BEYOND THE TRACKS: BUILDING PARTNERSHIPS AND TRANSPORT SYSTEM RESILIENCE

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VALENCIA
OCTOBER 2024

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BEYOND THE TRACKS: BUILDING PARTNERSHIPS AND TRANSPORT SYSTEM RESILIENCE

Extreme Weather Events and Floodings

Flash pluvial floods in Valencia. October 29th 2024

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Contents

- Damaged area, what do we find?: HSL and commuter lines
- How do we organize ourselves? Emergency management
- Repair lines: current situation
- Technical contingency plans
- Especific actions of Directorate of Security and Civil Protection
- Improving the Resilience of Railway Infrastructure
- Best practices

Damaged area
What do we find?

How do we organize ourselves? Emergency management

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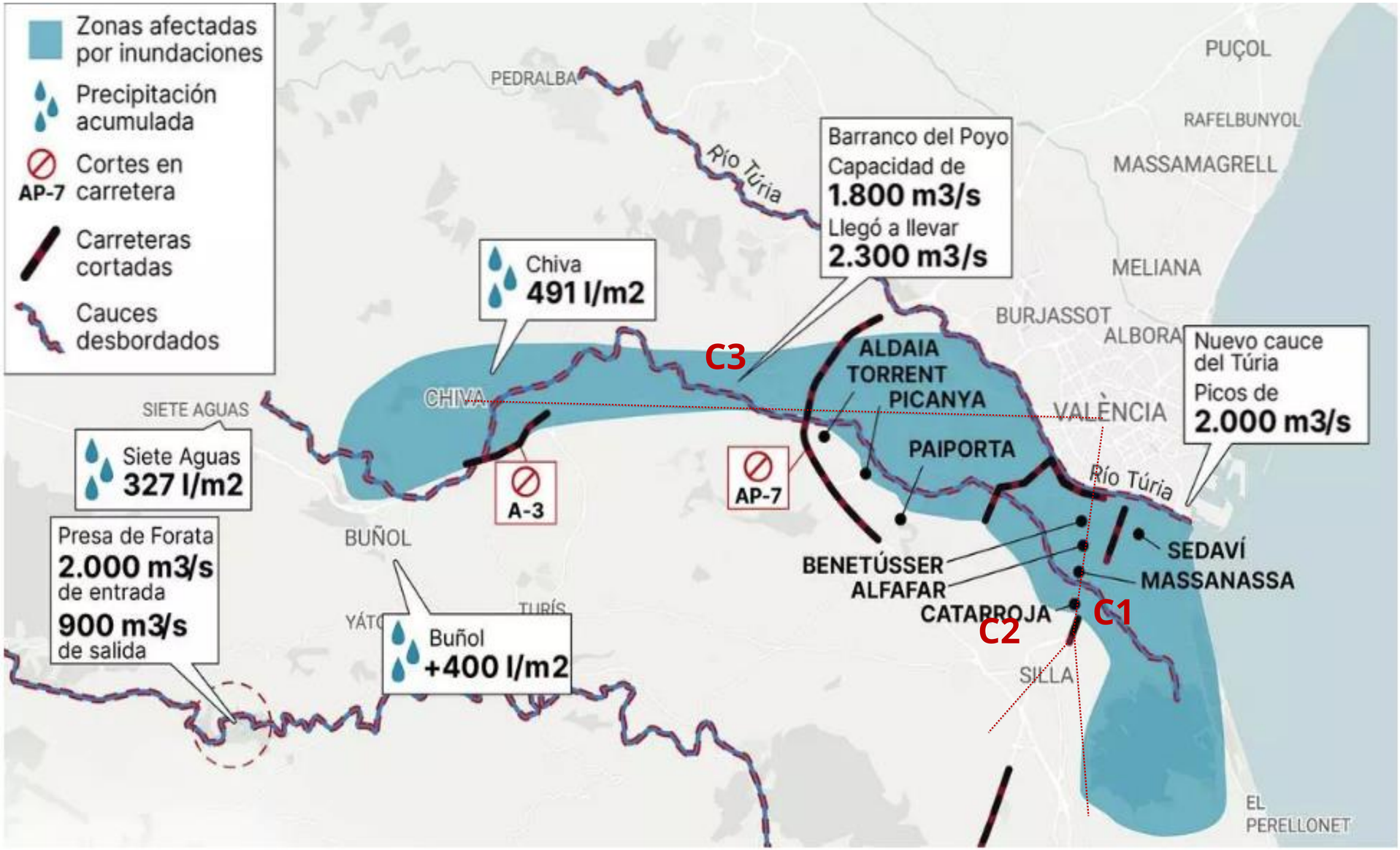
Valencia flood 29th of October



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Damaged area. What do we find?

HSL Madrid València

- **Chiva tunnel**, 1,2 kilometres of infrastructure that have completely collapsed
- **Torrent tunnel**, 2,9 kilometres was flooded

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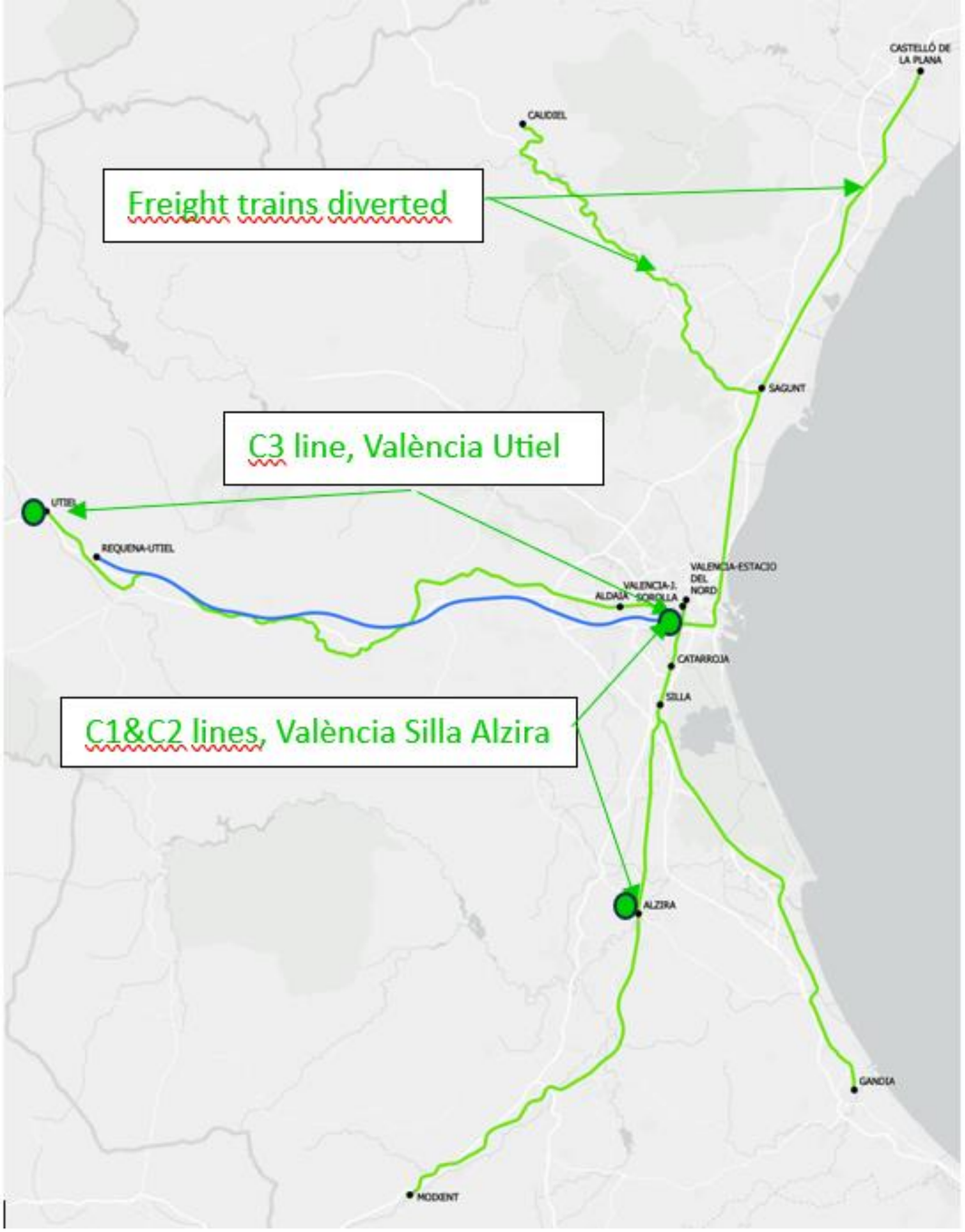
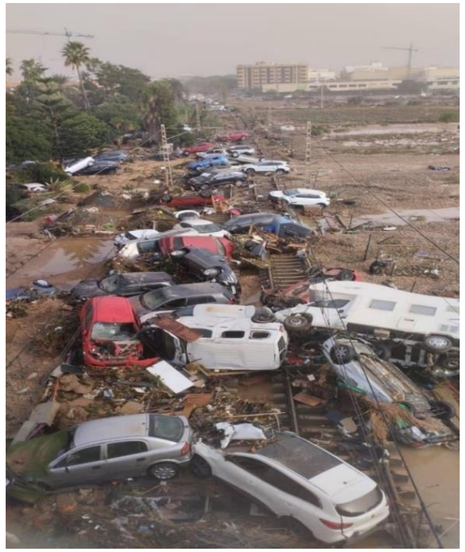


Damaged area. What do we find?

Commuter trains

- **Three lines damaged:**
  - **Ninety kilometres of the C3**, Valencia Utiel
  - **Twenty-five kilometres of the C1 and C2**, València – Silla – Alzira (intermodal, steel and automotive **freight trains** with origin and destination in the Port of Valencia, Sagunto and Center and North diverted through TERUEL and Tarragona)



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DETALLE DANA LÍNEA C-3

Notas a tener en cuenta:

- Daños en Buñol-utiel, similares a los del Valencia-Buñol, estaba el corte a partir de enero de 2025 para su renovación, por lo que su reparación responde a otra estrategia en combinación con dicha obra

UTIEL

BUÑOL

CHIVA

CHESTE

1.000 M

900 M

+ 300 M ambos lados de las estructuras

4.000 M

LORIGUILLA

3.000 M

500 M

900 M

1.500 M

ALDAIA

CMS: revisión del cableado de campo en la estación

VALENCIA NORD

VALENCIA SANT ISIDRE

Xirivella

Mislata

Aeropuerto de Valencia-Manises

Barranc de Torrent

Benaguasil

La Pobla de Vallbona

Vilamarxant

Barranco de La Teulada

Barranco de los Olmos

Riba-roja de Túria

L'Eliana

San Antonio de Benagéber

Barranc de

La Pobla de Farnals

Massamagrell

Massalfassar

Albalat dels Sorells

Foios

Meliana

Rambla de Poio

Río Turia

N

LEYENDA

Edición: 06/11/2024

- Daños estructura
- Reconstrucción de plataforma de especial dificultad
- Daños plataforma
- Daños superestructura
- Daños puntuales
- Otros daños no significativos (retirada de objetos, cerramientos, etc.)

Nota: la información está sujeta a variaciones en función de la evolución de las inspecciones que se están realizando.

Ninety kilometers of single track affected, 4 bridges, 6 underpasses, and 5 station buildings and equipment

DETALLE DANA LÍNEAS C-1 Y C-2

VALENCIA SANT ISIDRE

1,500 m

ALFAFAR-BENETUSSER

PN Alfafar: Sustitución de toda la electrónica

Barranco El Poyo

700 m

MASSANASSA

CATARROJA

700 m

200 m

SILLA

BENIFAIÓ

Todas las vías de la estación

ALGEMESÍ

1.300 m

ALZIRA

LA POBLA LLARGA

Twenty-five kilometers of double track affected, 12 underpasses, and 5 station buildings and equipment

LEYENDA

Edición: 06/11/2024

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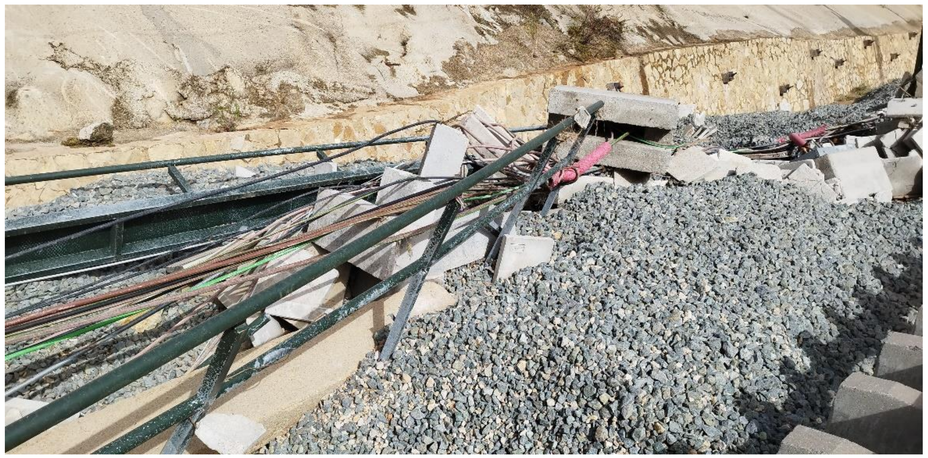
HSL: Chiva tunnel reopened on 14Th November 2.024



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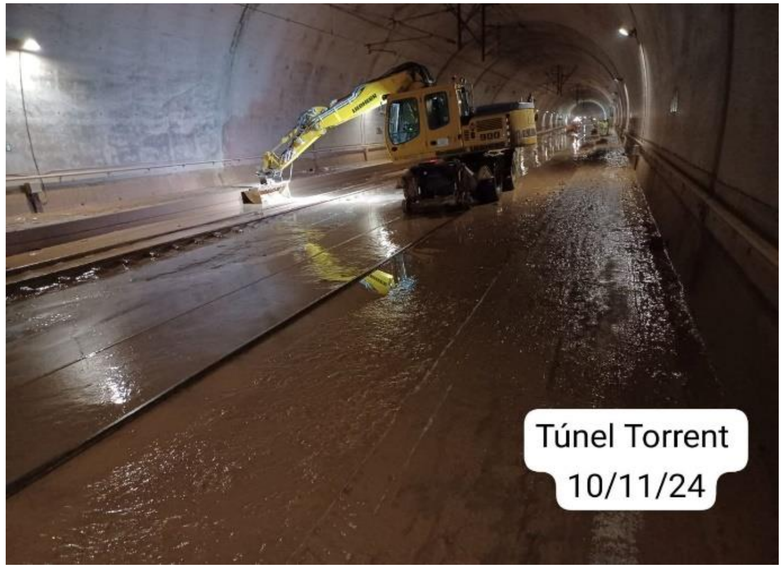
HSL: Torrent **tunnel reopened on 14Th November 2.024**



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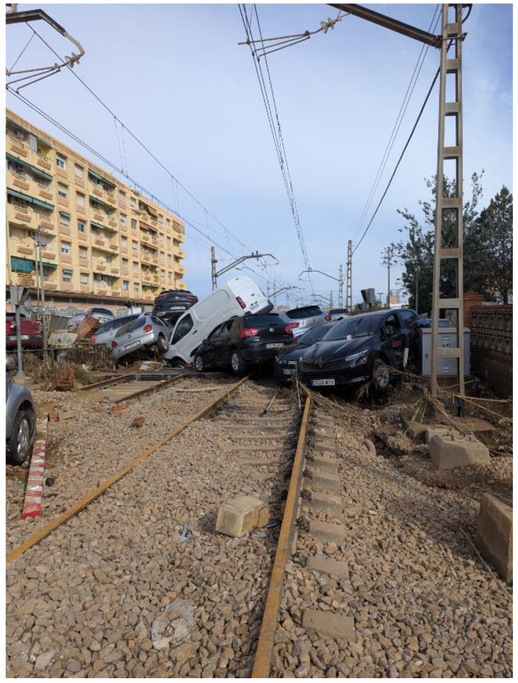
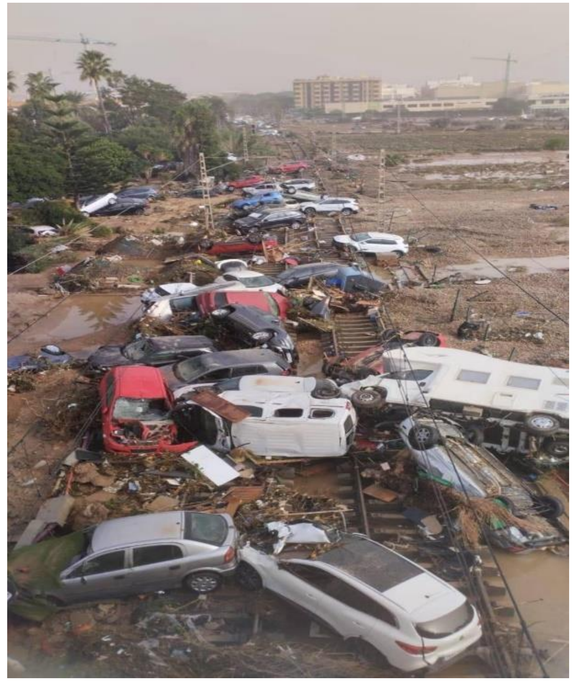
Commuter lines C1 & C2 are completely reopened on December 16 th, 2024.





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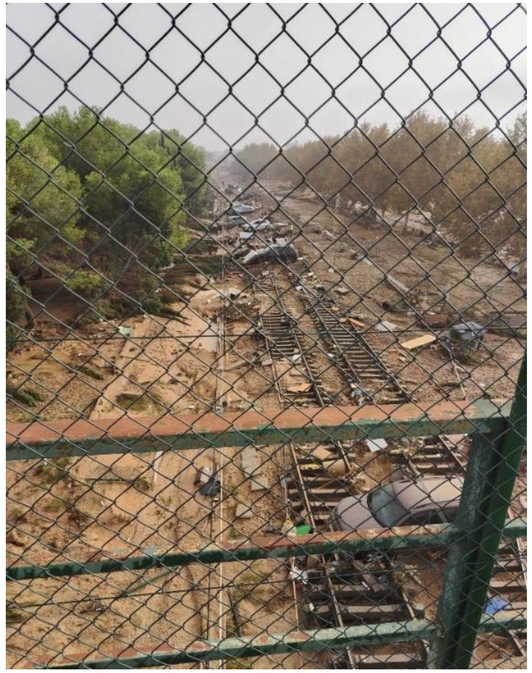

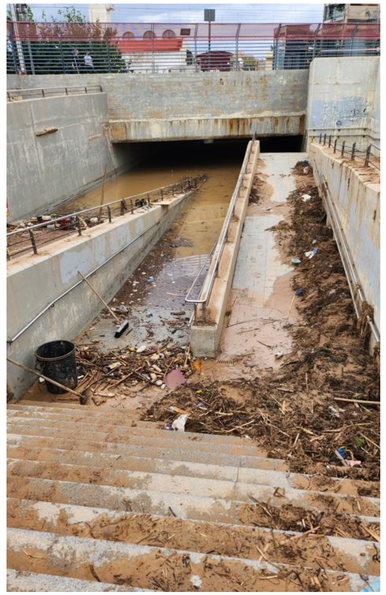

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C3 line it is in a very complicated situation only 10 km reopened December

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C3 line: state of the art
Bridge after the floods

Current status of the works on one of the affected bridges that needs to be rebuilt.

How do we organize ourselves?

Immediate purpose:

Restore traffic as soon as possible under safe conditions.

Strategy	• Visual and Technical Inspection (on foot and with drones) • Analysis, evaluation, and assessment of damages • Drafting and finalizing the emergency report • Internal and external teams, structured and coordinated • Sectorization and division of sections by companies
Monitoring	• Daily reports by sections for each emergency lot • Ensuring compliance with regulatory standards and safety protocols. • Diagnosis for prioritization of short-term actions • Establishment of a schedule to restore traffic by sections and lines

How do we organize ourselves?

Emergency management: Processes established for infrastructure repair following extreme weather events

State contract law

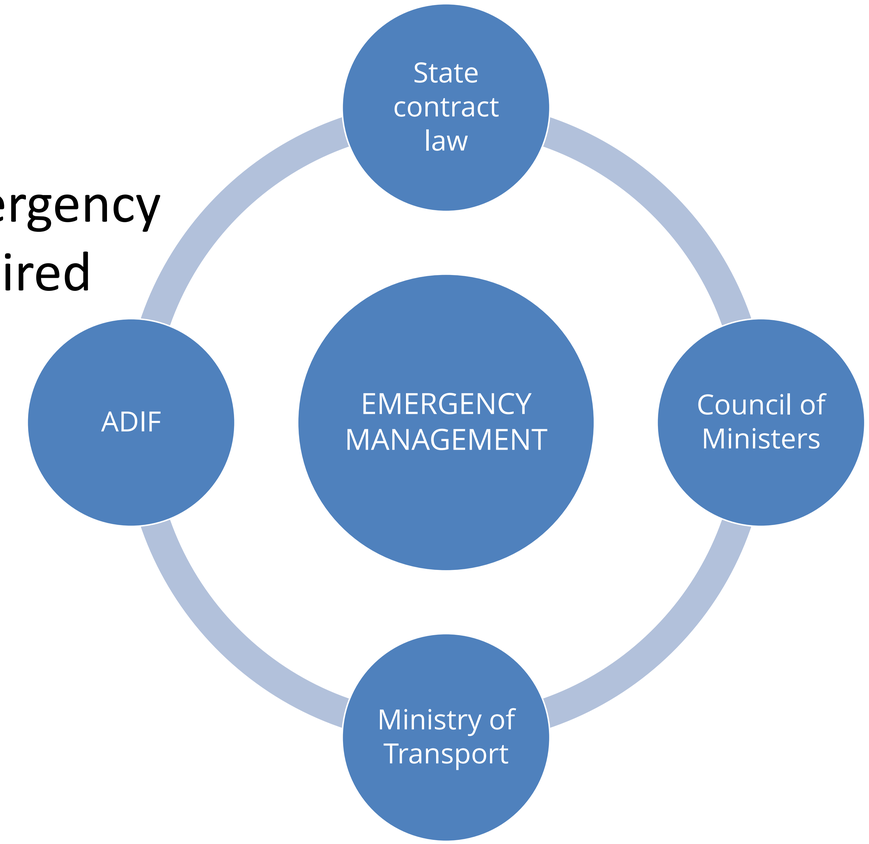
Public Sector Contracts, contemplates the possibility of “emergency processing” in those cases in which immediate action is required due to catastrophic events

The Council of Ministers

adopts the Agreement declaring Valencia area as "Area seriously affected by a civil protection emergency"

Ministry of Transport and Sustainable Mobility

The processing of emergency works by ADIF is adjusted to procedures and protocols referring to the processing of emergencies in accordance with the ministry



Management model in the event of an emergency caused by following extreme weather events (climate change)

The State Contract Law allows, the establishment of mutual verbal agreements with contractor/contractors, until the emergency report is approved by the Council of Ministers.

- **Criteria for the selection of these contractor/contractors:**
  - **Availability to undertake the work as soon as possible.**
  - **Presence in the emergency area to execute the required tasks**
  - **Ability to perform maintenance or construction activities on the railway infrastructure in the area affected by the emergency**
  - **Availability of the necessary technical and human resources to carry out above mentioned actions**

Specific actions of Directorate of Security and Civil Protection

- Monitoring and surveillance by the Protection and Security Center (until the video system was damaged by the DANA and became inoperative) of the rainfall, informing the Traffic Control Centers in real time.
- Adif activated the Railway Infrastructure Protection Plan in the part of the network affected by the DANA. This involved contacts and coordination with the concerned agencies, organizations and authorities.
- Civil Protection resources (most of them are part of external companies contracted by Adif) collaborated in the assistance to passengers, rolling stock and stations.
- For the areas where access control was established by state security forces, Adif obtained permission for Adif to have freedom of movement and access to realize its activities.

Repair lines & current situation

- Commuter lines C1 & C2 are completely reopened on December 16 th, 2024, after six weeks of intensive work to clear the tracks and stations of vehicles, mud and materials, and to repair the infrastructure and control, command and signaling, station platforms and waiting areas
- C3 line it is in a very complicated situation with four viaducts, with their abutments destroyed as well as the platform in many sections. Only the first 10 kilometers have been recovered.
- Specifically, ADIF has removed more than 1,500 vehicles from the lines, reviewed and lifted the track, repaired platforms, replaced the tracks and ballast and carried out safety tests to put them into service in optimum conditions.
- This work has also been carried out on the high-speed line between Madrid and Valencia (operational since November 14 th), where the platform had to be rebuilt and the tracks had to be replaced in the area of the Chiva tunnel, and the safety installations of the Torrent tunnel, which was flooded.

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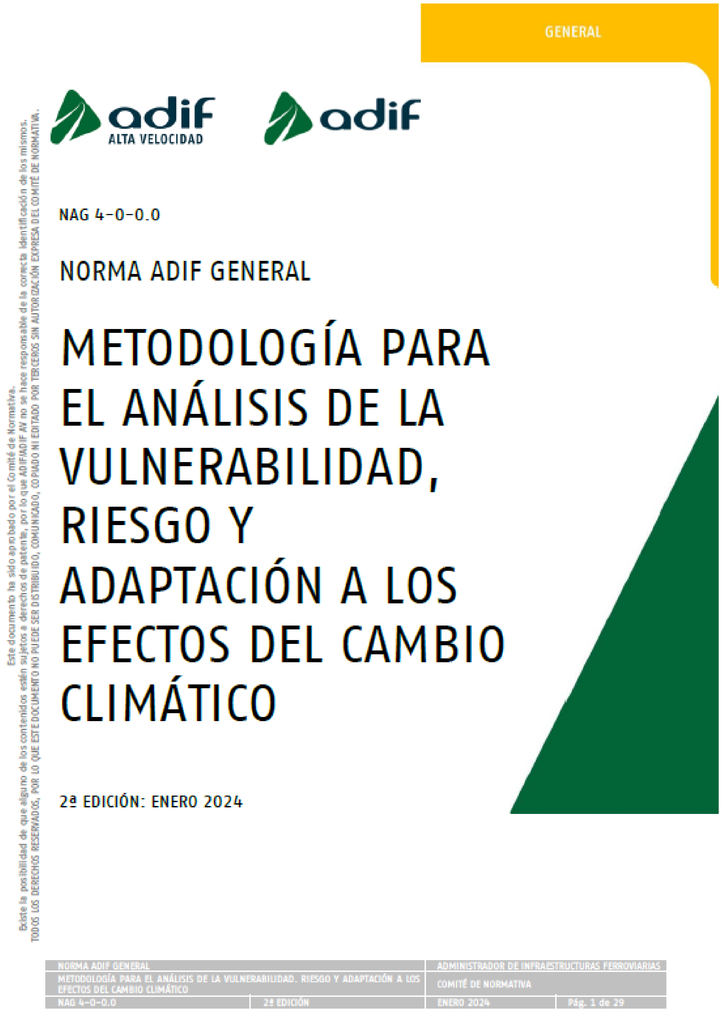
Improving the Resilience of Railway Infrastructure

Adif and Adif AV Climate Change Action Plan

Adaptation Studies


GENERAL

adif ALTA VELOCIDAD adif

NAG 4-0-0.0

NORMA ADIF GENERAL

METODOLOGÍA PARA EL ANÁLISIS DE LA VULNERABILIDAD, RIESGO Y ADAPTACIÓN A LOS EFECTOS DEL CAMBIO CLIMÁTICO

2ª EDICIÓN: ENERO 2024

NORMA ADIF GENERAL		ADMINISTRADOR DE INFRAESTRUCTURAS FERROVIARIAS	
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NAG 4-0-0.0	2ª EDICIÓN	ENERO 2024	Pág. 1 de 29

Stage 0. Preparation

- Understand the project to be evaluated: infra components, the most significant ones, etc
- Define the time horizon (short, medium, long term)

Stage 1. Vulnerability

- Identify the degree of vulnerability based on infrastructure components, service parameters, and exposure to climate variables (temperature, precipitation, winds, etc.)
- Vulnerability: Sensitivity x Exposure

Stage 2. Risk Assessment

- Identification of potential impacts
- Projections and variables to be used
- Risk assessment: Severity x Probability
- Evaluation Report

Railway Infra.
Railway service

Stage 3. Adaptation

- Identification measures→ **Adaptation Plan**

JASPERS. Guidance Note "The basics of Climate Change Adaptation. Vulnerability and Risk Assessment"

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Technical contingency plans

- ADIF has a Contingency Plan that allows it to categorize and solve any problems that disrupt traffic
- This plan includes a series of fact sheets containing guidelines for acting in (pre-) emergency situations for three types of impacts whth climatic events:
  - rain intensity
  - Wind intensity
  - Depht of snow
- This information is provided by AEMET (State Meteorological Agency) for the rail network, and produces 24-hours weather forecast (wind, rainfall and snow) for every 5 km of each line (conventional and high-speed) and sen them to ADIF every six hours.
- AEMET issues a waning alert

RIESGO DEL PUNTO	Sin Identificar	Medio	Medio-Alto	Alto con T	Alto sin T
ALERTAS					
Nivel de Alerta 1			Reconocimiento en recorrido una vez al día.	Reconocimiento en recorrido una vez al día. LTV – (T)	Reconocimiento en recorrido una vez al día.
Nivel de Alerta 2		Reconocimiento en recorrido una vez al día.	Reconocimiento en recorrido una vez al día. LTV – (T)	Reconocimiento en recorrido una vez al día. LTV – (T)	Reconocimiento en recorrido una vez al día.
Nivel de Alerta 3	Reconocimiento en recorrido una vez al día.	Reconocimiento en recorrido una vez al día.	Vigilancia Específica Periódica. LTV – (T)	Vigilancia específica Periódica. LTV – (T)	Vigilancia específica Periódica.

Technical contingency plans (I)

ADIF has a Contingency Plan that allows it to categorize and solve any problems that disrupt traffic-

The structure and subject are as follows:

- **Adif Contingency Plan. General.**
  - **Annex I: Priority Criteria in Traffic Regulation**
  - **Annex II: Incident Prevention and Management: Incident Management Handbook**
  - **Annex III: List of persons in charge and contact telephone numbers**
  - **Annex IV: Contingency Indicators Monitoring**
  - ***Annex V: Winter: Preventive Measures Plan***
  - ***Annex VI: Summer: Preventive Measures Plan***
  - ***Annex VII: Fire Preventive Measures Plan***

Exchanging best practices

- Being resilient is not the same as being prepared for a catastrophe of this magnitude, but it helps to cope with it.
- Management model: retaining and sharing knowledge with external companies in railway specialties, enables strong involvement and reinforces this management.
- Ensure effective and coordinated action during the event to save lives and reduce damage
- The technical and economic requirements are established in the contract specifications.
- When it comes to being more effective, especially in the case of extreme weather situations, having a well-organized maintenance schedule and good response times are important.
- Incorporating climate change into new construction projects, as well as development and implementation of weather monitoring systems should be accelerated, to be able to implement them in old and new infrastructures

Thank you very much for your attention
Any questions?

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TRANSPORT SYSTEM RESILIENCE AND SUPPLY CHAINS

François Combes

Freight Transport Economist

Université Gustave Eiffel

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TRANSPORT SYSTEM RESILIENCE AND SUPPLY CHAINS

Logistics is about providing commodities:
- According to **customer requirements**
- With **cost efficiency**

Customer requirements include:
- **Flexibility**
- **Availability**
- **Reliability**

Supply chains are globalized. Globalization:
- Stimulates competition, cost-efficiency, and innovation
- Stimulates **product diversity**
- Implies efficient, yet **complex**, transport chains

TRANSPORT SYSTEM RESILIENCE AND SUPPLY CHAINS

Logistics is about providing commodities:

- According to **customer requirements**
- With **cost efficiency (tends towards low stocks, and speed)**

Customer requirements include:

- **Flexibility (tends towards low stocks, and speed)**
- **Availability (assumes resilience)**
- **Reliability (assumes resilience as well)**

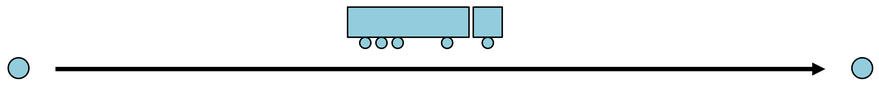
Supply chains are globalized. Globalization:

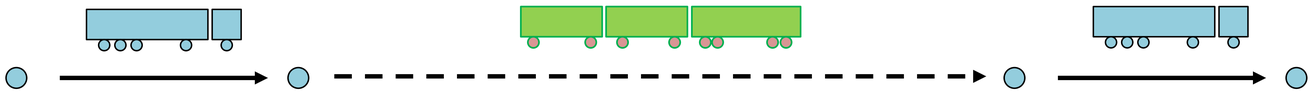
- Stimulates competition, cost-efficiency, and innovation
- Stimulates **product diversity (tends towards low stocks)**
- Implies efficient, yet **complex**, transport chains

TRANSPORT SYSTEM RESILIENCE AND SUPPLY CHAINS

Vulnerability comes from **exposure,** exposure increases with the serial combination of operations

- Using massified mode can increase vulnerability





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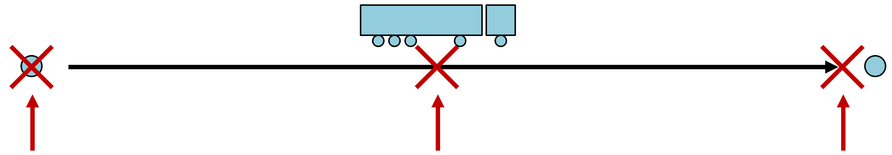

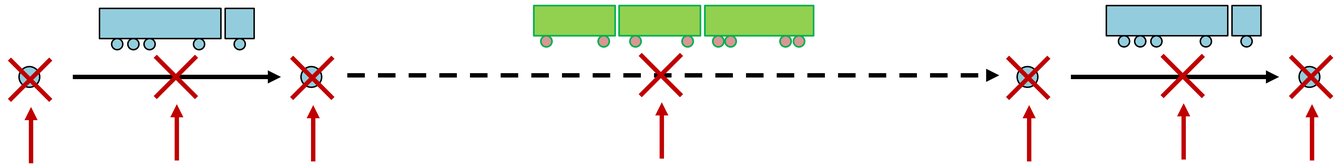

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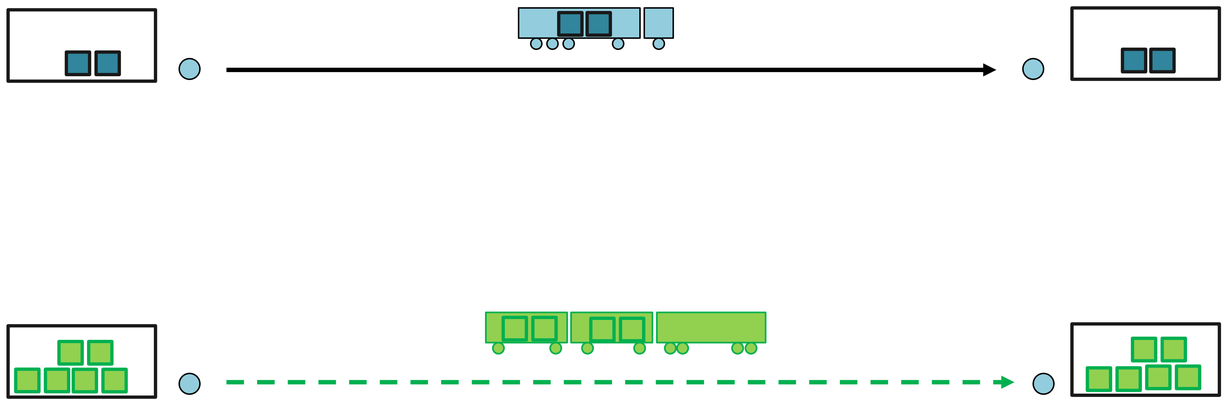
TRANSPORT SYSTEM RESILIENCE AND SUPPLY CHAINS

- **Vulnerability** comes from **exposure,** exposure increases with the serial combination of operations
- - Using massified mode can increase vulnerability

- However, massified modes can be an instrument for resilience
  - Massification implies **buffers**; buffers **absorb shocks**
  - Multimodal networks can improve redundancy



TRANSPORT SYSTEM RESILIENCE AND SUPPLY CHAINS

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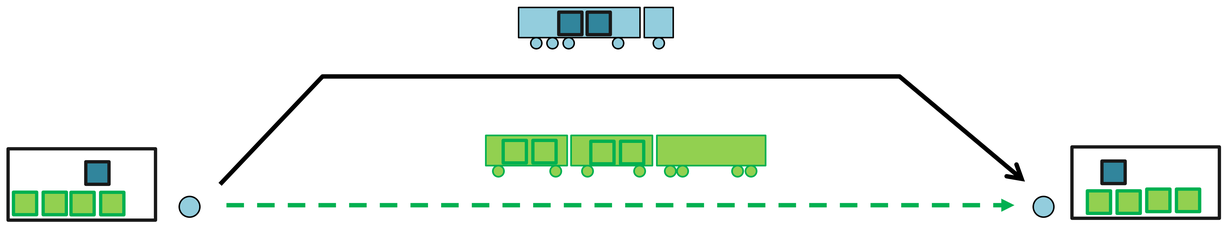
Multimodal networks can improve redundancy

Parallel (massified + low capacity) modes can also reduce vulnerability



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TRANSPORT SYSTEM RESILIENCE AND SUPPLY CHAINS

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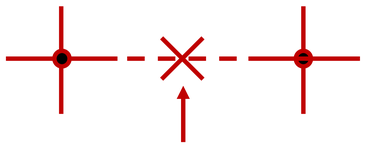
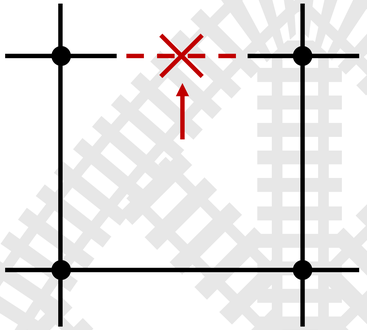
Network density plays a major role

- Increases risk exposure, but reduces risk impacts **even more**
- When disruptions remain local, return to normal state is made easier





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There is great common value to resilience.

However, improving global resilience requires a strategy, and funding: it is highly improbable that pure economic market forces will spontaneously be sufficient

Thank you very much for your attention
Any questions?

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Building Partnerships And Transport System Resilience

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PIARC World Road Association

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PIANC

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What's Next?
Join the Sustainable Reporting plenary "Greenwashing or Transparency?" in room 203 starting shortly

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