ANSFISA
AGENZIA NAZIONALE PER LA SICUREZZA DELLE FERROVIE
E DELLE INFRASTRUTTURE STRADALI E AUTOSTRADALI

SOUTH AFRICA

IRSC
INTERNATIONAL RAIL SAFETY
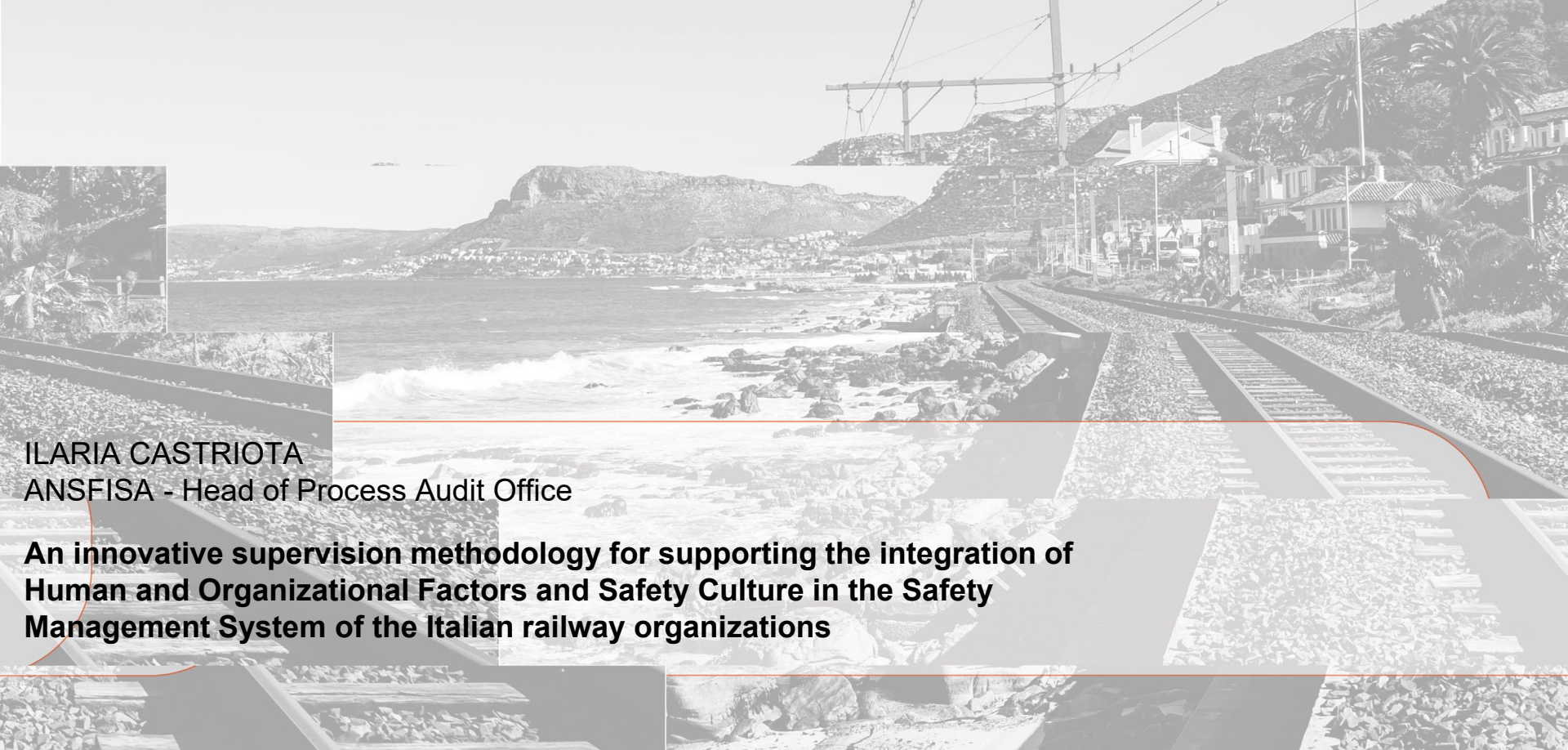SOUTH A

RSC 2023

INTERNATIONAL RAILWAY
SAFETY COUNCIL

"Reshaping Railways in an Uncertain World"

CAPE TOWN, OCTOBER 1 - 6, 2023

IR

INTE

HOSTED BY   HOSTED BY   RAILWAY
SAFETY
REGULATOR
RAIL SAFETY ON THE RIGHT TRACK

ILARIA CASTRIOTA
ANSFISA - Head of Process Audit Office

An innovative supervision methodology for supporting the integration of Human and Organizational Factors and Safety Culture in the Safety Management System of the Italian railway organizations

SUPERVISION METHODS: QUESTIONNAIRE AND AUDITING PROCESS

Phase 1 **published in November 2021**
- A questionnaire was developed and submitted to all 63 Italian railway organizations. The questionnaire (29 questions pre-filled with single/multiple-choice answers), based on the ERA "*Guideline on the requirements of the safety management system for safety certification or safety authorization",* permitted a baseline assessment *before* the on-site audit

Phase 2 **in progress on-site audit**
- Semi-structured interviews (based on 18 questions) are administered to the organization's staff (leaderships, middle-managements, and operative staff).

During the on-site audit the operative staff interview allows:
  - Verification of the effectiveness of the actions implementing HOF and SC
  - Quantification of two indexes: Compliance (Ci) and Effectiveness (Ei) about HOF and SC
  - The operative staff's point of view about the implementation of HOF and SC
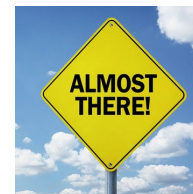
Phase 3 new proposals
- Developing & Improving supervision activities on HOF and SC

ITALIAN NSA SUPERVISION ON HOF AND SC

- Why do we need an innovative method for HOF and SC?

- What kind of competence is needed?

- What does the method look like?

- What are the results?

- Any "collateral" effects?

- Is this method cost/effective?

WHY AN INNOVATIVE METHOD?

The **innovative _method for supervision_** activities on HOF and SC developed has the main goal to check the integration of HOF and SC in SMS in a **structured way**

A **systematic approach** allows to conduct on-site audits and to effectively monitor and assess HOF and SC within the SMS of railways organizations

The results of the method provide a baseline assessment of the **state of the art** on HOF and SC for both each organization audited and the entire Italian railway system

COMPETENCE NEEDED

The method requires competences about:

- **HOF and SC**
- **SMS requirements**
- **Auditing expertise**

A training program for ANSFISA'S auditors on HOF and SC was carried out in 2022, which led to:

- Provide a general overview of the HOF and SC disciplines
- Give preparation of different levels of topics to be studied (from very basics for each kind of auditor to detailed and technical information for HOF dedicated auditors)
- Challenging stereotypes and prejudices on HOF and SC on NSA's personnel

IMPLEMENTATION OF THE METHOD

- Starting from **July 2022** (in progress)

- **Number** of audited organisations:
    - 6 in 2022 (from July 2022)
    - 12 in 2023 (until now)
    - about 80% of the Italian railway network
    - about 20% of rail traffic volume

- **Audit Team:** 2 psychologists and 2 engineers (experts in HOF)

  the audit team might vary according with the dimension of the audited organisation

- **Man/month**:
    - 1 week for audit preparation (reading documentation, customizing checklist, sample selection, logistics, ….)
    - 1 week for on-site audit

ANSFISA
AGENZIA NAZIONALE PER LA SICUREZZA DELLE FERROVIE
E DELLE INFRASTRUTTURE STRADALI E AUTOSTRADALI

METHODOLOGY: GENERAL OVERVIEW

The steps of the method:

a) **a semi-structured interview administered to the organization's staff at different level**
- **Leadership of the organization (CEO or Manager who signed the Policy), about the HOF and SC implementation strategy**
- **Middle management and operative staff, about their perspective about the implementation of HOF and SC**

b) **a dedicated HOF and SC audit check list for verifying the implementation of HOF and SC in SMS through the concordance between the activities scheduled in the implementation strategy and the activities effectively carried out**

c) **a verification activity between the evidences collected during on-site audit and the answers given to the 2021 questionnaire (taking into account any actual updates)**

ANSFISA
AGENZIA NAZIONALE PER LA SICUREZZA DELLE FERROVIE E DELLE INFRASTRUTTURE STRADALI E AUTOSTRADALI

METHODOLOGY: THE DEVELOPMENT OF TWO INDEXES

The collected information is used to calculating two quantitative indexes:

EFFECTIVENESS INDEX:

- Semi-structured interviews administered to organization's staff
    - Middle-management
    - Operative staff

COMPLIANCE INDEX:

- Interviews (with checklist) to people responsible for implementing HOF and SC in SMS to verify the strategy adopted by the organization

ANSFISA
AGENZIA NAZIONALE PER LA SICUREZZA DELLE FERROVIE
E DELLE INFRASTRUTTURE STRADALI E AUTOSTRADALI

EFFECTIVENESS INDEX (Ei)

Let's have a closer look

What is its main goal?

Verifying statements and perceived implementations on HOF and SC by operative staff in the SMS (quantitative evaluation of the effectiveness of the implementation strategy)

How is it determined?

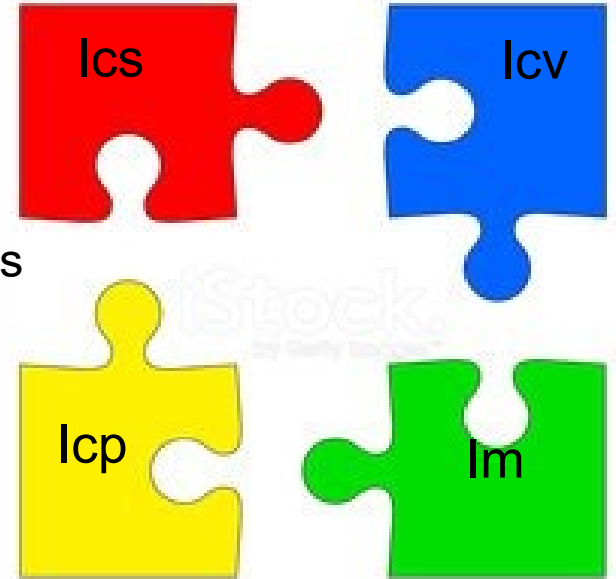Combining **4 sub-indexes** related to the 4 different SMS requirements investigated:

- Leadership and commitment
    - *Staff involvement (safety culture)*
- Consultation of staff and other parties
- Awareness
- Continual improvement

The numerical estimate obtained is related exclusively to the type and number of interviewees and it is representative of the interviewed sample only

EFFECTIVENESS INDEX (Ei) - SUBINDEXES

- **Ics** = implementation index HOF related to Safety Culture requirement
- **Icv** = implementation index HOF related to Consultation of staff and other parties requirement
- **Icp** = implementation index HOF related to Awareness requirement
- **Im** = implementation index HOF related to Improvement requirement

These sub-indexes are valued and combined in an arithmetic mean: $Ei = (Icv + Icp + Ics + Im) / 4$

ANSFISA
AGENZIA NAZIONALE PER LA SICUREZZA DELLE FERROVIE
E DELLE INFRASTRUTTURE STRADALI E AUTOSTRADALI

EFFECTIVENESS INDEX (Ei) - INTERVIEWS

Scheme of interviews:

- Answers in 1 to 6 Likert scale (1=minimum, 6=maximum)

- For each subindex there are two or more questions

- Collecting safety opinions about specific themes

- Free response (integrating/supporting the interpretation of the quantitative answer; anonymity of the interviewee is guaranteed)

- *Q13 "In your opinion, on a scale 1 to 6, (1=totally disagree, 6= totally agree), how much do your colleagues feel free to express their opinions and evaluations on the organization's safety levels, using formal means (emails, reports...)?" Quantitative response: 1__X__3__4__5__6* → Positive

- *Qualitative response: "We are all a little afraid to put it in writing, but I think it's normal. We talk a lot, but before formalizing we think about it"*

COMPLIANCE INDEX (Ci)

Let's have a closer look

What is its main goal?
Verifying the correspondence between planned and accomplished actions (also by matching the evidence collected during on-site audit with the answers given to the 2021 questionnaire)

How is it determined?
It is the arithmetic mean of 13 activities identified in the 2021 questionnaire

- 0 = activity not started or partially carried out, up to 50% excluded
- 0.5 = activity in progress and completed in a percentage greater than or equal to 50%
- 1 = activity 100% accomplished

ANSFISA
AGENZIA NAZIONALE PER LA SICUREZZA DELLE FERROVIE
E DELLE INFRASTRUTTURE STRADALI E AUTOSTRADALI

# COMPLIANCE INDEX (Ci) – THE 13 ACTIVITIES on HOF and SC

1. Presence of skilled people
2. Risk identification
3. Risk analysis and risk evaluation
4. Upgrading of the hazard log
5. Upgrading of the SMS documentation
6. Collecting of confidential reports
7. Staff involvement
8. Staff awareness (of own role risks)
9. Accidents/incidents investigation using specific methods
10. Introduction of activities for the Just Culture (avoiding blame culture)
11. Analysis of organisational Safety Culture (e.g. questionnaires)
12. Verification of effectiveness of initiatives undertaken
13. Dissemination activities on HOF and SC

COMPLIANCE INDEX (Ci) – THE CHECKLIST

The checklist is (mainly) based on:

- Occurred accidents related to HOF and analysis of the remote causes
- Projects from the annual safety plan
- Residual concerns for supervision on HOF linked to the certification process of railway organizations
- Annual safety report
- Non-conformities from previous audits by ANSFISA
- Risk assessment related to HOF (is the EN 31010 used?)
- Training programs about HOF
- Answers to the 2021 ANSFISA questionnaire
- Implementation and, if any, findings from voluntary reports

Integration of Human Factors in Rail
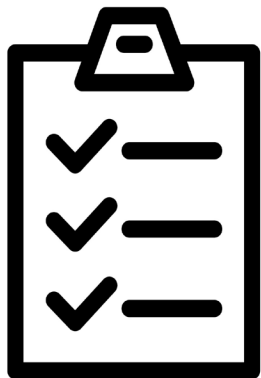
RESULTS: EFFECTIVENESS SUBINDEXES
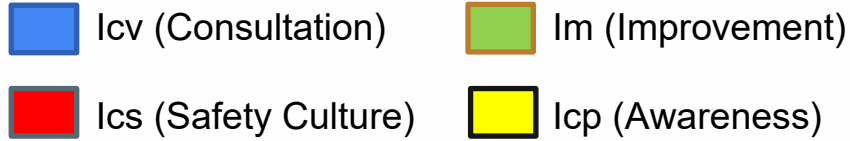
Icv (Consultation)   Im (Improvement)   * Icp for Org. 1 was not quantified but only qualitatively evaluated
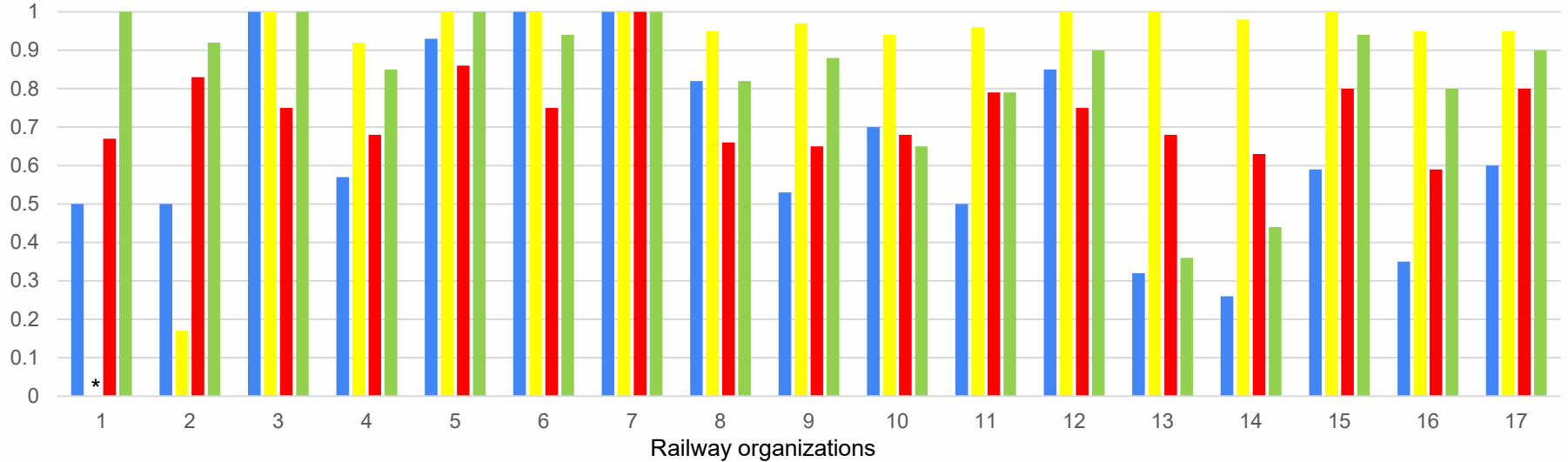
Ics (Safety Culture)   Icp (Awareness)

Railway organizations

Integration of Human Factors in Rail

ANSFISA
AGENZIA NAZIONALE PER LA SICUREZZA DELLE FERROVIE
E DELLE INFRASTRUTTURE STRADALI E AUTOSTRADALI

ANALYSIS OF EFFECTIVENESS SUBINDEXES

- In average, **Ics** (Safety Culture) is low because a large part of the organisations has:

  - lack of knowledge of Safety Policy by the staff
  - generational differences about safety perception (experienced vs. new staff)

  Q4 "Have you ever read the Safety Policy of your Organization? If yes, do you remember on which occasion? (do you remember how many pages? the main topics covered?)"

  Answer: "Yes, I happened to read it, but now I don't remember exactly what it's about"

- **Im** (Improvement) is high where the organisations:

  - consider HOF by analysing incidents/accidents
  - efficient confidential report systems are implemented

Overall, reporting is in place, but with a preference for verbal vs. written reports

Q19 "On a scale from 1 to 6, in the event of an operational problem (near misses, potential risk situations, etc.) what are the chances of proceeding with a formal report?"

Answer: "It's not in my culture to write: I relate to my superiors, but I think twice before putting it in writing"

ANSFISA
AGENZIA NAZIONALE PER LA SICUREZZA DELLE FERROVIE
E DELLE INFRASTRUTTURE STRADALI E AUTOSTRADALI

ANALYSIS OF EFFECTIVENESS SUBINDEXES

- **Icp** (Awareness) often scores high mainly due to:
    - effective initial training of staff
    - a traditionally high awareness of the safety role of the railway operating staff

  Q14 "On a scale from 1 to 6, how would you rate your level of awareness of occupational risks related to your role?"

  Answer: "You must be aware of the professional figure you cover, you must get rid of personal problems and be ready for your role"
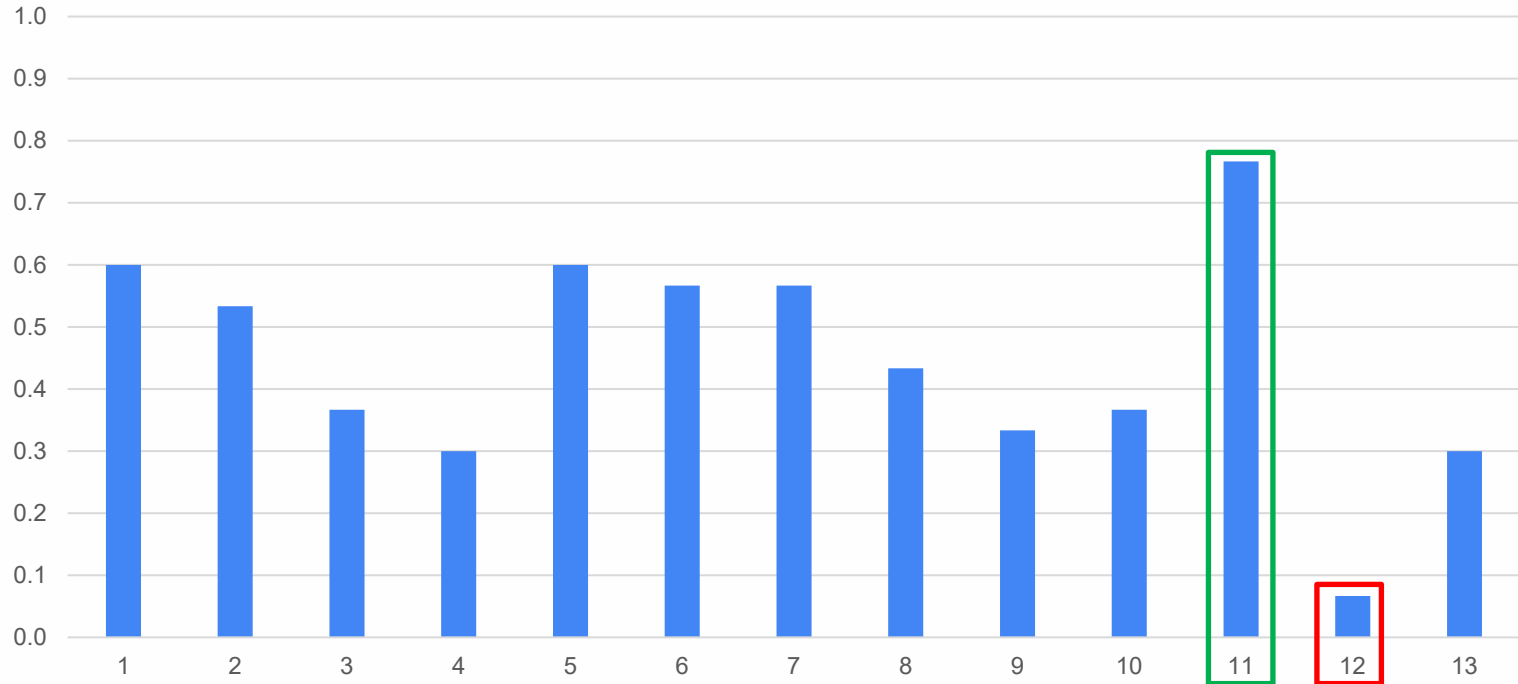
- **Icv** (Consultation) is the index that score most variation amongst railway organizations: overall, the railway organizations are willing to listen to operative staff opinion, but mainly in a reactive way rather than with proactive initiatives

  Q18 "On a scale from 1 to 6, how involved do you feel in the safety processes? (e.g. opinion sought, staff consultation in case of introduction/revision of new procedures/legislation, etc.)"

  Answer: "I would like our experience to be used, I would like to make a contribution, so we write the procedures only once"

ANSFISA
AGENZIA NAZIONALE PER LA SICUREZZA DELLE FERROVIE
E DELLE INFRASTRUTTURE STRADALI E AUTOSTRADALI

RESULTS: COMPLIANCE INDEX (Ci)

Average of 13 activities (strategy implementation) for all the 17 audited organizations

13 activities identified in the 2021 questionnaire

Integration of Human Factors in Rail

ANSFISA
AGENZIA NAZIONALE PER LA SICUREZZA DELLE FERROVIE
E DELLE INFRASTRUTTURE STRADALI E AUTOSTRADALI

ANALYSIS OF COMPLIANCE INDEX
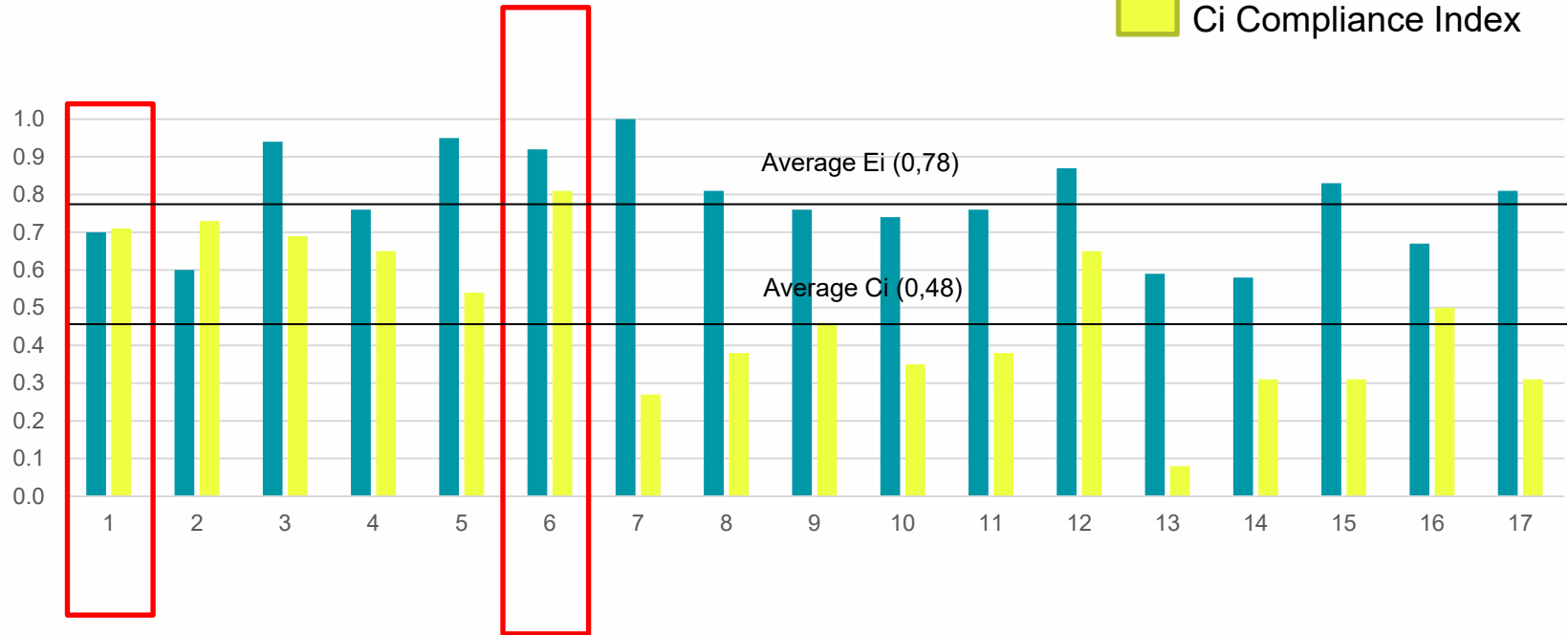
Main observed criticalities:

- Dissemination events of company's initiatives are poorly implemented

- Check of effectiveness of HOF initiative is rarely carried out

- Skilled/certified staff in HOF sector is seldom found

- Application of non adequate methods for risk identification, risk analysis and risk evaluation linked to HOF (e.g. UNI CEI EN 31010)

As positive aspects found, there is a large engagement of external experts on HOF and SC

BENCHMARK OF THE 2 INDEXES

Integration of Human Factors in Rail

WHAT IS THE OUTPUT?

The output is an audit report that mainly includes:

- Interviews findings
- Selection of relevant free responses
- Quantification of two HOF indexes
- Main observed criticalities related to the HOF implementation strategy
- Non-conformities (NCs) related to SMS requirements (ref. CSM 2018/762)

    e.g. Safety policy and safety objectives are not known and understood by the operational staff

    e.g. Safety measures deriving from HOF risk analysis are inadequate

    e.g. Planning process about HOF is not adequate/not respected

    e.g. Internal audits to verifying implementation of HOF are not implemented

The report is given to the audited organization for further improvements and for planning actions to remove NCs

ANSFISA
AGENZIA NAZIONALE PER LA SICUREZZA DELLE FERROVIE
E DELLE INFRASTRUTTURE STRADALI E AUTOSTRADALI

POSITIVE "COLLATERAL" EFFECTS

- Change of approach by persons responsible for safety, being aware that operative staff opinions are sought and considered in the overall NSA's supervision process

- Positive feedbacks by the interviewed operative staff (happy to see their point of view being requested)

- Higher commitment and involvement of the leadership: the mid and higher management of the organizations have shown a clear appreciation for the opportunity to discuss and clarify the applicability of some requirements

- Stimulus for railway organizations to develop and share new strategies of systematic implementation of HOF and SC in SMS (technical articles published, increased participation to congresses on these topics etc.)

In a nutshell: **this activity supports the integration of HOF and SC in SMS**

IS THIS METHOD COST/EFFECTIVE?

Yes, it proved to be effective overall and efficient in the start-up, experimental phase for supervising relatively "new" topics to be audited

Now it's time for "lesson learned" → revising the method and trying new proposals for a mid-long term supervision strategy on HOF and SC

FUTURE PLAN AND NEW PROPOSALS (PHASE 3)

1. Revision of the semi-structured interview (time to tune up the tool)

2. Dedicated audits to HOF and SC program 2024? Probably a _reduced_, HOF and SC dedicated audit program 2024 will be schedule by the end of 2023

3. Follow up of the Compliance Index → self evaluation of the progress on HOF and SC (update of the score obtained during the supervision)

4. Increasing dissemination activities on HOF and SC

5. New: planning to experiment dedicated activities of semi-structured interviews to the operative staff → listen to people that carry out the work!

6. New: integrating the HOF and SC method into the ordinary audit activities

7. New: a revised version of the 2021 questionnaire sent to all the railway organizations

8. New: a structured overall evaluation of the auditing team on some organizational aspects related to safety (level of collaboration amongst staff, safety climate elements)

Integration of Human Factors in Rail

ANSFISA
AGENZIA NAZIONALE PER LA SICUREZZA DELLE FERROVIE
E DELLE INFRASTRUTTURE STRADALI E AUTOSTRADALI

WHAT'S NEXT?

keeping improving HOF and SC in the railway's world and see you all at:

IRSC 2024

IRSC 2025
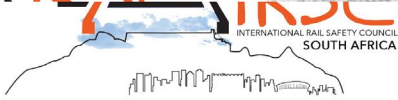
IRSC 2026

IRSC 2027

IRSC 2028

IRSC 2029

IRSC 2030

IRSC 2031

THANK YOU FOR YOUR ATTENTION

INTERNATIONAL RAIL SAFETY COUNCIL
SOUTH AFRICA

ANSFISA
AGENZIA NAZIONALE PER LA SICUREZZA DELLE FERROVIE
E DELLE INFRASTRUTTURE STRADALI E AUTOSTRADALI

HOSTED BY

RAILWAY
SAFETY
REGULATOR

RAIL SAFETY ON THE RIGHT TRACK

www.irsc2023.com

ANSFISA
AGENZIA NAZIONALE PER LA SICUREZZA DELLE FERROVIE
E DELLE INFRASTRUTTURE STRADALI E AUTOSTRADALI

INTERNATIONAL RAIL SAFETY COUNCIL
SOUTH AFRICA