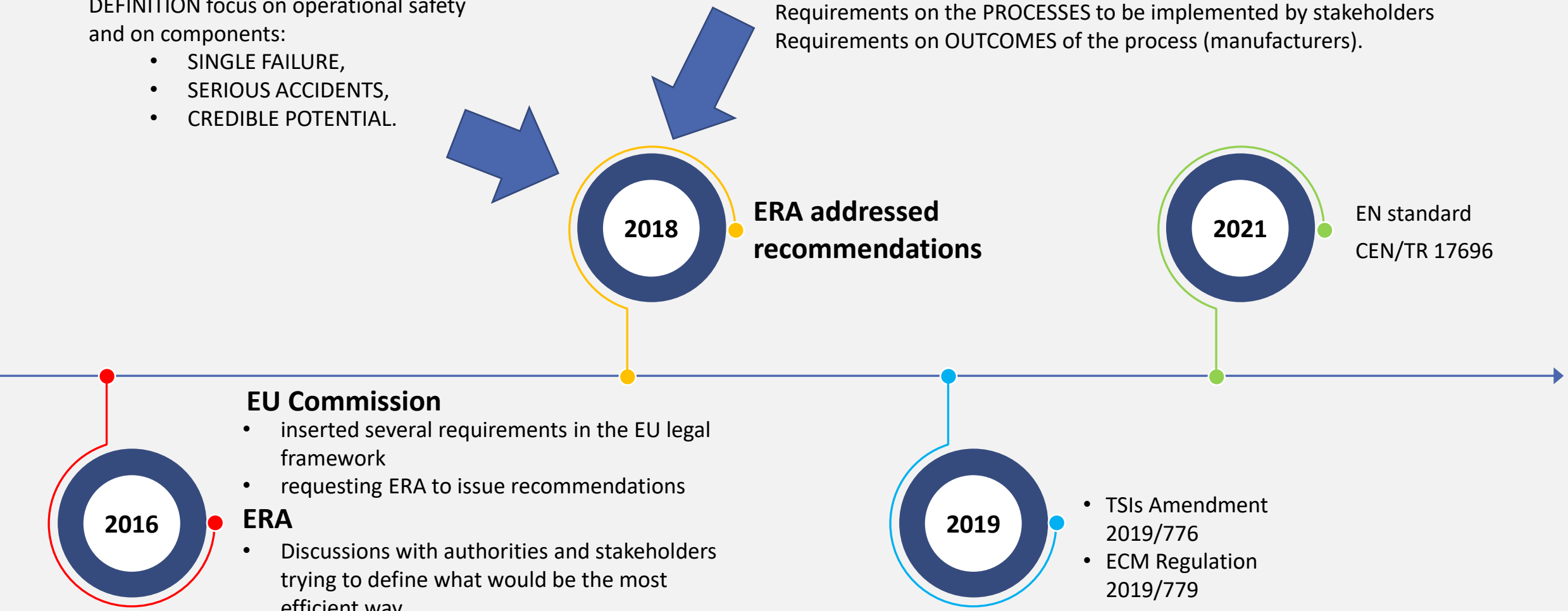
What has been done

DEFINITION focus on operational safety and on components:

- SINGLE FAILURE,
- SERIOUS ACCIDENTS,
- CREDIBLE POTENTIAL.

WHO are involved and must COMMUNICATE: Directly: Manufacturers, ECMs, RUs. Indirectly IMs, keepers.
Requirements on the PROCESSES to be implemented by stakeholders
Requirements on OUTCOMES of the process (manufacturers).



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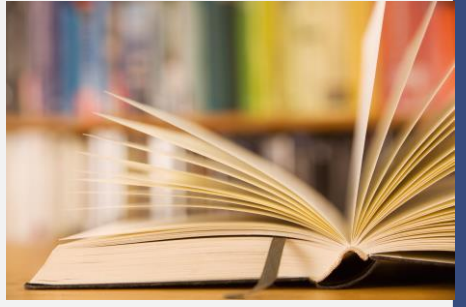
Definition Terminology



Agency regulation

Regulation (EU) 2016/796

Interoperability directive

Directive (EU) 2016/797

Safety directive

Directive (EU) 2016/798

TSIs revision

Commission Implementing Regulation (EU) 2019/776

ECM Regulation

Commission Implementing Regulation (EU) 2019/779 of 16 May

EUROPEAN COMMITTEE FOR STANDARDIZATION

CEN/TR 17696

Vehicle Maintenance Guide for identification and management of Safety Critical Components for railway vehicles

TECHNICAL REPORT **CEN/TR 17696**

RAPPORT TECHNIQUE

TECHNISCHER BERICHT October 2021

ICS 45.060.01

English Version

Railway applications - Vehicle Maintenance - Guide for identification and management of Safety Critical Components for railway vehicles

Applications Ferroviaires - Maintenance des véhicules - Guide pour l'identification et le management des Composants Critiques de Sécurité pour les véhicules ferroviaires

Bahnanwendungen - Fahrzeuginstandhaltung - Leitfaden zur Identifizierung und dem Management von Sicherheitskritischen Komponenten für Schienenfahrzeuge

This Technical Report was approved by CEN on 20 September 2021. It has been drawn up by the Technical Committee CEN/TC 256.

CEN members are the national standards bodies of Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Republic of North Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and United Kingdom.

Safety critical components *are components for which a single failure has a credible potential to lead directly to a serious accident resulting in stated consequences*

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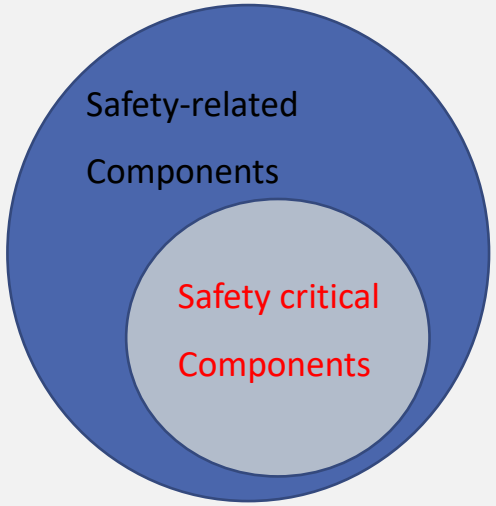
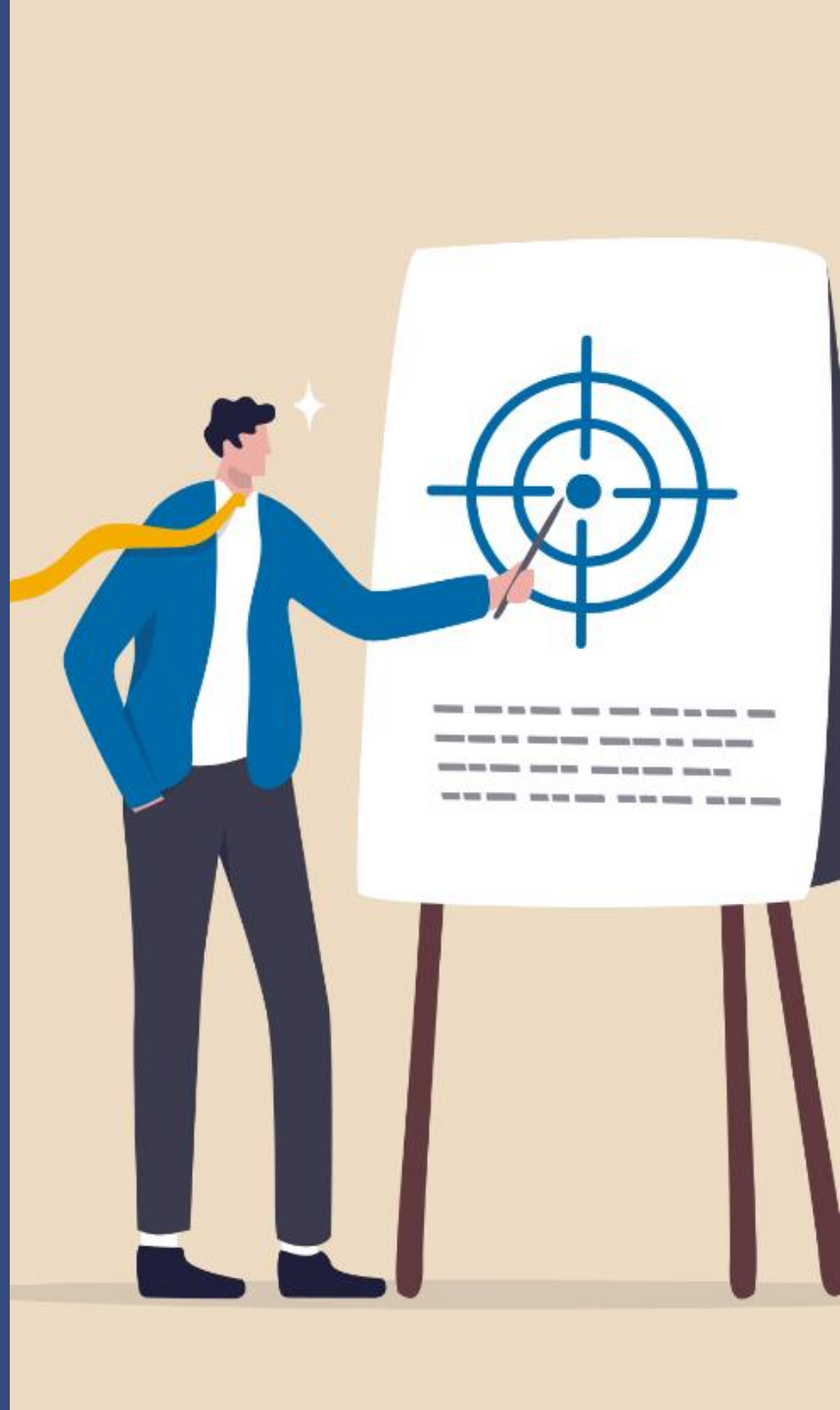
Definition Terminology

Safety critical components *are components for which a single failure has a credible potential to lead directly to a serious accident resulting in stated consequences*

CEN/TR 17696 "*Vehicle Maintenance - Guide for identification and management of Safety Critical Components for railway vehicles*" – Section 7.3.1



SCCs are a sub-set of the **safety-related components**, where these are defined as components performing safety relevant functions keeping the vehicle in a safe state and preventing a safety hazard occurring (see EN 17023-2018-ANNEX_B).



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Definition Terminology

single failure: it means that when the failure of the component occurs, it is the unique event causing the partial/complete loss of the function performed by the component. No other failure or combination of failures is considered. All the other vehicle's components have to be considered in good state for performing their functions;

The components of the vehicle can be defined and identified by starting with the definition as in 3.11 of **EN 15380-2:2006**:

'3.11 component

uniquely identifiable product that is considered indivisible for a particular planning or control purpose and/or which cannot be disassembled without it being destroyed

(12) 'serious accident' means any train collision or derailment of trains resulting in the death of at least one person or serious injuries to five or more persons or extensive damage to rolling stock, the infrastructure or the environment, and any other accident with the same consequences which has an obvious impact on railway safety regulation or the management of safety; 'extensive damage' means damage that can be immediately assessed by the investigating body to cost at least EUR 2 million in total;

Table 1 — SCCs - List of accidents (non-exhaustive) from CEN/TR 17696

Safety critical components *are components for which a single failure has a credible potential to lead directly to a serious accident resulting in stated consequences*

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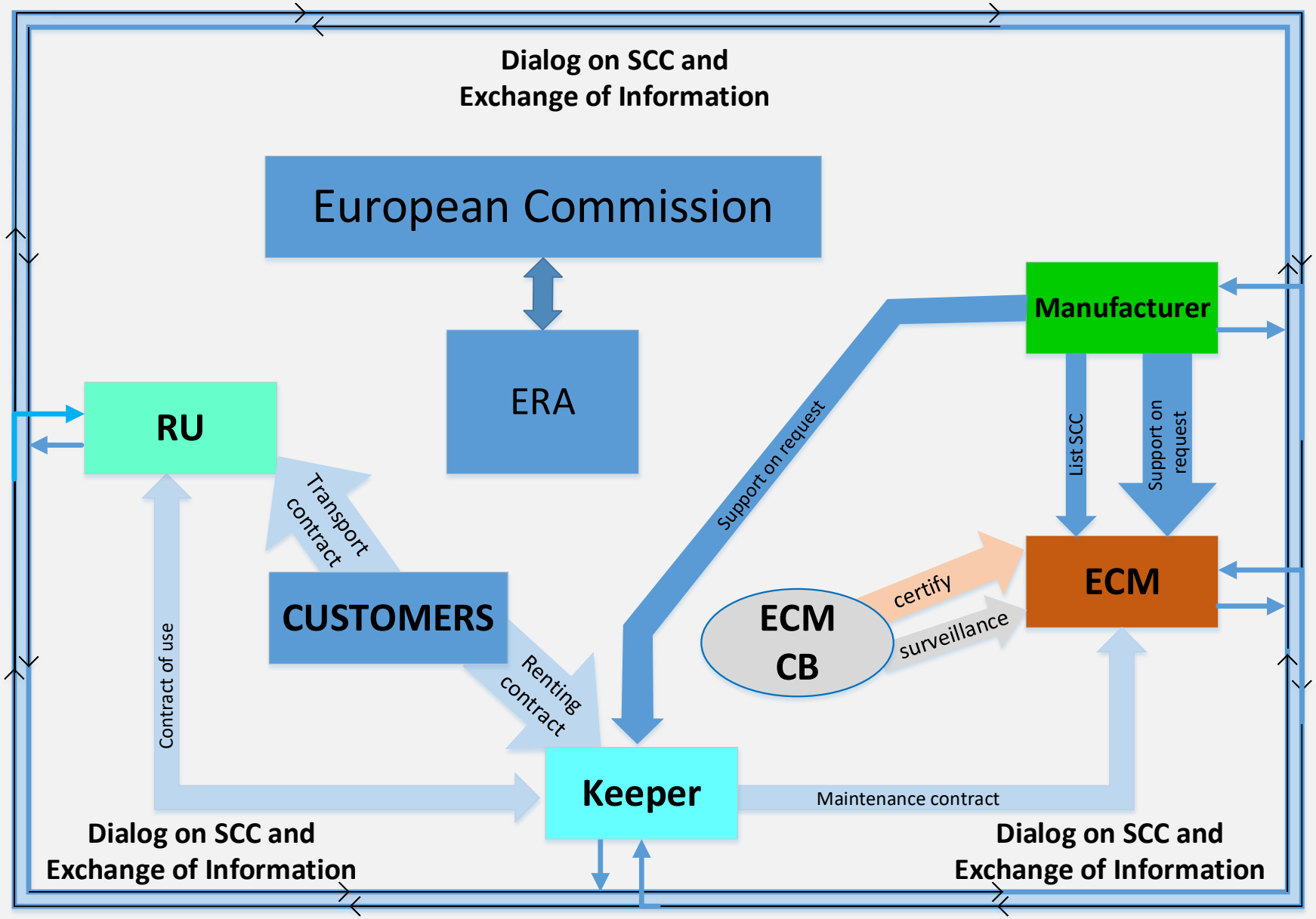
Safety Critical Components Who is involved ?



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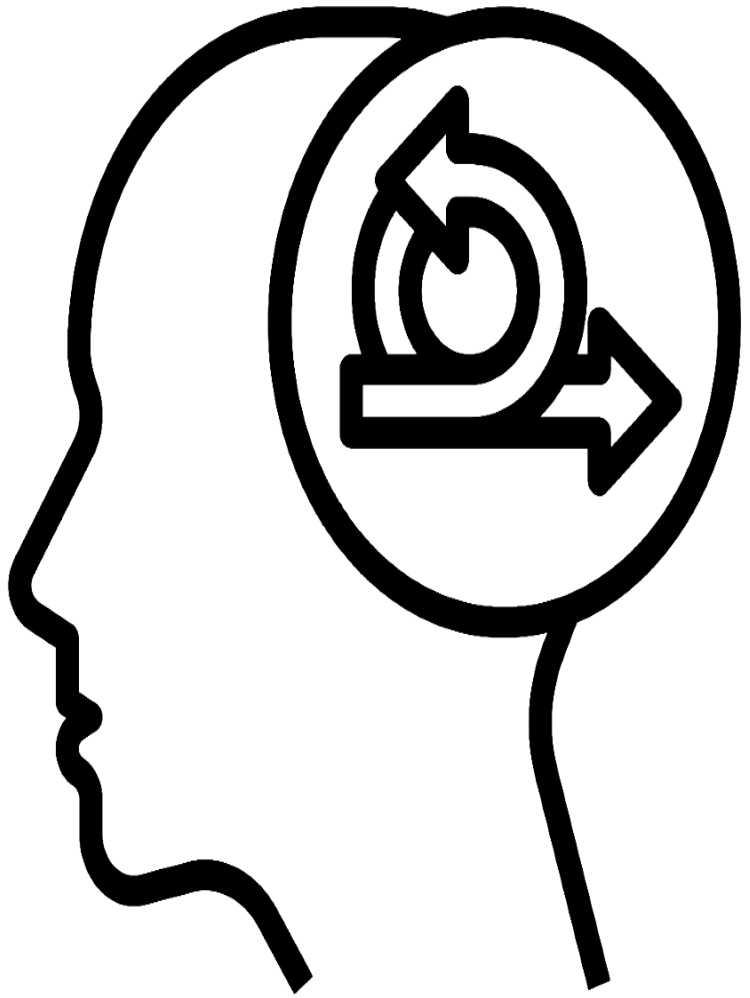
Methodology

- SCC what is involved ?
- SCC Identification process
- SCC method 1- FMECA
- SCC method 2 - FTA
- SCC deliverables



Reference document

TECHNICAL REPORT CEN/TR 17696

Safety Critical Components – What is involved

New vehicle

Manufacturer

Authorisation process complying with Regulation 2018/545

existing vehicle

in case of technical changes

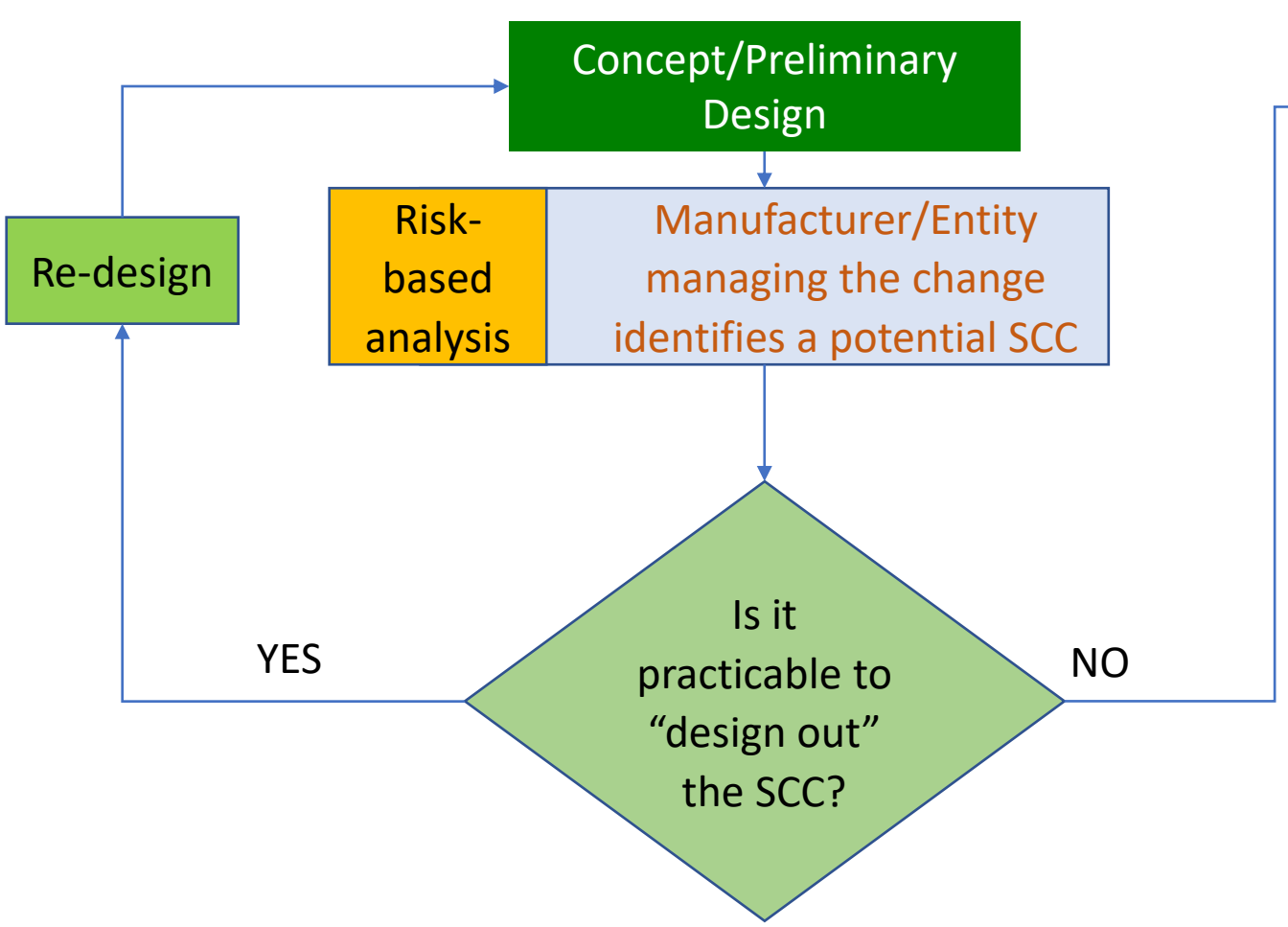
Manufacturer/entity managing the change

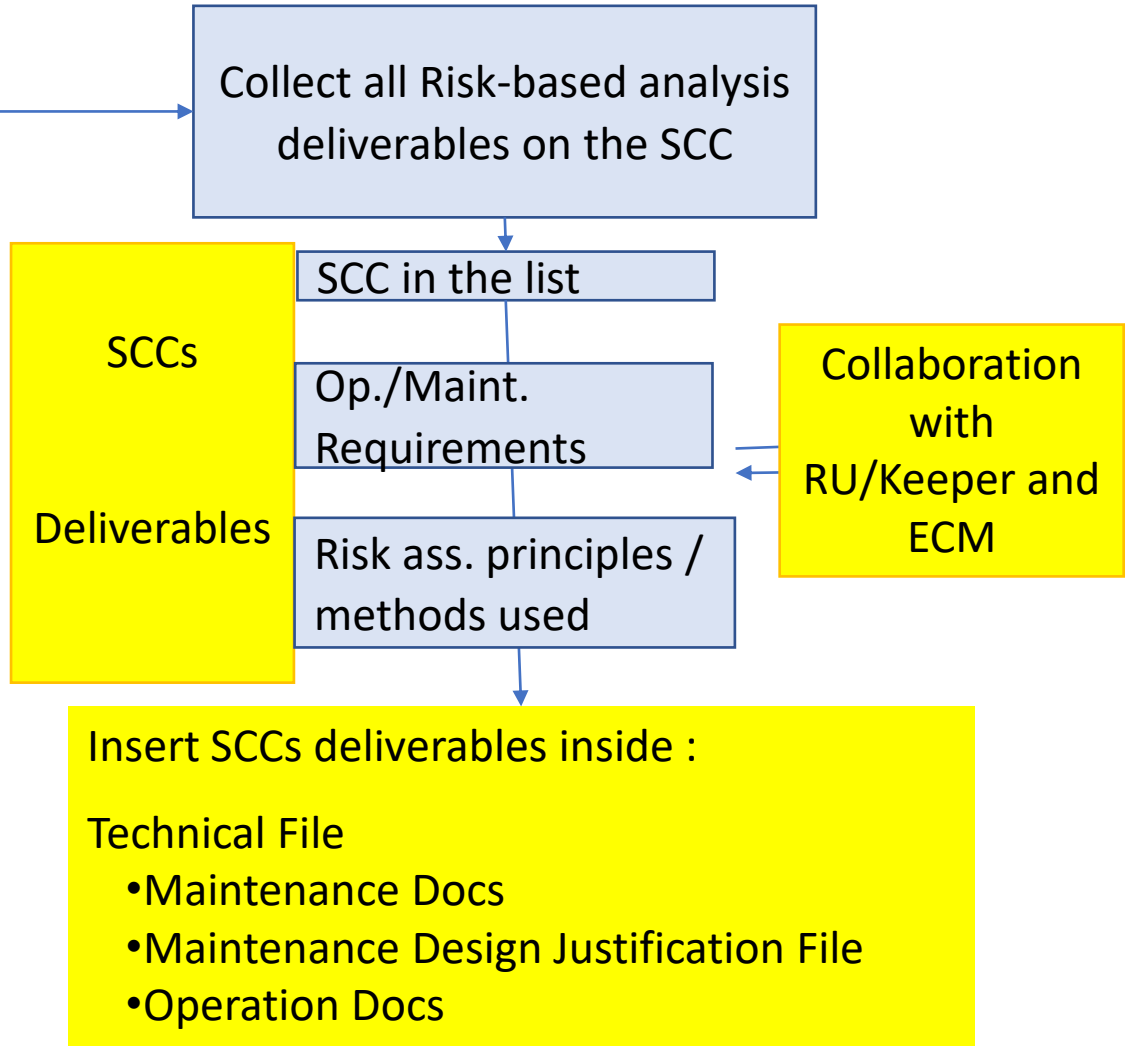
Maintenance process

Maintenance process complying with Regulation 2019/779

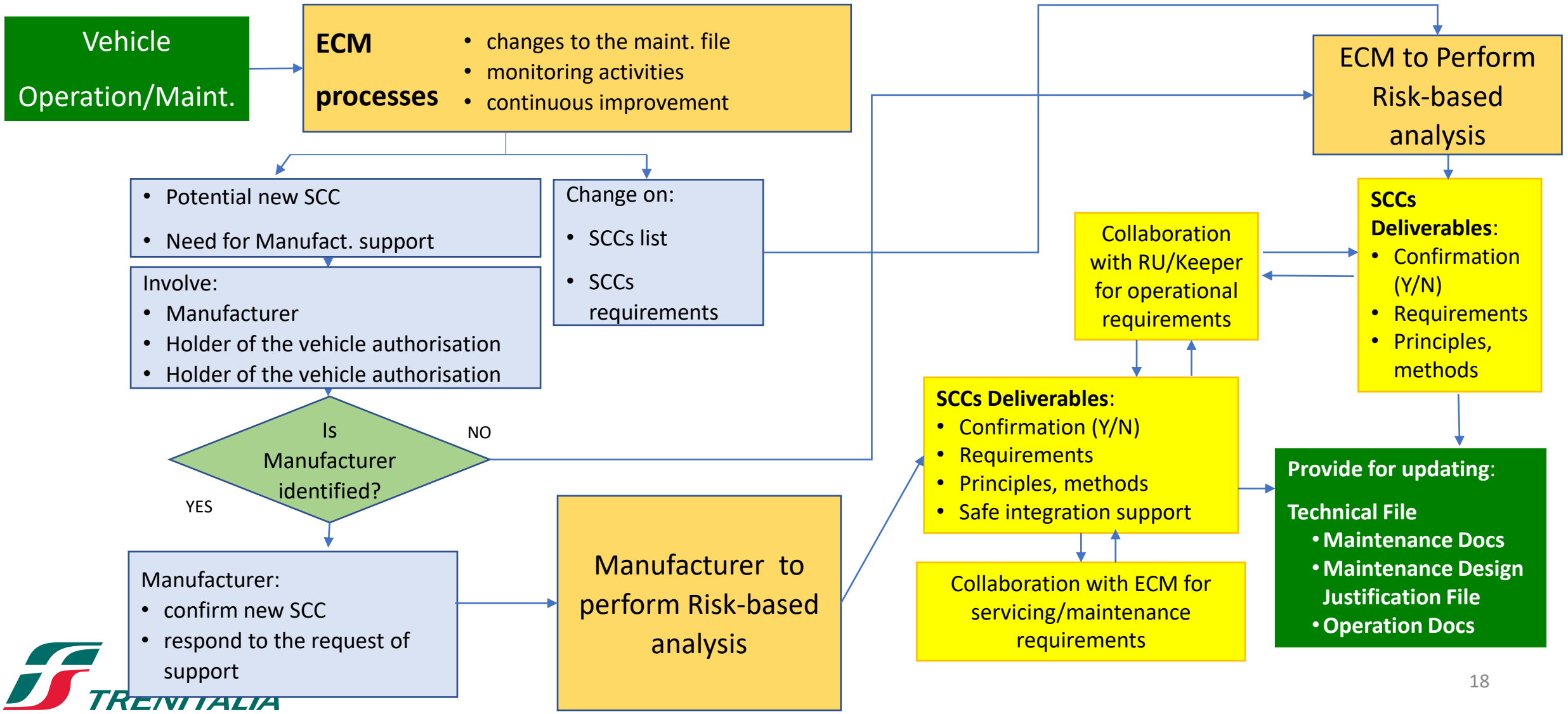
Safety Critical Components – Identification process
Perspective from Manufacturer/Entity managing the change

New vehicle or engineering change/ renewal/upgrading/refurbishment of existing vehicles

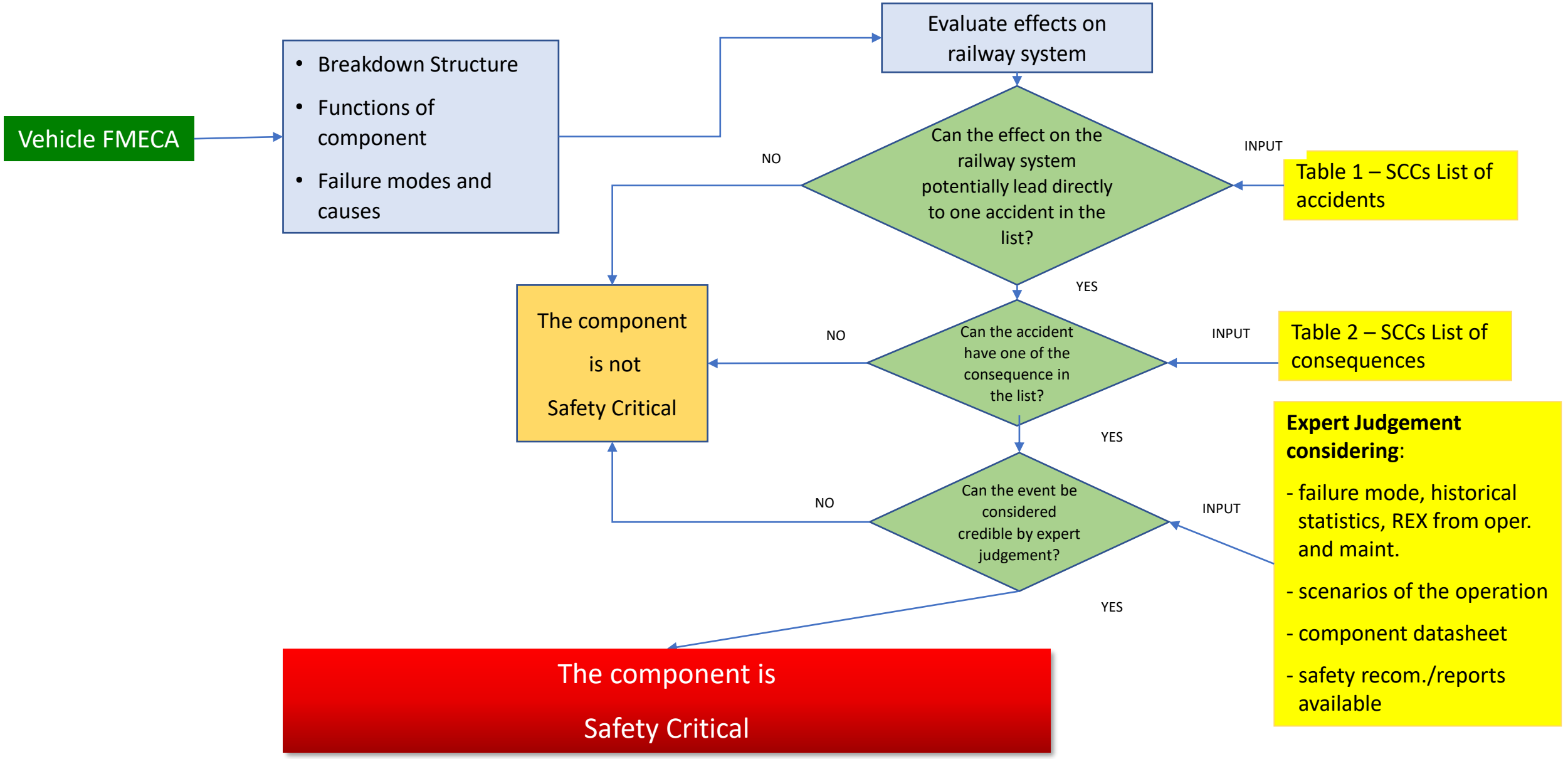




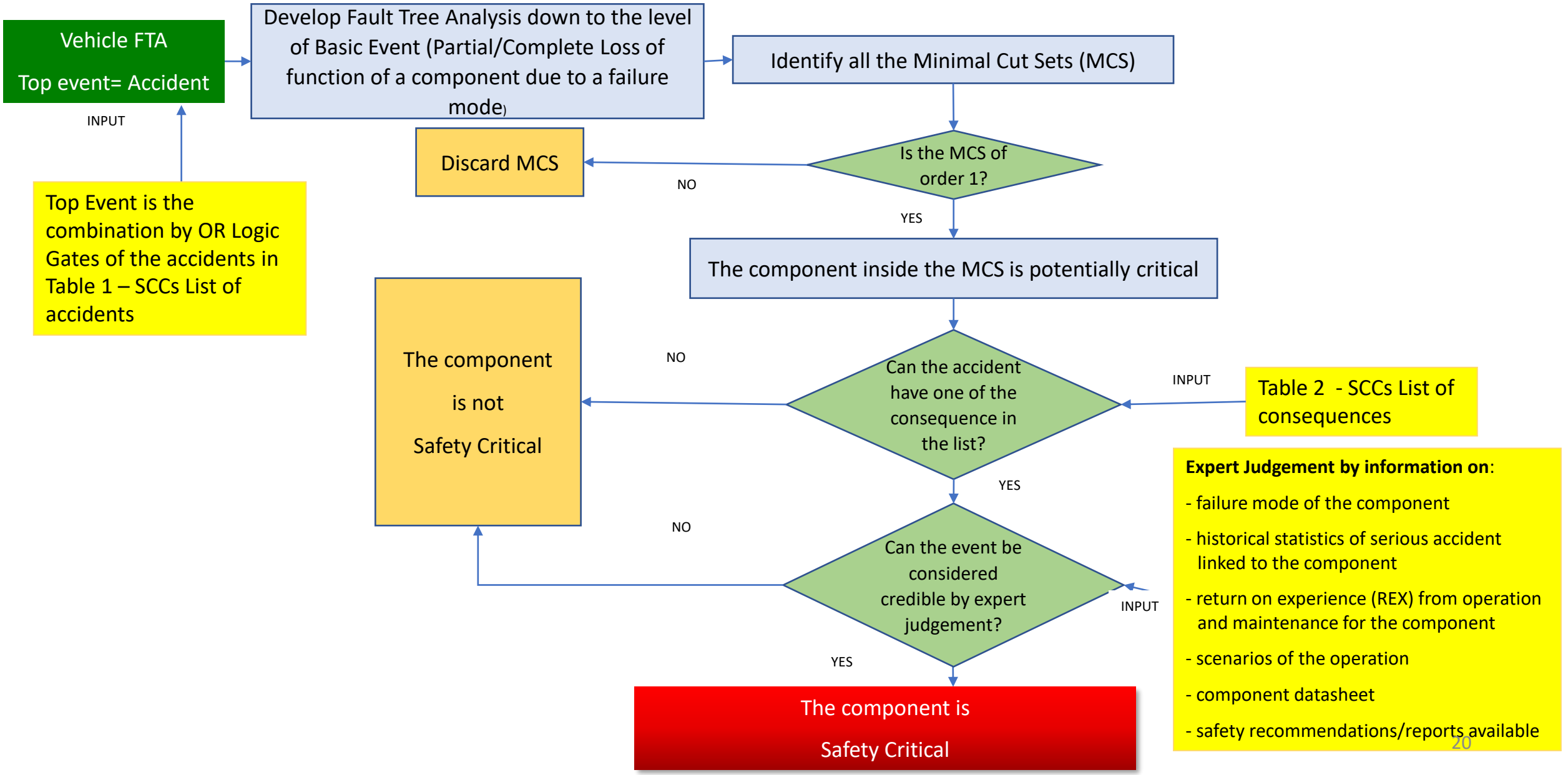
Safety Critical Components – Identification process
Perspective from ECM



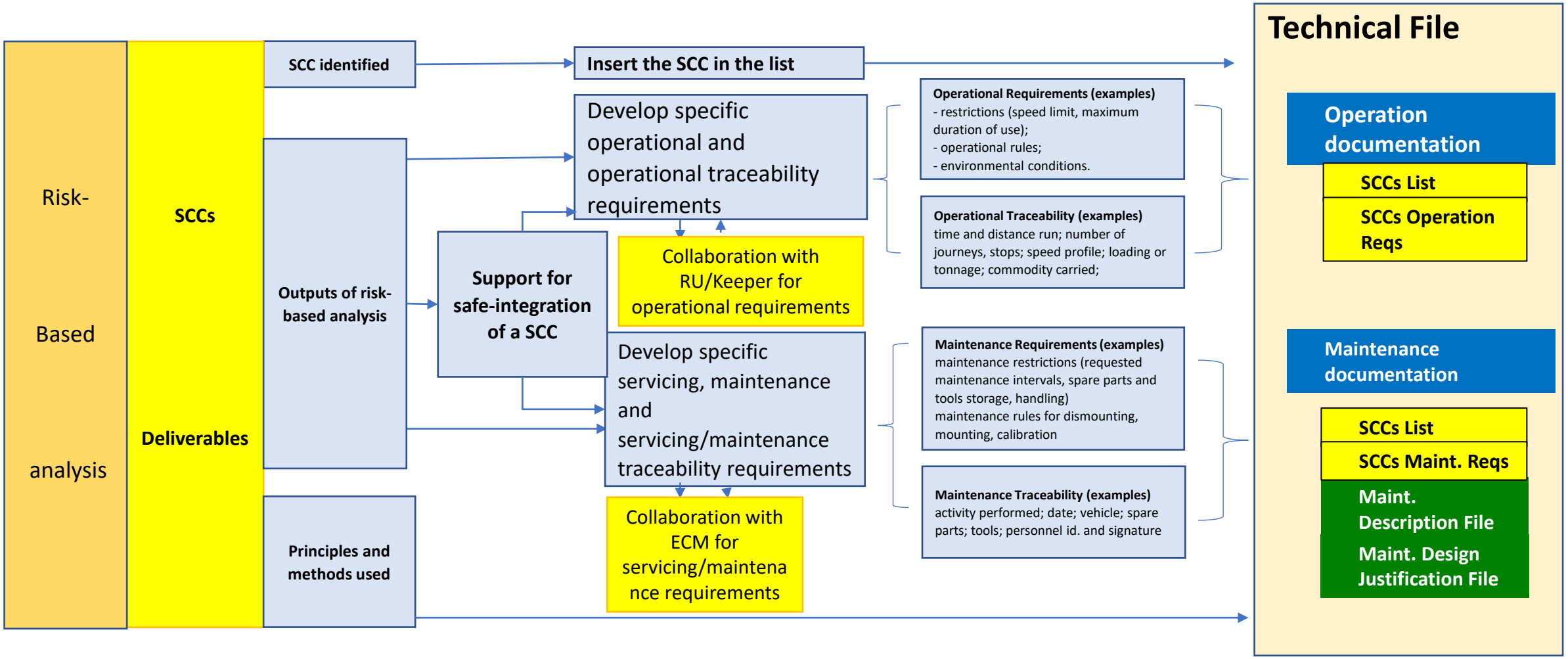
Safety Critical Components – SCCs – Identification method - 1



Safety Critical Components – SCCs – Identification method - 2



Safety Critical Components SCCs Deliverables



Trenitalia Tper

Safety Critical Components (SCC) - Focus

Springer Giovanni Marco – Responsible for Management Function (ECM-F1)

Cozza Leonardo - Fleet Maintenance Engineer

TRENITALIA TPER

2 June 2023

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Trenitalia Tper

Presentation

- Trenitalia Tper is a railway company with its own **safety certificate**
- Trenitalia Tper is certified as an **entity in charge of maintenance** ECM in accordance with Regulation (UE) No 779/2019

THE NUMBERS

155.000 TRAVELLERS

4.893 STORES → **19** TICKET OFFICES

880 RUNS PER DAY

1416 RESOURCES

90 + 26 NEW TRAINS

1 NEW MAINTENANCE PLANT «IMC Bologna»

THE FLEET

HITACHI **ROCK**

39

ALSTOM **POP**

47

STADLER **ETR350**

26

COMPLESSI **VIVALTO**

6

PESA **ATR220**

12

Automotrici/Rimorchiate Diesel **ALn**

67

HITACHI **ROCK 621**

4

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Railway Safety Management System

Compliance with standards and observance of mandatory regulations

Safety Management System as a strategic and systemic choice

Guarantee, as an entity in charge of maintenance, the correctness and timeliness of the maintenance processes in accordance with Regulation (UE) 779/2019

Railway Safety Management System

Risk analysis, assessment and monitoring as a process to support decision-making processes

Promote the culture of safety and stimulate the culture of risk assessment

Trenitalia Tper

Safety Critical Components (SCC) - Definition

Safety Critical Components (SCC) are components for which a single failure has a credible potential to lead directly to a serious accident resulting in stated consequences

1. any train collision or derailment of trains resulting in the death of at least one person or serious injuries to five or more persons or extensive damage to rolling stock
2. any other accident with the same consequences which has an obvious impact on railway safety regulation or the management of safety
3. ‘extensive damage’ means damage that can be immediately assessed by the investigating body to cost at least EUR 2 million in total

New vehicle

a vehicle for which an applicant has requested from the authorising entity the vehicle type authorisation for placing on the market under the new legislation (complying with Regulation 2018/545 and using the One-Stop-Shop of Agency).

Existing vehicle

SCCs identification in case of changes to the vehicle only for the parts of the vehicle related to engineering change renewal/upgrading/refurbishment

Entity managing the change

Identification of potential SCCs during maintenance

ECM

Trenitalia Tper

Safety Critical Components (SCC) - Procedure

Trenitalia Tper has its own sub-procedure for **Identifying and Monitoring** Safety Critical Components.

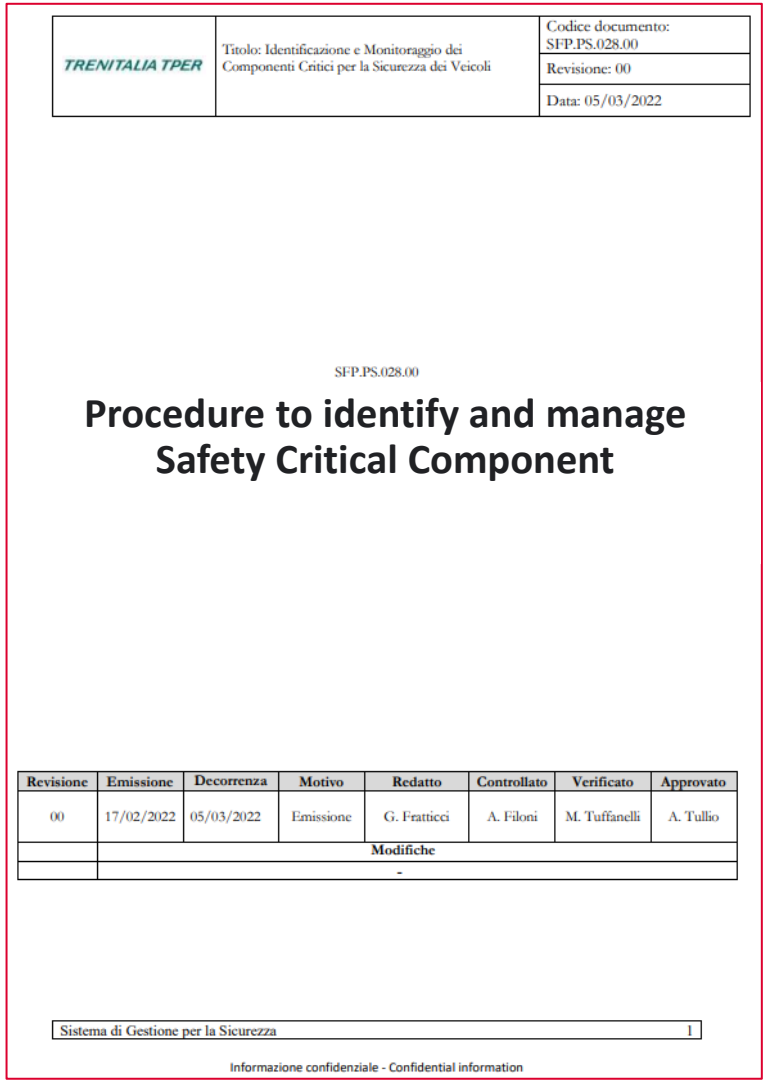
PS.028

Trenitalia Tper has outsourced the maintenance development Function (ECM-F2) relating to the development of maintenance to the following External Subjects:

- **Trenitalia** DT for new vehicles Rock ETR421-521-621, Pop ETR103-104 owned by Trenitalia and Trenitalia Tper;
- **MaFer** for existing vehicles ETR350, ATR220, E464, Vivalto, Aln/Ln.

Both external subjects have their respective identification and monitoring procedures for Identifying and Monitoring Critical Components.

With procedure PS.028 Trenitalia Tper implemented the documents and procedures of the suppliers



TRENITALIA TPER | Titolo: Identificazione e Monitoraggio dei Componenti Critici per la Sicurezza dei Veicoli | Codice documento: SFP.PS.028.00 | Revisione: 00 | Data: 05/03/2022

SFP.PS.028.00

Procedure to identify and manage Safety Critical Component

Revisione	Emissione	Decorrenza	Motivo	Redatto	Controllato	Verificato	Approvato
00	17/02/2022	05/03/2022	Emissione	G. Fratticci	A. Filoni	M. Tuffanelli	A. Tullio
	Modifiche						
	-						

Sistema di Gestione per la Sicurezza 1

Informazione confidenziale - Confidential information

Trenitalia Tper

Safety Critical Components (SCC) - Identifying

New Vehicles Rock ETR 621-521-421

For the Rock fleet, Hitachi (manufacturer) **has identified** Safety Critical Components which are indicated in the Maintenance Documentation Dossier through **a risk assessment** taking into account the use and environment of the components:

- **Carbody**
- **Running gears:**
  - **Standing Bogie**
    - **Bogie Chassis**
    - **Axile**
    - **Anti-roll Bar**
    - **Standing Bogie-Chassis Connection**
  - **Motor Bogie**
    - **Bogie Chassis**
    - **Axile**
    - **Gear**
    - **Secondary Sospension**
    - **Motor Bogie-Chassis Connection**
- **Traction and Repulsion**
  - **Automatic Coupler**
  - **Bearings**
  - **Springs**

HITACHI Inspire the Next

QY07P019504B Rev. 07 Pagina/*Page* 15/201

Safety Critical Component (SCC)

Codice RAM	Descrizione	Codice P/N
1	Cassa	034295CG01 cassa DM1 034446CG01 cassa TA 034448CG01 cassa TX 036292CG01 Cassa M3 034449CG01 cassa TB 034450CG01 cassa DM2
4	Organi di Corsa	
4.1	Carrello Portante	
4.1.1	Telaio	031644EB03
4.1.1.1	Telaio principale	031567EB01
4.1.1.3	Rulli limitatori	00069433EA01
4.1.2	Sala montata	032338EC01
4.1.2.1	Assile	00050274EC03
4.1.2.2	Ruota	00050272EC02
4.1.2.3	Cuscinetto	00050270EC04
4.1.2.4	Boccola a braccio	028837EC04 028836EC04
4.1.5	Barra antirollio	00055131EF01
4.1.6	Collegamento cassa-carrello	-
4.1.6.1	Trave di trascinamento	032146EB02
4.1.6.2	Biella di Trazione	030941ED03
4.1.6.3	Bilancere	033628ED03
4.1.6.4	Perno di trascinamento	00054369ED03

4.3	Carrello Motore	
4.3.1	Telaio	031388EB01
4.3.1.1	Telaio principale	030838EB01
4.3.1.4	Rulli limitatori	00069433EA01,
4.3.2	Sala montata	031421EC01
4.3.2.1	Assile	00050273EC03
4.3.2.2	Ruota	00050272EC02
4.3.2.3	Cuscinetto	00050270EC04
4.3.2.4	Boccola a braccio	028837EC04 028836EC04
4.3.2.5	Riduttore	031377EA03
4.3.4	Sospensione secondaria	
4.3.4.6	Ammortizzatore antiserpeggio	032629ED02
4.3.5	Barra antirollio	031630EF01 00055131EF01
4.3.6	Collegamento cassa-carrello	-
4.3.6.1	Trave di trascinamento	032146EB02
4.3.6.2	Biella di Trazione	030941ED03
4.3.6.3	Bilancere	033628ED03
4.3.6.4	Perno di trascinamento	00054369ED03
16	Dispositivi di collegamento	
16.1	Trazione e Repulsione	031377EA03
16.1.1	Accoppiatore Automatico	231 004934
16.1.1.1	Blocco Accoppiatore	230 041026
16.1.1.2	Molla di tensione (per il Blocco Accoppiatore)	230 008813
16.1.1.4	Involucro della Testa	230 031854
16.1.1.26	Cuscinetti in Gomma della Barra di Trazione	230 043970
16.1.1.27	Dispositivo Collassabile	230 043970
16.1.1.29	Dispositivo di Centraggio	230 041027
16.1.1.31	Manicotto di Accoppiamento	230 034730

With reference to the management of these SCCs, Trenitalia Tper **satisfies the maintenance requirements** for operation:

- **Traceability**
- **Identification by Serial Number (Bogie and Axile)**
- **Qualifications of the maintainers who carry out the maintenance activities**

TRENITALIA TPER

Trenitalia Tper

Safety Critical Components (SCC) - Identifying

New Vehicles Pop ETR 104-103

At the moment the manufacturer has not identified Safety Critical Components so Trenitalia and Trenitalia Tper, both as ECM, has chosen the **wheelset** as SCC based on Trenitalia's feedback on experience.

Considering the evolution of the attentional theme, Trenitalia Tper is studying other solutions about it.

Existing Vehicles ETR350, ATR220, E464, Vivalto, Aln/Ln.

Trenitalia and Trenitalia Tper, both as ECM, has identified the **wheelset** as SCC based on Trenitalia's feedback on experience .

Ongoing and Next Steps

- Inform Manufacturer, the holder of the vehicle type and the holder of the vehicle authorization (if these parties can be identified), when it becomes aware of evidence about a new SCC is identified .
- where necessary, addressing a request to the Manufacturer, directly or via the Keeper, for technical and engineering support about SCCs and their safe integration
- collaborating with the Manufacturer to develop specific servicing, maintenance and maintenance traceability requirements after the vehicles have entered into operation

TRENITALIA TPER

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Safety Critical Components (SCC) - Monitoring

Trenitalia Tper Management function **monitors** and **verifies** the correct application of the actions and criteria adopted by External Subjects and Fleet Maintenance Management (ECM-F3) and Maintenance Delivery (ECM-F4) regarding the management of the Critical Components.

- **Technical Meetings**
- **Maintenance Return of Experience**
- **Audit**
- **Engineering Studies**

TRENITALIA TPER

Trenitalia Tper

Safety Critical Components (SCC) – How To

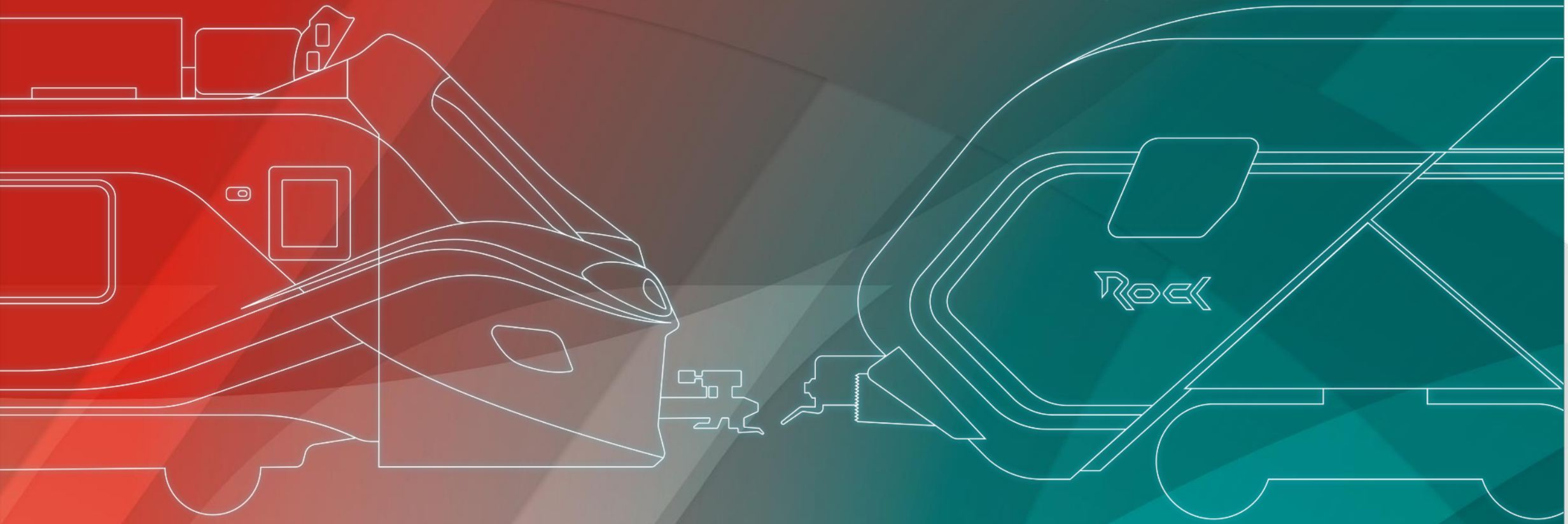
Trenitalia and Trenitalia Tper, as ECM, are **studying, learning and analyzing the SCCs** as required by article 4 of 779/2019 Regulation (UE).

In fact, Trenitalia and Trenitalia Tper already considered and still consider the function of «**Organo di Sicurezza**» (Safety Component) in compliance of ANSF Decree #4/2012, that defines the responsibilities and operating methods of the training delivery process, the certification and maintenance of the skills of the personnel who carry out the security activity of vehicle maintenance.

It is now clear that the regulamentation of SCCs is leading to the next level of safety to ensure the maximum safety criteria for the railways system.

TRENITALIA TPER

Thank you



ERA Webinar: Capture your Safety Critical Components. Improve your barriers

Manufacturer / ECM Experience

Raymond Groves

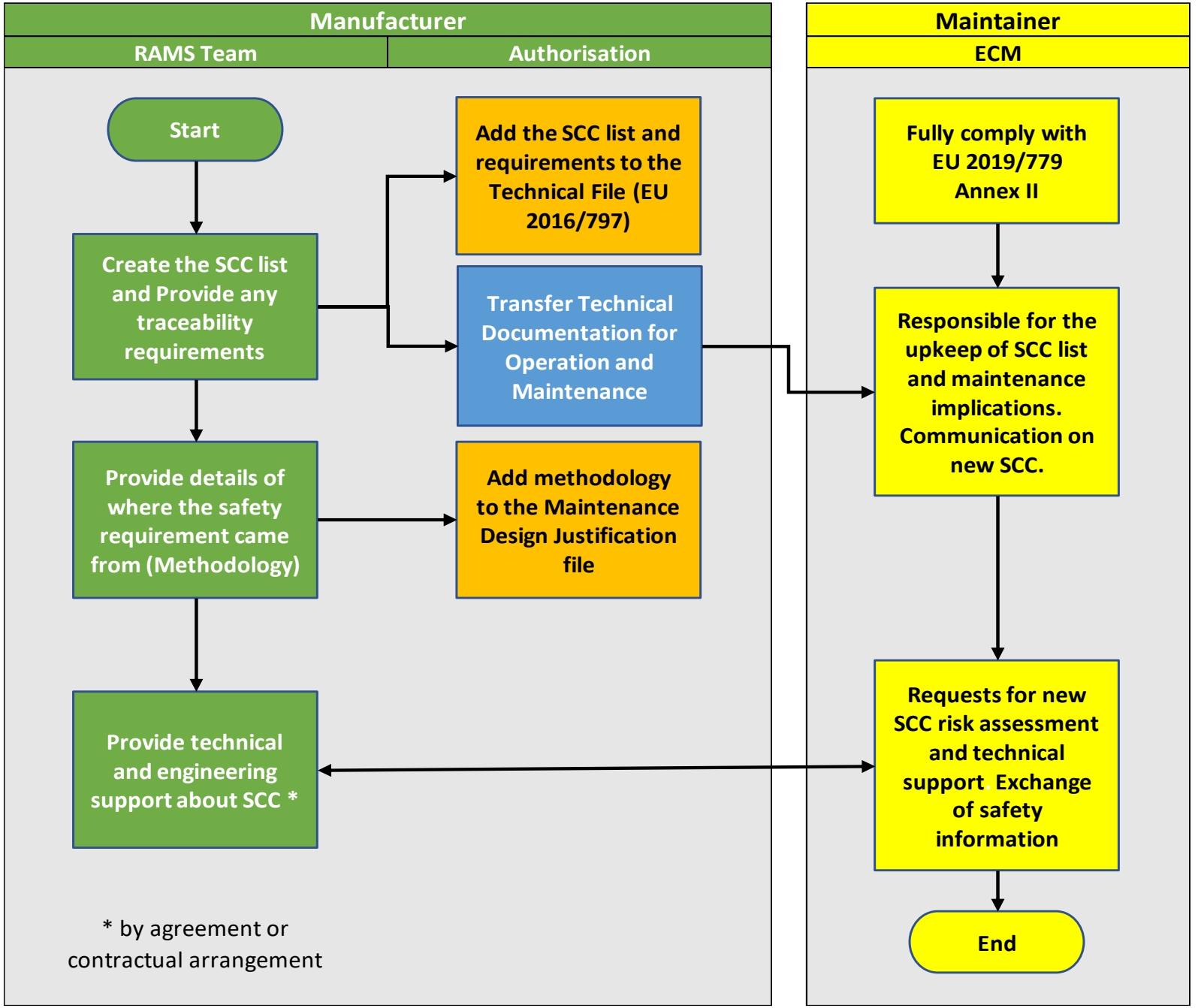
2nd June 2023

ALSTOM
• mobility by nature •

SCC: a Rolling Stock Manufacturer's point of view

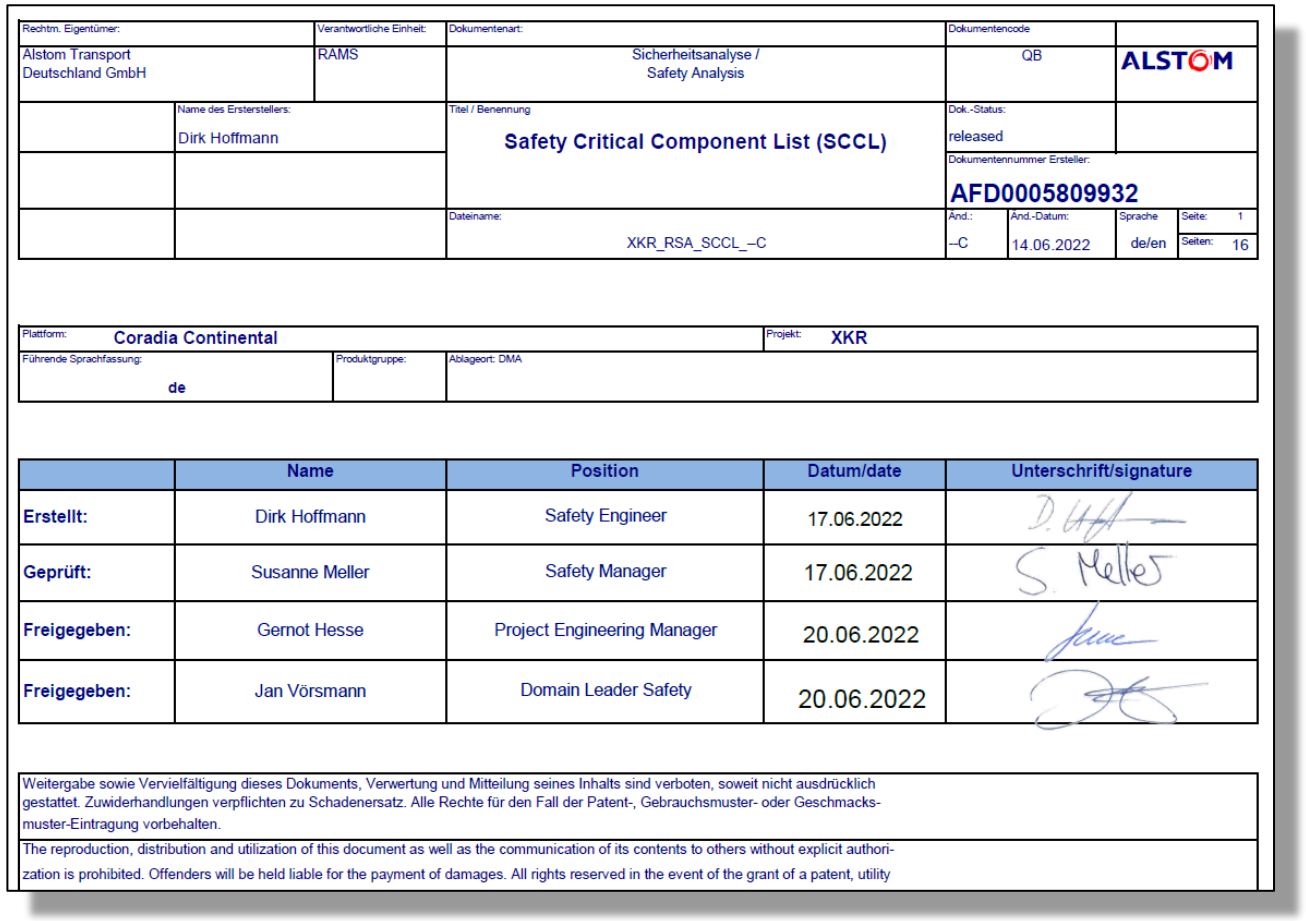
- Requirements of the **Fourth Railway Package** (4RP) relating to the creation of a **Safety Critical Components** (SCC) list
  - Interoperability Directive EU 2016/797
  - TSI revision regulations (all)
  - Entity in Charge of Maintenance Regulation EU 2019/779
    - New requirements primarily relating to Safety Critical Components (SCC) for the manufacturer and the use of the SAIT tool
  - Amendment to TSI (Loc&Pas) includes the requirement for a SCC list - (EU) 2019/766
- For the purposes of new build and **Vehicle Authorisation (EU 2018/545)**
- **Rolling Stock RAMS** teams are responsible for the creation of the SCC list and methodology document (risk assessment)
- **ECM EU 2019/779 Art. 4, 5. (a)** *manufacturers shall manage information on safety critical components and appropriate maintenance instructions related to them through reference in the technical file of subsystems.*

SCC = Safety Critical Component ECM = Entity in Charge of Maintenance RAMS =Reliability, Availability, Maintainability, Safety



This diagram shows the responsibilities between the two different actors - the New Build vehicle Manufacturer and the ECM Maintenance organisations.

SCC List - Example



Rechtm. Eigentümer:	Verantwortliche Einheit:	Dokumentenart:	Dokumentencode	
Alstom Transport Deutschland GmbH	RAMS	Sicherheitsanalyse / Safety Analysis	QB	ALSTOM

Name des Ersterstellers:	Titel / Benennung	Dok.-Status:	
Dirk Hoffmann	**Safety Critical Component List (SCCL)**	released	
		Dokumentennummer Ersteller:	
		AFD0005809932	

Dateiname:	And.:	And.-Datum:	Sprache	Seite: 1
XKR_RSA_SCCL_–C	–C	14.06.2022	de/en	Seiten: 16

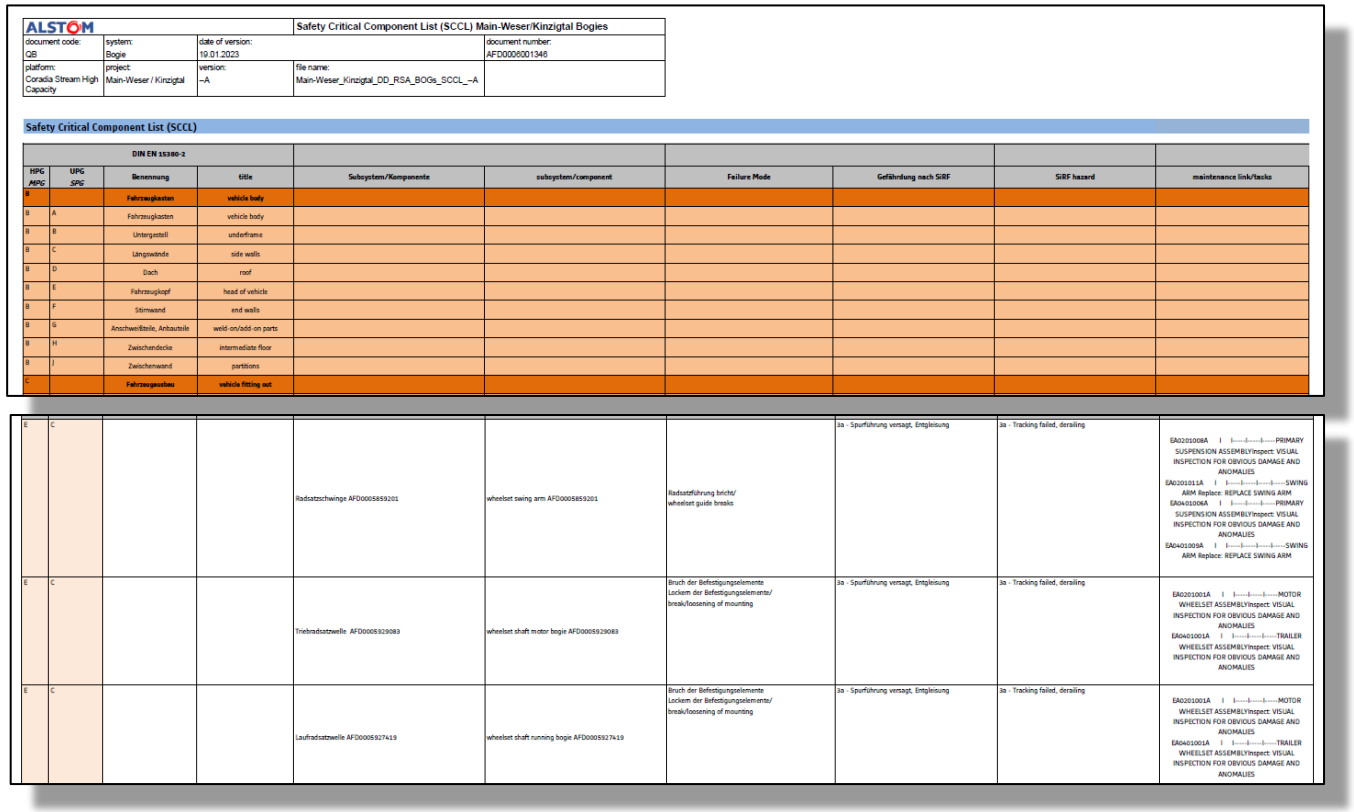
Plattform: **Coradia Continental**		Projekt: **XKR**
Führende Sprachfassung: **de**	Produktgruppe:	Ablageort: DMA

	Name	Position	Datum/date	Unterschrift/signature
Erstellt:	Dirk Hoffmann	Safety Engineer	17.06.2022	
Geprüft:	Susanne Meller	Safety Manager	17.06.2022	
Freigegeben:	Gernot Hesse	Project Engineering Manager	20.06.2022	
Freigegeben:	Jan Vörsmann	Domain Leader Safety	20.06.2022	

- The Safety Critical Component List (SCCL) is a mandatory component of the technical file, as outlined in the EU Interoperability Directive (EU 2016/797)
- In addition, the ECM Regulation (EU 2019/779), which falls under the EU 4th Railway Package applicable to Alstom as a rail vehicle manufacturer, also requires the SCCL
- Moreover, the SCCL aims to prioritise safety critical components during maintenance activities, ensuring they receive special attention.

SCC List produced as part of vehicle authorisations process deliverables

SCC List – Example for a Bogie



ALSTOM			Safety Critical Component List (SCCL) Main-Weser/Kinzigtal Bogies	
document code: QB	system: Bogie	date of version: 19.01.2023		document number: AFD0006001346
platform: Coradia Stream High Capacity	project: Main-Weser / Kinzigtal	version: --A	file name: Main-Weser_Kinzigtal_DD_RSA_BOGs_SCCL_--A	

Safety Critical Component List (SCCL)

DIN EN 15380-2									
HPG / MPG	UPG / SPG	Benennung	title	Subsystem/Komponente	subsystem/component	Failure Mode	Gefährdung nach SiRF	SiRF hazard	maintenance link/tasks
B		Fahrzeugkasten	vehicle body						
B	A	Fahrzeugkasten	vehicle body						
B	B	Untergestell	underframe						
B	C	Längswände	side walls						
B	D	Dach	roof						
B	E	Fahrzeugkopf	head of vehicle						
B	F	Stirnwand	end walls						
B	G	Anschweißteile, Anbauteile	weld-on/add-on parts						
B	H	Zwischendecke	intermediate floor						
B	I	Zwischenwand	partitions						
C		Fahrzeugeinbau	vehicle fitting out						
E	C			Radsatzschwinge AFD0005859201	wheelset swing arm AFD0005859201	Radsatzführung bricht/ wheelset guide breaks	3a - Spurführung versagt, Entgleisung	3a - Tracking failed, derailing	EA0201008A I ---PRIMARY SUSPENSION ASSEMBLY/inspect: VISUAL INSPECTION FOR OBVIOUS DAMAGE AND ANOMALIES EA0201011A I ---SWING ARM Replace: REPLACE SWING ARM EA0401008A I ---PRIMARY SUSPENSION ASSEMBLY/inspect: VISUAL INSPECTION FOR OBVIOUS DAMAGE AND ANOMALIES EA0401009A I ---SWING ARM Replace: REPLACE SWING ARM
E	C			Triebradsatzwelle AFD0005929083	wheelset shaft motor bogie AFD0005929083	Bruch der Befestigungselemente Lockern der Befestigungselemente/ break/loosening of mounting	3a - Spurführung versagt, Entgleisung	3a - Tracking failed, derailing	EA0201001A I ---MOTOR WHEELSET ASSEMBLY/inspect: VISUAL INSPECTION FOR OBVIOUS DAMAGE AND ANOMALIES EA0401001A I ---TRAILER WHEELSET ASSEMBLY/inspect: VISUAL INSPECTION FOR OBVIOUS DAMAGE AND ANOMALIES
E	C			Laufradsatzwelle AFD0005927419	wheelset shaft running bogie AFD0005927419	Bruch der Befestigungselemente Lockern der Befestigungselemente/ break/loosening of mounting	3a - Spurführung versagt, Entgleisung	3a - Tracking failed, derailing	EA0201001A I ---MOTOR WHEELSET ASSEMBLY/inspect: VISUAL INSPECTION FOR OBVIOUS DAMAGE AND ANOMALIES EA0401001A I ---TRAILER WHEELSET ASSEMBLY/inspect: VISUAL INSPECTION FOR OBVIOUS DAMAGE AND ANOMALIES

Zoom on the detailed elements identified:

- ***Bogie frame*** complete - loss/damage/break of bogie frame elements
- ***Wheel*** - wheel breaks
- ***Wheelset swing arm*** - wheelset guide breaks
- ***Wheelset shaft motor bogie*** - break/loosening of mounting
- ***Wheelset shaft running bogie*** - break/loosening of mounting
- ***Longitudinal guide*** - break/loosening of mounting

Elements included in the SCC List with failure mode considered – example Bogie

Discussion – difficulties in application of SCC for the Manufacturer

Current situation:

- Different definitions of accident types are given in the RSD EU 2016/798 and CSM-RA EU 402/2013 (EN 50126)

Activities	References	Used definitions
Reporting of safety in operation (CSI) and trigger for investigation	RSD 2016/798	Serious accident
Demonstration of safe integration and Safety requirement capture	CSM-RA 402/2013	Catastrophic Accident Critical Accident
Management of Safety Critical Components	ECM 2019/779 with reference to TSI Loc&Pas	Serious accident

- The safety demonstration for vehicle authorisation uses the accident scenarios for Catastrophic and Critical as required in accordance with CSM Risk Evaluation and Assessment EU 402/2013.

- Once the vehicle is under the responsibility of the RU and ECM, the operational and locational context can be reassessed addressing the Safety Directive requirement to consider also potential extensive damage to the infrastructure or the environment (e.g. the IM may be approached to assist with infrastructure details)

- The operating conditions may change over the life of the vehicle depending on any change in usage or new RUs e.g. passengers and goods transported, and routes operated.

RSD = Railway Safety Directive RU = Railway Undertaking CSM = Common Safety Method

Entity in Charge of Maintenance (ECM) – point of view

- The transferred technical documentation for Operation and Maintenance
- ILS / ISR team includes the flagged safety exports in the Maintenance Manual and match it to the maintenance tasks.
- ECM is responsible for the management of the SCC list during the O&M phase
- Alstom maintains 20% of fleets that are non-Alstom manufactured.
- Many are in service before the 4RP / ECM regulations → no SCC List exists
- However, it can be that the ECM needs to identify new SCCs e.g. following a vehicle modification that upgrades or introduces new or changed components
- CEN/TR17696:2021 Railway applications - Vehicle Maintenance - Guide for identification and management of Safety Critical Components for railway vehicles is a help.
  - However, CEN/TR 17696 talks about whether an “event” is credible regarding a potential SCC e.g. UAT maintenance means an axle failure is an incredible event?

ILS = Integrated Logistic Support ISR = Integrated Service Readiness UAT = Ultrasonic Axle Testing

Exported requirements SRAC in Maintenance Manual with traceability

Traditional Paper Documentation

ALSTOM	ROLLING STOCK		CHECKLIST	
Title	CITADIS XOs - 25,000 km Inspection Checklist		Version	A
AEC Reference	A-0000185815A-0000156562		Page	- 9 of 25 -

System	Brake Disk Assembly			TMP Reference				A-0000184737
Component	Calipers and Absence of Oil Leaks			eCatalogue Ref.				LRCX000336102
Qty	2 per Motor Car 4 per Trailer Car	Material	Safety degreasing solvent SOCOMOR hyso 94, Qty: 1	Tools		Standard Tool Kit, Qty: 1 Torque Wrench, Qty: 1 Dry Cloth, Qty: 1		
Maximo Task No./LRC Step No.	Task Description			**M1**	**C1**	**IC**	**C2**	**M2**
130 – A2 **130 – A3**	⚠ **WARNING:** Before any work on the brake calipers, make sure that the disks have cooled down. In fact, the disks heat up during braking and their cooling can take up to 3 hours (maximum). Secure and electrically lockout the trainset.							
130 – A4	Remove the skirt (Ref. LRCX000339320).							
130 - B	**SAFETY WARNING:** Safety related operation 430R358.							
130 – B1:10	Visually check the overall state of the calipers (good state, absence of oxidation, of corrosion).							
130 – B2:10	Check for possible leaks: • At couplings (1) and (2) of the hoses • Over the length of the hoses (3) and (4) • At the pressure taps (5) and (6)							
130 – B2:30 **130 – B2:40**	Check the oil level in the hydraulic power unit and if need be top up the oil.				-		-	
TOOL ID		**Calibration Date**		**Calibration Due Date**				
Remark(s)			**Staff Initial(s)**					

Example from a maintenance manual for a

Service Execution System (SES)

Ordine di Servizio : 60241716 **Descrizione Service order :** VG porte treno 04 - carrozza

Priorità SO: 1 **Tempo allocato:** 8

Op. nb.: 0020 **Descrizione operazione:** PORTE ESTERNE Op.A

LISTA OPERAZIONI | CHIUDI SO | RI-APRIRE L'OPERAZIONE | MODIFICAZIONE

Lista Sub-Operazioni | Aggiungi Componenti | Notifiche | Strumento utilizzato | Valori

CRONOLOGIA | TUTTI OK

Profile: Default Profile

Safety	Tool	Sta...	Descrizione Sub Op
Display			Not filtered
			Porte accesso passeggeri Lato Stella Azionare manualmente porta, verificare assenza blocco: cuscinettiguida inf.,kit cuscinetto glycodur, assenza danni snodo sfericoradiale,bocco la scorrimento tubo,snodo sferico radiale, kit braccio boccola. ESEM 15 3-167-169-173- 174-176-177-180.(Qual. E)
			Porte accesso passeggeri Lato Stella Verificare l'assenza di danni per: i fissaggi del supporto motore, il pignone vite<(>,<)> il kit boccola carrellino e i suoi fissaggi. Segue ESEM 153-167-169-173-174-176-177-180.(Qual. E)
			Porte accesso passeggeri Lato Stella Ispezionare guida interna, i suoi fissaggi ed il suo supporto: assenza di urti, deformazioni, presenza integrità fili di sicurezza sulle teste delle viti, presenza di tutte le parti di fissaggio e assenza di allentamento.(Qual. E). ESEM 152-145

SES shows “Safety related” task with a Red warning sign. This will replace the paper check list in our Depots

SRAC = Safety Related Application Conditions SES = Services Execution System

Conclusions

1. **Regulations** in the 4RP introduced new SCC requirements on the Manufacturer and the ECM
2. **Manufacturer** – initially concerned to produce the SCC list for Vehicle Authorisation
   - SCC List document in the Technical File
   - Risk Assessment method included in the Maintenance Design Justification file
3. **ECM** – is then responsible to manage the SCC List for the remainder of the O&M lifecycle
   - For example, tagging specific SCC tasks in the Work Instruction
   - Ensuring adequate control processes in compliance with CSM Monitoring
   - Identifying new or changes components that may be in the SCC list (e.g. as a result of change)
4. An **Example has been shown**
   - SCC Lists do exist
   - SCC items identified
5. **Question** – the requirement for Manufacturer to perform Safety Demonstration to one definition (CSM RA) and SCC list to another (ECM)

CSM Monitoring EU 1078/2012 CSA Risk Acceptance EU 402/2013

Conclusions

6. **ECM and RU -** have a role during the O&M phase on the Vehicle usage in the identification of **Environmental** and **Infrastructure** related hazards likely to involve the SCC definition. Arguably this is outside the knowledge of the Manufacturer
7. What to do about **older vehicles** and where the Manufacturer is no longer around?
8. Little or **no Feedback / REX** on other SCC Lists
   - Should there typically be 1 or 100 items?
   - Any views or challenges from the assessment bodies?
   - The EU Agency for Railways?
9. The Manufacturer identifies safety critical components, recognising their vital role as **safety barriers** against potential hazards.
10. The ECM ensures controlled maintenance of safety critical components through robust **documented processes** and strict **quality checks**, serving as additional barriers that effectively prevent potential failures.

---- Thank you ----

REX = Return on Experience / Lessons Learned

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• mobility by nature •

Questions/Answers

EUROPEAN UNION AGENCY FOR RAILWAYS

Give us your feedback

EUROPEAN UNION AGENCY FOR RAILWAYS

Upcoming ERA Events

TSI Revision Package 2023: Key Changes (part 1)

15 June

12.00-13.00 (CEST)

ETCR Seminar 2023

3-14 July

REGISTER NOW

Bruges, Brussels, Antwerp – Belgium

19 June

REGISTER NOW

Safety Leadership Training

20-22 September

Tallinn, Estonia

REGISTER NOW

Safety Days 2023

Give us your feedback

THANK YOU

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