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## **Economic Commission for Europe**

### **Inland Transport Committee**

#### **Working Party on Transport Trends and Economics**

##### **Group of Experts on Assessment of Climate Change Impacts and Adaptation for Inland Transport**

###### **Twentieth session**

Geneva, 22 and 23 April 2021

Item 3 of the provisional agenda

###### **Climate change and transport assets data**

### **Responses to simple survey to assess needs of transport professionals in UNECE region with regard to understanding the future potential impacts from climate change on transport**

#### **Note by the secretariat**

#### **Background**

The Group of Experts on Assessment of Climate Change Impacts and Adaptation for Inland Transport decided at its nineteenth session to construct and disseminate a simple survey for consulting transport infrastructure managers on climate change impacts of most interest to them as well as on relevant thresholds of climate indices. The information collected on impacts of interests will be used by the Group of Experts to inform the analysis of climate variables and indices that are related to these kinds of impacts. In this way, the Group of Experts should be able to provide analysis on how these variables and indices may change in the future which should help understand the future conditions under which transport would need to operate.

This document presents the responses to the survey. At the time of preparation of this document 64 respondents submitted their responses.

#### **Responses to questions**

##### **Q.1. Which business area do you work in the transport sector? Please select**

Responses:

Majority of respondents work in Operation (17) and Planning (15). Under Others – selected 36 times the following business areas were referred to: Customs, Passenger advocacy, Strategy, Scientific Research/Research, International relations, Environment, Investment, Legislation, Education and training, Inspection, Consultancy, Sustainability, International relations.

**Q.2. Which mode(s) of transportation do you focus on in your role? Please select all that apply**

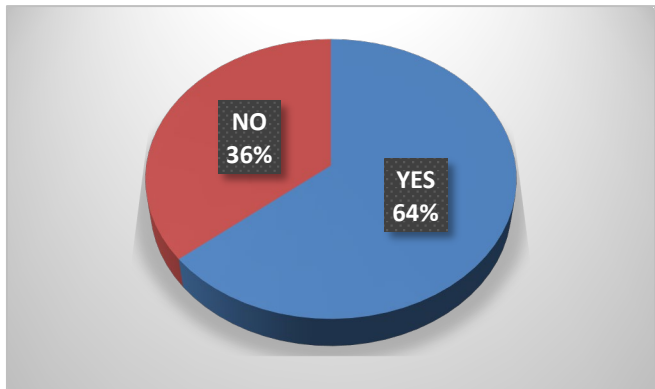
Responses:

Respondents work in all modes. Majority of them focus on road and rail followed by waterway transport.

**Q.3. Do you currently make use of climate projections i.e. information on how the climate may change over the next multiple number of decades throughout the 21<sup>st</sup> century, in your work?**

Responses:

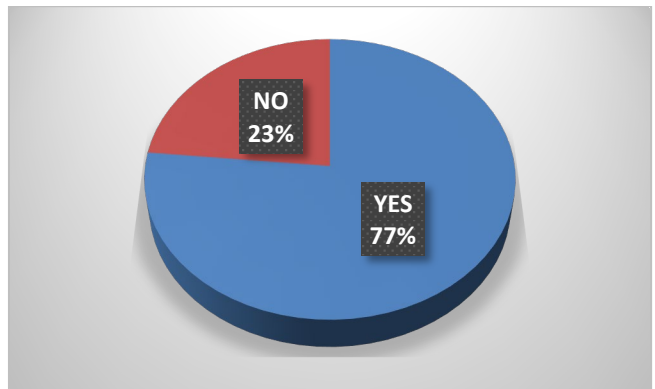
Almost two-third of respondents indicate their work with climate projections.



**Q.4. Does flooding, as a climate-related event, cause impact in your area of work?**

Responses:

A great majority of respondents are concerned by flooding.



**Q.4.1. What are the associated impacts of flooding on your area of work?**

Responses:

The following impacts are mainly referred to:

- Disruption to operation
- Damage to infrastructure (drainage system, cracks, swelling)
- Decrease to operational safety
- Consequences to maintenance and construction budgets

**Q.4.2. Are there any critical thresholds beyond which you know you will see impacts of flooding on your area of work? Can you provide details on what the associated threshold(s) may be?**

Responses:

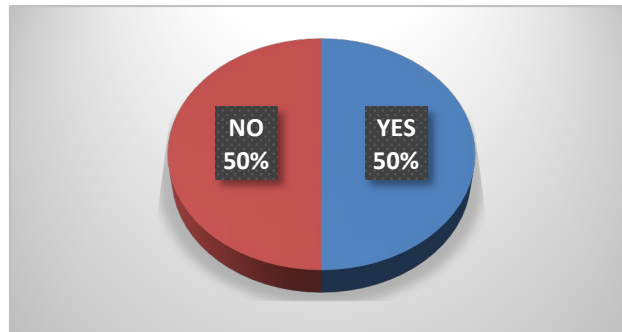
The following thresholds are mentioned:

- ‘1-month rainfall in 3 hours’ (rail)
- ‘Water level 34 to 90 cm above statistical HSW’ (waterway)
- ‘Water level 1.5m below the rail surface’ (rail)
- ‘Depends on amount of rain and drainage infrastructure in a particular location’ (rail)
- ‘Highest navigable water level’ (waterway)

**Q.5. Does drought, as a climate-related event, cause impact in your area of work?**

Responses:

Half of respondents are concerned by drought.



**Q.5.1. What are the associated impacts of droughts on your area of work?**

Responses:

The following impacts are mainly referred to:

- Disruption to operation (no navigation or reduction of transport capacity for waterways)
- Possible damage to infrastructure (sands on rail system, drying, cracking, failure/destabilisation of embankments causing track geometry problems, fire)
- Failure of replanting scheme in infrastructure projects

**Q.5.2. Are there any critical thresholds beyond which you know you will see impacts of droughts on your area of work? Can you provide details on what the associated threshold(s) may be?**

Responses:

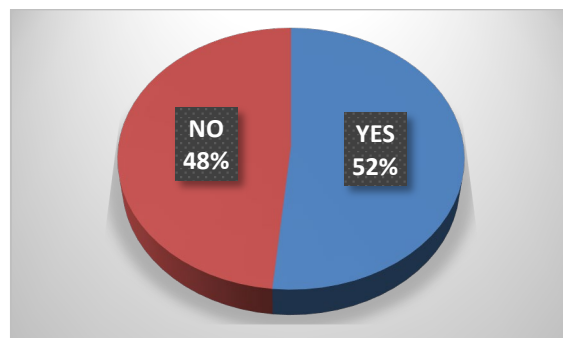
The following thresholds are mentioned:

- ‘water levels below RNW’ (waterway)
- ‘ship specific thresholds’ (waterway)

**Q.6. Does extreme heat, as a climate-related event, cause impact in your area of work?**

Responses:

Slightly above half of respondents are concerned by heat.



**Q.6.1. What are the associated impacts of extreme heat on your area of work?**

Responses:

The following impacts are mainly referred to:

- Disruption to operation (road traffic suspension for trucks, fires)
- Disruption to operation/damage to infrastructure (deformation of tracks, decrease in travel speed, sagging of overhead lines)
- Deformation of road and rail infrastructure
- Increase of emissions
- Disruption to construction of new infrastructure
- Additional maintenance to superstructures
- Disruption to operation of cranes in terminals
- Failure of electronic devices/signals failure
- Increase in energy consumption for cooling purpose

**Q.6.2. Are there any critical thresholds beyond which you know you will see impacts of extreme heat on your area of work? Can you provide details on what the associated threshold(s) may be?**

Responses:

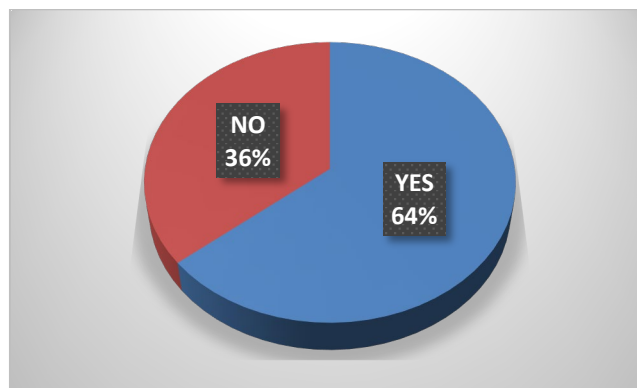
The following thresholds are mentioned:

- ‘Above 40°C’
- ‘Above 35°C’
- ‘37°C / 40°C’
- ‘Increase of failure above 32°C’
- ‘General increase in impacts above around 25°C. Exact threshold varies by asset type; work is underway to review and update our understanding of thresholds and asset sensitivities’
- ‘Prolonged exposure to over 30°C’

**Q.7. Does windstorm, as a climate-related event, cause impact in your area of work?**

Responses:

Nearly two-thirds of respondents are concerned by windstorm.



**Q.7.1. What are the associated impacts of windstorm on your area of work?**

Responses:

The following impacts are mainly referred to:

- Disruption to operation (road traffic suspension, navigation disruption, blockage road/rail of infrastructure due to fallen trees, speed reduction for high speed rail, malfunctioning of ICT system)
- Damage to catenaries/interruption of power supply
- Waterlogging
- High waves – disruption to port operation, difficulties to moor
- Decrease of safety – dust on road/ flying debris, handling of vehicles, stacking of containers
- Closure of elevated bridges

**Q.7.2. Are there any critical thresholds beyond which you know you will see impacts of windstorm on your area of work? Can you provide details on what the associated threshold(s) may be?**

Responses:

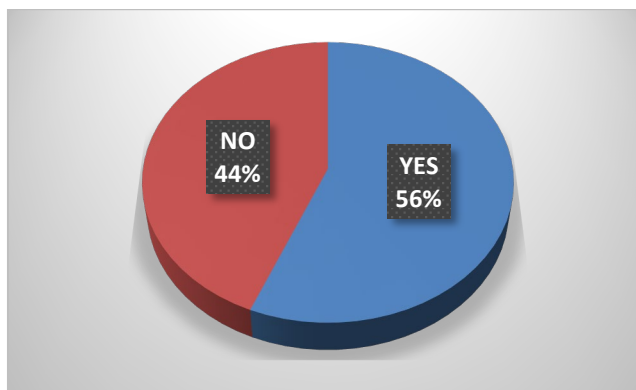
The following thresholds are mentioned:

- ‘Above 30m/s for high rail speed operations’
- ‘32.7 m/s’
- ‘above 50km/h for rail operations’
- ‘12m/s for traffic on reservoirs and in ports’

**Q.8. Does extreme snowfall, as a climate-related event, cause impact in your area of work?**

Responses:

More than half of respondents are concerned by extreme snowfall.



**Q.8.1. What are the associated impacts of extreme snowfall on your area of work?**

Responses:

The following impacts are mainly referred to:

- Traffic disruption (decrease of speed)
- Traffic temporary interruption/port closure
- Infrastructure malfunction (rail switches, ice on conductor rail and track impeding electric and signalling systems, failure of ICT devices)
- Infrastructure damage (freeze/thaw impacting embankment stability, snow melting causing drainage failure)
- Decrease/risk in safety (due to slippery surfaces, limited visibility, icicles in tunnels)
- Increased road management costs

**Q.8.2. Are there any critical thresholds beyond which you know you will see impacts of extreme snowfall on your area of work? Can you provide details on what the associated threshold(s) may be?**

Responses:

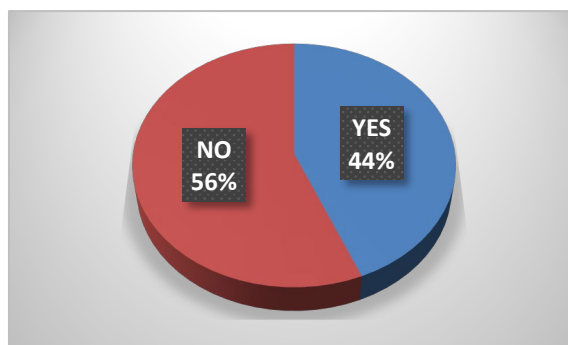
The following thresholds are mentioned:

- ‘Snow in excess of 60 cm in 24 hours’

**Q.9. Does storm surge, as a climate-related event, cause impact in your area of work?**

Responses:

Less than half of respondents are concerned by storm surge.



**Q.9.1. What are the associated impacts of storm surge on your area of work?**

Responses:

The following impacts are mainly referred to:

- Traffic/navigation interruption
- Damage to costal infrastructure
- Disruption to container stacking

**Q.9.2. Are there any critical thresholds beyond which you know you will see impacts of storm surge on your area of work? Can you provide details on what the associated threshold(s) may be?**

Responses:

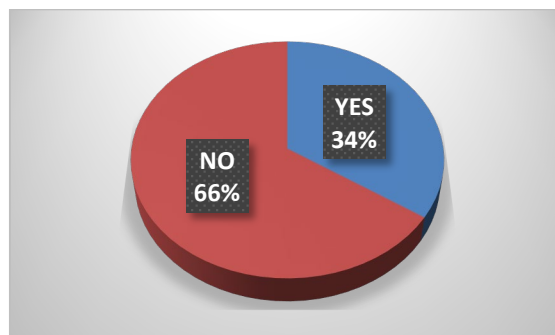
The following thresholds are mentioned:

- ‘Wave height above 1m’

**Q.10. Does sea level rise, as a climate-related event, cause impact in your area of work?**

Responses:

About one-third of respondents are concerned by sea level rise.



**Q.10.1. What are the associated impacts of sea level rise on your area of work?**

Responses:

The following impacts are mainly referred to:

- Difficulties for seaports
- Challenges to infrastructure maintenance
- Shrinking shores
- Coastal erosion impacting infrastructure

**Q.10.2. Are there any critical thresholds beyond which you know you will see impacts of sea level rise on your area of work? Can you provide details on what the associated threshold(s) may be?**

Responses:

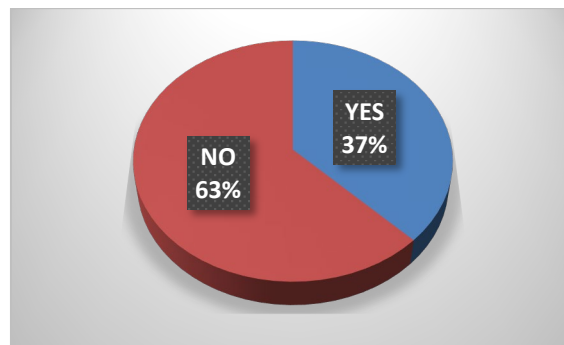
The following thresholds are mentioned:

- ‘An increase in the water level to the foundation surface of the track superstructure’

**Q.11. Does ice thaw, as a climate-related event, cause impact in your area of work?**

Responses:

About one-third of respondents are concerned by ice thaw.



**Q.11.1. What are the associated impacts of ice thaw on your area of work?**

Responses:

The following impacts are mainly referred to:

- Navigation interruption
- Infrastructure damage (freeze/thaw can destabilise embankments and rock cuttings, cracks)

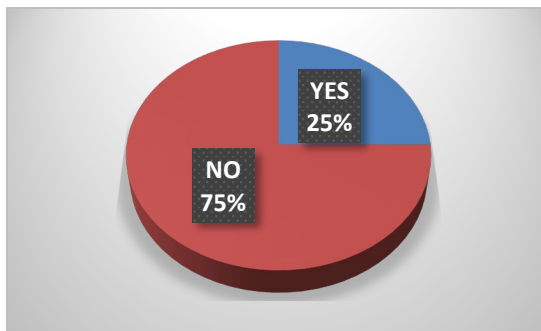
**Q.11.2. Are there any critical thresholds beyond which you know you will see impacts of ice thaw on your area of work? Can you provide details on what the associated threshold(s) may be?**

Responses: No specific thresholds provided.

**Q.12. Are there any other climate-related events, which cause impact in your area of work?**

Responses:

24 responses were provided to this question. One-fourth of respondents are concerned by some other climate-related events.



**Q.12.1. What are these other climate-related events causing impact on your area of work?**

Responses:

The following climate-related events are mentioned:

- Lightning
- Fog
- Heavy rainfall
- Combination of different climate-related events
- Solar flares
- Sleet (rainfall or wet snowfall at temperatures below zero)
- Low temperatures

**Q.12.2. What are their associated impacts on your area of work?**

- Speed restriction due to fog
- Damage to infrastructure e.g. electric failures due to lightening
- Drainage washouts from flowing water due to heavy rain
- Solar flares that alter the magnetosphere can disrupt communication and affect the transmission of electricity.
- Disruption of operation due to sleet, freezing of turnouts for rail
- Damage to infrastructure due to low temperature (Cracking of steel)

**Q.12.3. Are there any critical thresholds beyond which you know you will see impacts of these events on your area of work? Can you provide details on what the associated threshold(s) may be?**

Responses: No specific thresholds provided.

**Q.13. Would you be interested in discussing this survey and your responses in more detail with someone from the Group of Experts?**

Responses:

About half of respondents are ready to discuss the survey questions in more detail in an interview.

