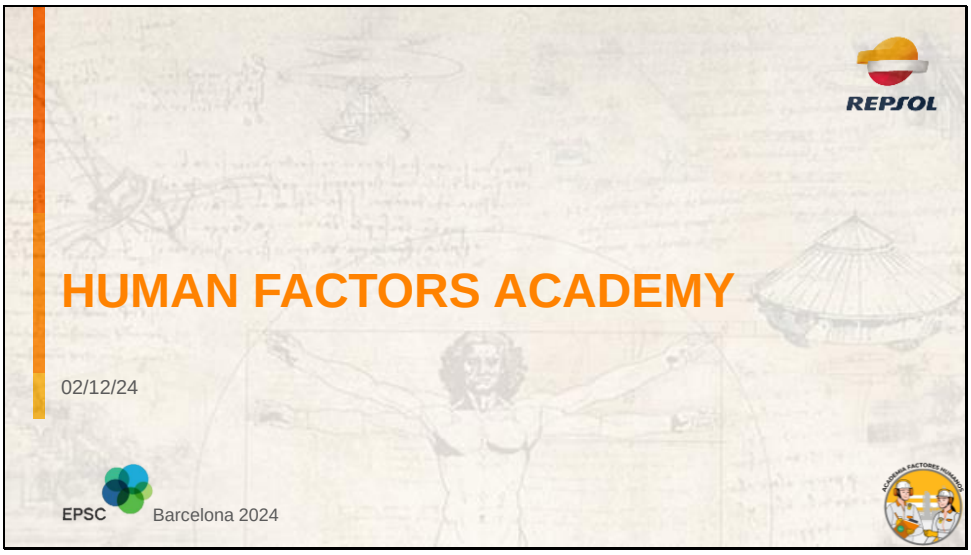
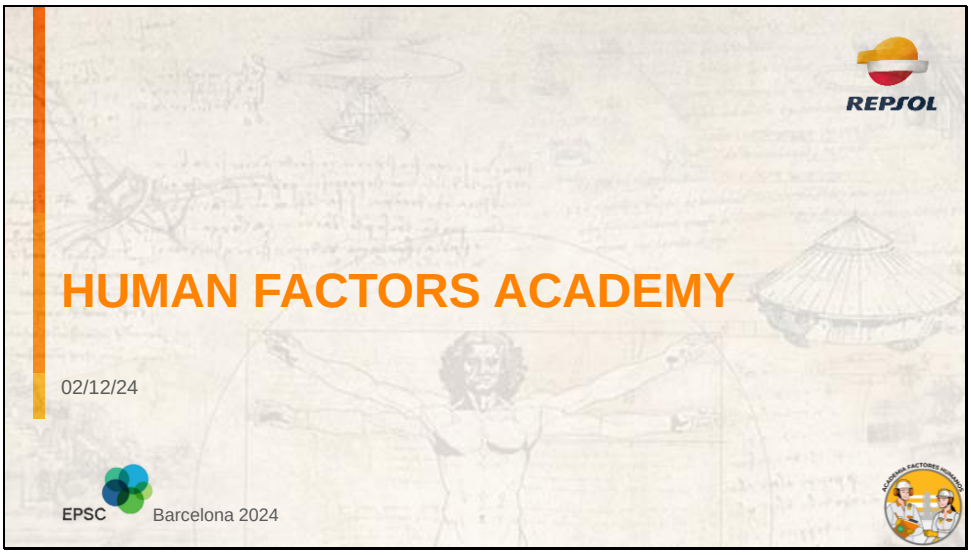


Good morning and welcome everyone.

To introduce the subject, I'll show you an example of Human Factors that all Spaniards and some of today's guests will remember.

Video: train accident. Santiago de Compostela – Galicia – Spain. 24/07/2013.
Voices: Train driver and traffic controller in Atocha (Madrid)

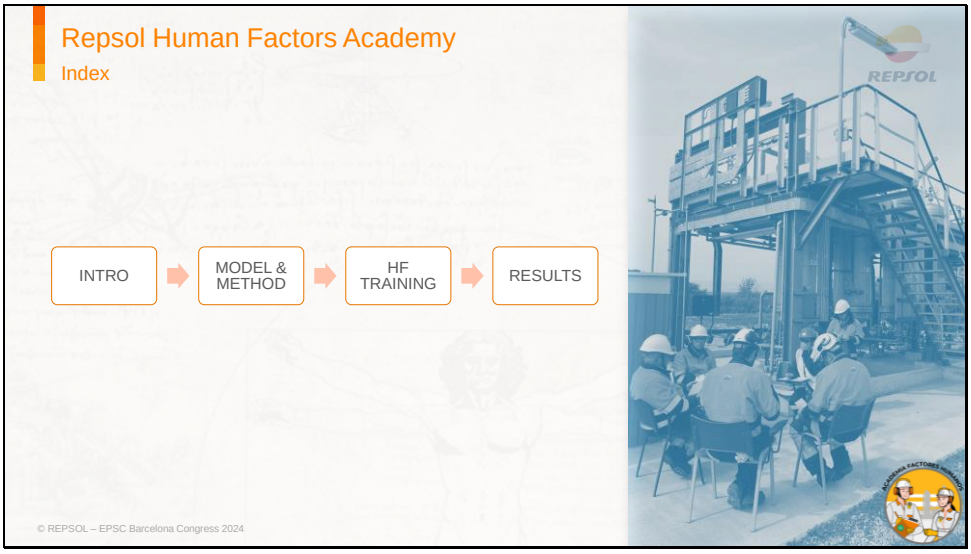


Welcome to Repsol's Human Factors Academy.

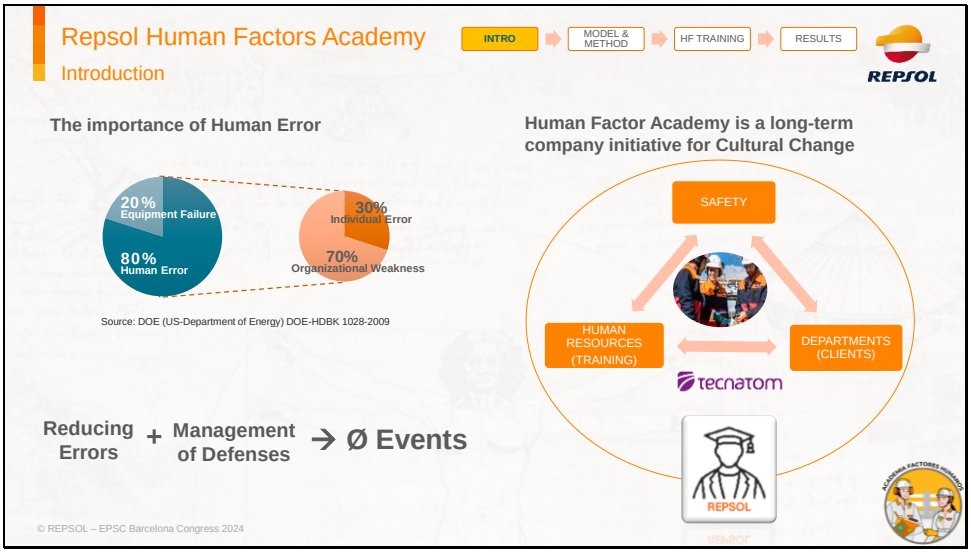
A plant is not only as safe as each of its workers are, but also as safe as the interactions between them. It is therefore a complex system in which people are a critical component.

Today we will explain the main aspects of the Academy as well as its origin, results and day-to-day operation. Let me say in advance that the actions we are carrying out in this first cycle of the Academy are the result of an evolution in our safety work and the heritage and good practices of other high-risk sectors, such as nuclear or aeronautics.

As a result of networking with the nuclear industry, we felt the need to start this Academy to work on Safety Management and Human Factor



To easily understand what we are doing at the Human Factors Academy at Repsol, originating in Tarragona, we will start with a brief introduction, we will explain the model and method we follow, what the training action we are now carrying out is like, and what results we have and expect.



As indicated by a large number of studies, a large part of the errors that cause an event, have a human component

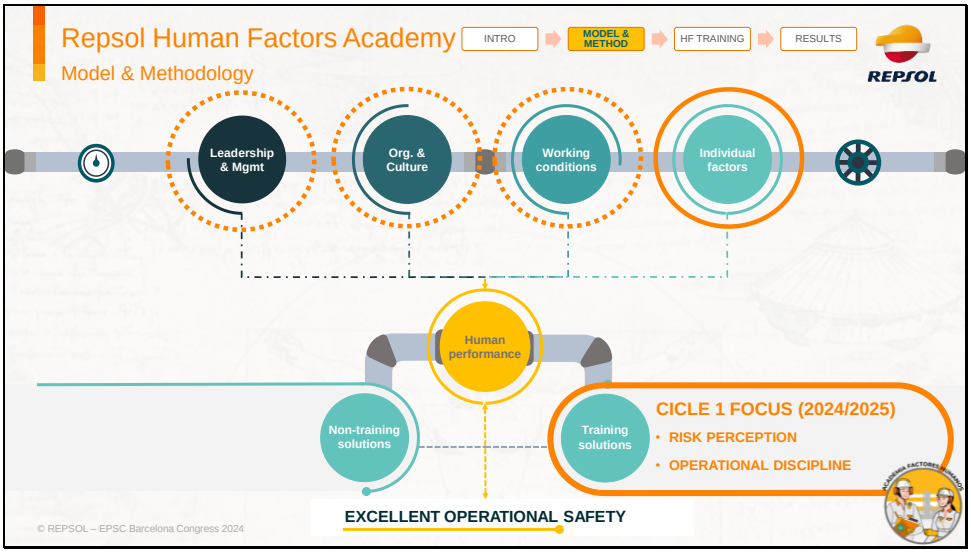
- The immediate cause after an accident comes 80% of the time from human error.
- 30% of those human errors are individual errors and the remaining 70% come from latent organizational weaknesses and barrier failures

Under this paradigm, reducing error and managing defenses is what will lead us to that excellence in operation or safety to get the fewest possible events.

Here's our why. We believe and know that working to reduce human error is one of the bases for improving safety and therefore production and people's well-being at work.

TRANSVERSAL Project: Focus on the individual and how human error occurs. It provides tools and error prevention techniques that allow us to minimize it, reducing unwanted event

- ❑ The project started in 2019 in Tarragona based on the experience of the nearby nuclear industry. With these previous learnings, in 2023 the initiative was improved with the help of the experts working for the nuclear plants (TECNATOM)
- ❑ During 2024, it has been implemented in other REPSOL sites (Coruña, Cartagena, and Petronor), and the analysis phase has begun in Puertollano. It is expected to start in Sines in 2025
- ❑ It adds value in terms of training, analysis, and improvement of departmental weaknesses
- ❑ Training is adapted to the reality of the students, with small groups. The format facilitates continuous improvement of safe behaviors
- ❑ It works on the cultural change of the concepts of human error, the value of supervision and safe practices
- ❑ Theoretical and simulator training is reinforced with on-the-job accompaniment of the student, thus allowing follow-up on the use of error reduction tools



As I said, the improvement of human performance, our motivation, has working on individual factors as one of its legs but it also has other levers on which we must work. These are leadership and management, the culture and therefore the organization, and the working conditions that are created in it and that directly influence those individual factors of people. When I speak about working conditions, I am referring to how tasks are designed and procedures are written, how the processes with which we work on a daily basis are thought of, such as lotus, confined spaces or the exclusion of foreign materials, or even how the installation is designed from the point of view of human factors engineering.

The solutions to improve safety Human Performance may or may not be based on training.
In the case of Repsol's Human Factors Academy, the focus of the first wave of actions or the first cycle has been on training and support solutions for both frontline workers and leaders and supervisors.

At his stage we are working on Individual Factors, with the practice and implementation of human error prevention techniques focusing on risk perception and operational discipline.

But also discussions with students are encouraged to understand their concerns regarding leadership, organization, and working conditions.
These concerns are collected and should help us to learn and improve company processes and culture

Let me explain a little better what our solution consists of.

Leadership & Management:
- Values and expectations
- Feedback, coaching & reinforcement
- Monitoring of indicators
- Decision-making
- Communication

Organization & Culture:
- Safety culture
- Fair culture
- Learning and organizational resilience
- Teamwork
- Organizational changes

Working conditions:

- Processes: LOTO, FME...
- Task
- Procedures
- Human Factors Engineering- HFE
- Job management

Individual factors:

- Reliability and error
- Knowledge
- Training
- Motivation
- Precursors
- Risk perception

Non-training solutions:

- Integration of the human factor in processes and procedures
- Leadership, supervision, and observation programs
- Analysis of events and incidents
- Culture Assessment and Improvement
- Human Factors Engineering (HFE)

Training solutions:

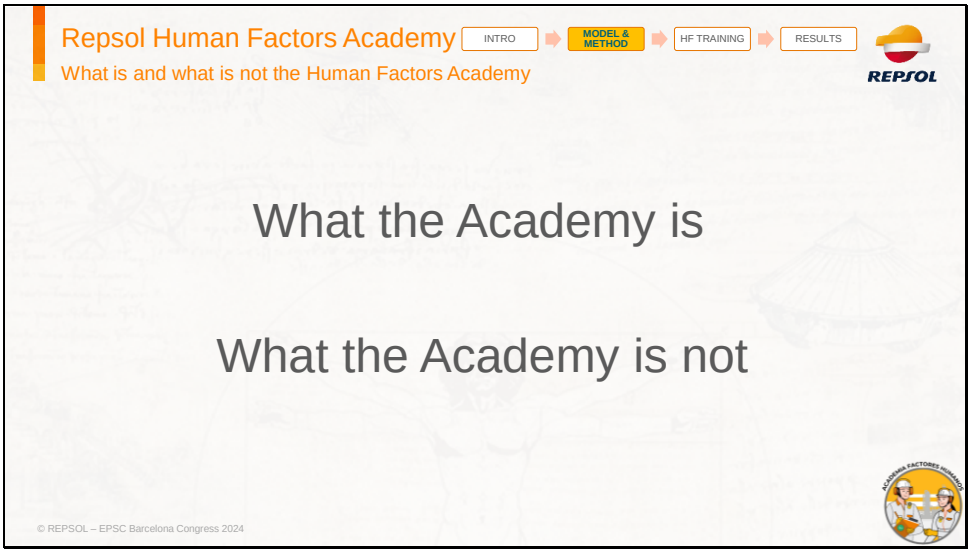
Solutions for workers

- Error prevention techniques
- Safety Culture: process safety, risk perception, behaviour-based safety.

Solutions for Leaders and Supervisors

- Soft Skills, supervisory skills and field observations
- Risk management and decision-making
- Root Cause Analysis Training

Before we start with the details, I'll show you what we are talking about. Here you can see the Human Factors Academy facilities.
Next to our plants, but outside the Industrial Complex, we have some training rooms where we work the theoretical part of the training.
Outside these rooms we have installed and plant that went out of use. This is a full plant with vessels, reactors, valves, different access levels, etcétera. The only difference with a real plant is that this one does not have fluids, temperature, pressure or electrical power.
We have even included loud speakers to simulate plant noise and make the experience more real.



The Academy is a initiative where we work on how to prevent human errors, identify error precursors and learn tools to do all that.

The Academy is not aimed at practising specific procedures with special equipment. The training plant is a standard plant, not each operator's plant. This specific procedures with their specific equipments are trained in sessions run by each operating or maintenance department.

- This is the typical schedule of a day at the academy. It takes 6 h with subsequent 2 h follow-up.

- Our training experience oriented to the application of safe behaviours in operation and maintenance begins with a theoretical and practical session where, in addition to introducing some concepts of error and the human factor, such as precursors of error, operative experiences or the human performance tools, we challenge the trainees in different discussions and exercises to arouse their curiosity and willingness of change. The assistance in this case, is attempted to be organised by units of work, to create a solid change with a sense of group.
- Then we move on to the simulator or pilot plant where we propose to the students, realistic situations where they can apply what they have learnt in class, with malfunctions and small "traps" to, as we say, make mistakes cheaply and safely. In the case of operators, they work with communications and shift turnover. With the Area Managers and Maintenance supervisors we focus more on soft skills. After the scenario, a feedback session is held where we learn from these mistakes and the strengths that also appear.
- The second part takes place a few weeks later and takes the form of a coaching session. The aim is to ensure the transfer of the training to the workplace. We go to the field with each participant in a session of about two hours and see how what we have seen in class is applied. In this accompaniment we must be as non-intrusive as possible and that is why we call it shadowing. We are but a shadow. Of course, after the accompaniment we carry out a feedback session with the participants to reinforce the strengths and deal with the difficulties and allows us to evaluate the forgetting-learning curve

- Both in the classroom, in the simulator, and in the field, we not only instruct, model or evaluate, but we activate the consultant or coach mode to identify strengths and areas for improvement in terms of the human factor, Individual Performance, Working Conditions, Organization & Culture or Leadership & Management

Classroom session:
- Unit taylor-made sessions
- Theoretical-practical training on Human Error, Operational Experience, Error Prevention Techniques…

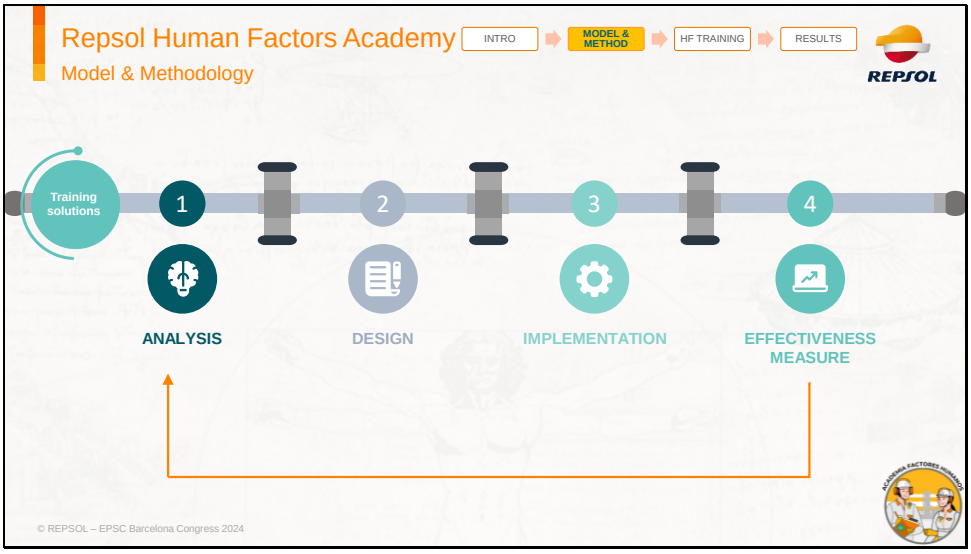
Pilot plat or boxes scenario
- Implementation of safe behaviours and reinforced expectations in the classroom.
- Realistic scenario with specific “traps” or malfunctions based on Lessons Learned

Customized specific work

- Specific work on the needs of the attending group: supervisory skills, communications, shift handover...
- Consulting and identification of areas for improvement

Shadowing in the field

- Real observation at the workplace
- Postcritical feedback sessions
- Tracking the evolution of safe behaviours



The sessions at the academy consist of four phases:
•The first phase involves analyzing the department that will receive the training. This serves as the starting point for **adapting** the training programs, with an emphasis on the real situation of the unit, organization, and experiences.
•In the design phase, objectives to be consolidated are established, and training content as well as simulation **scenarios are developed**.
•During the implementation phase, the training is conducted at the academy in 6-hour sessions (with a format that will be detailed below).
•Finally, an effectiveness measure is carried out to **assess the impact** of the training evaluating satisfaction, knowledge and transfer to the workplace. We use these indicators for **continuous program improvement**.

Although we are talking about training, what we want to achieve is a change in behaviour, so our training will be very much based on working on those behaviours or as Einstein would say…

Analysis:
- Current **Performance**
- Operational experiences and **incidents**
- Plant and Org **Reality**
- Task Types and Processes
- Previous good practices
- Establishment of indicators

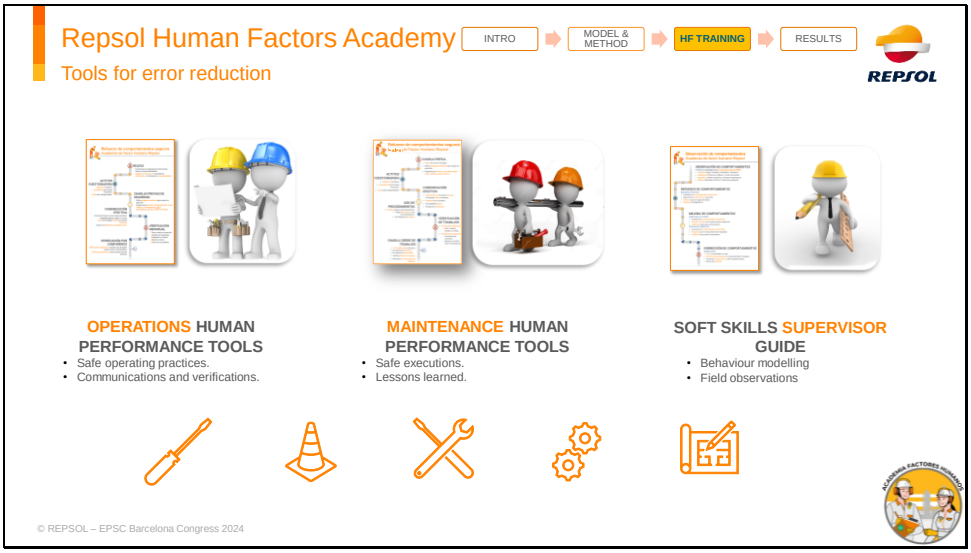
Design:
- **Objectives** and planning
- **Prioritization** of needs based on phase 1
- **Contents** and materials development
- Pilot plant **scenarios** design
- Field Training Program for instructors
- Documentation researching
- Pre-Implementation **Pilot**

Implementation:

- Management and delivery of training
- Field shadowing
- Student and Instructor Assessment
- Training Control
- Observation

Effectiveness measure:
- Knowledge evaluation
- Field observations
- Analysis of indicators
- HF issues evaluation
- Continuous improvement

True learning is experience, everything else is just information.
What is our learning experience like within the Repsol Human Factors Academy?



As an example of the behaviours and the tools for error reduction that are worked on in the classroom, we have the infographics that are used with operations, with maintenance and with supervisors and middle managers.
Between the first two there are only small changes depending on the most necessary behaviours such as the reinforcement of shift turnovers for operations and procedures for maintenance. In the third we touch on softer skills that are fully applicable to their job.

OPERATIONS HUMAN PERFORMANCE TOOLS

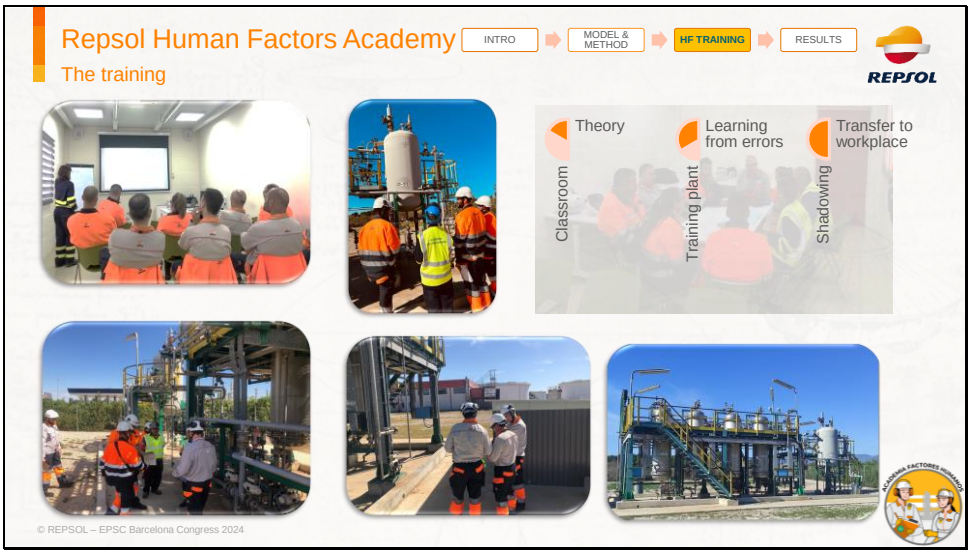
- Reinforcement of safe operating practices.
- Focus on communications and verifications.

MAINTENANCE HUMAN PERFORMANCE TOOLS

- Reinforcement of efficient and safe executions.
- Extra focus on extracting and applying lessons learned.

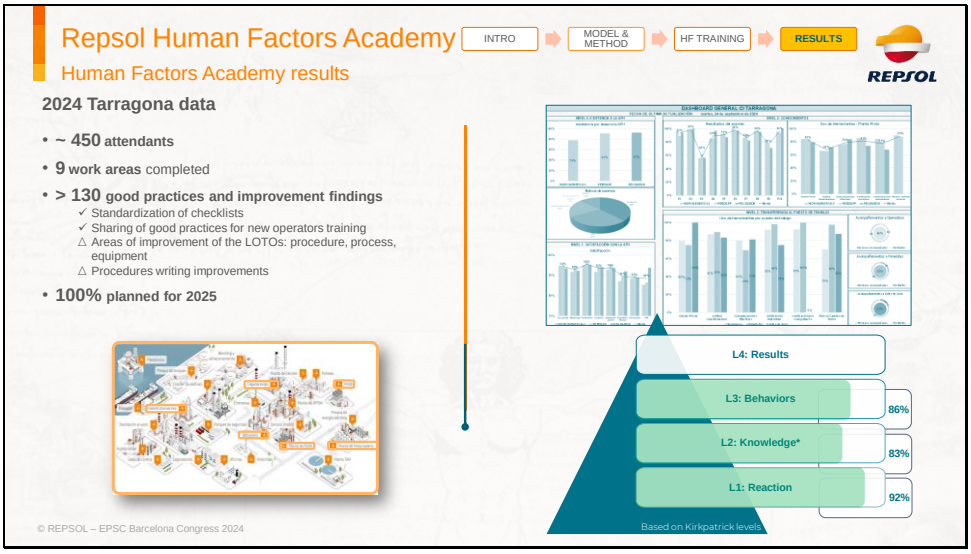
SOFT SKILLS SUPERVISOR GUIDE

- Specific work in behaviour modelling
- Focus on effective field observations



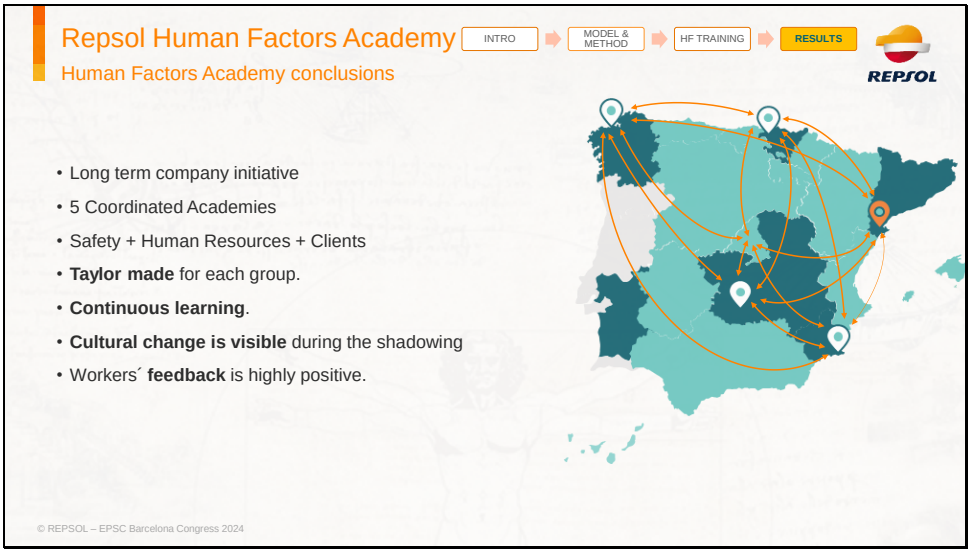
Some images of what we do.
We usually have 2 groups of 4 trainees each with 2 instructors. They go together to the classroom session. Afterwards, they separate into 2 groups of four people, each of them with an instructor.
In each group, two people are given a task following a certain procedure and they have to complete it using the tools for error prevention that they have been explained before. The other two trainees practise their safety prevention observation skills. After this, the four of them have a feedback session. Then they go for the second session where the observers and workers change places and finish with a final feedback session.
The goal is not to practise any specific plant procedure (i.e. starting a certain compressor) as they train this in their own plant with the real equipment. The training plant is not their plant and choosing one procedure or other is just so they can realise the errors we all do and practise the tools for error prevention.

We prepare a realistic environment: loud speakers simulating plant noise, radio urgent calls, in some cases telling about family emergencies, etc



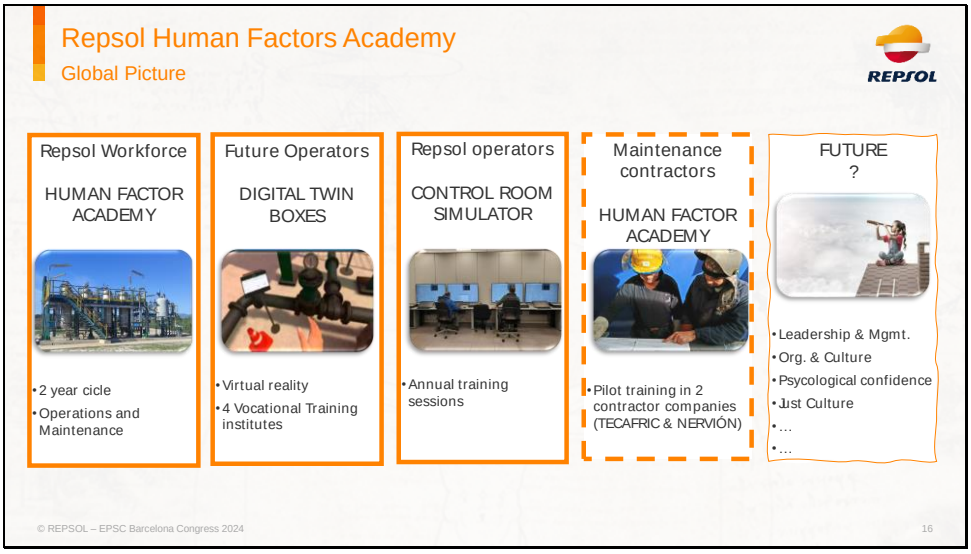
2024 Tarragona data (oct-24)

- 424 attendants
- 114 shadowings executed
- 9 work areas completed: Hydrotreatment, Energy, Butadiene, HDPE, LDPE, Polypropylene, Dynamic Equipment & Electrical Maintenance and Technicians & Middle Managers
- >130 good practices and improvement findings identified during the Academy Sessions
  - ✓ Standardization of checklists
  - ✓ Sharing of good practices for new operators training
  - △ Areas of improvement of the LOTOs: procedure, process, equipment
  - △ Procedures writing improvements
- 100% planned for 2025



CONCLUSIONS

- Long term company initiative
- Coordinated Academies in 5 sites (add value in terms of training and analysis)
- Safety + Human Resources + Clients
- **Adapted to the reality and pain points o**f each group.
- **Global and continuous learning** is generated through the academy sessions.
- The **cultural change** on concepts of human error, value of supervision, safe practices, etc., is visible in the workplace during the shadowing.
- The **feedback** of the academy is **highly positive** by the workers



Repsol Workforce

HUMAN FACTOR ACADEMY

- 2 year cicle
- Operations and Maintenance

Future Operators

DIGITAL TWIN BOXES

- Human Factor training using virtual reality
- 4 Vocational Training institutes in Spain
- Working on Maintenance degrees

Repsol operators

CONTROL ROOM SIMULATOR

- Annual training sessions

Repsol operators

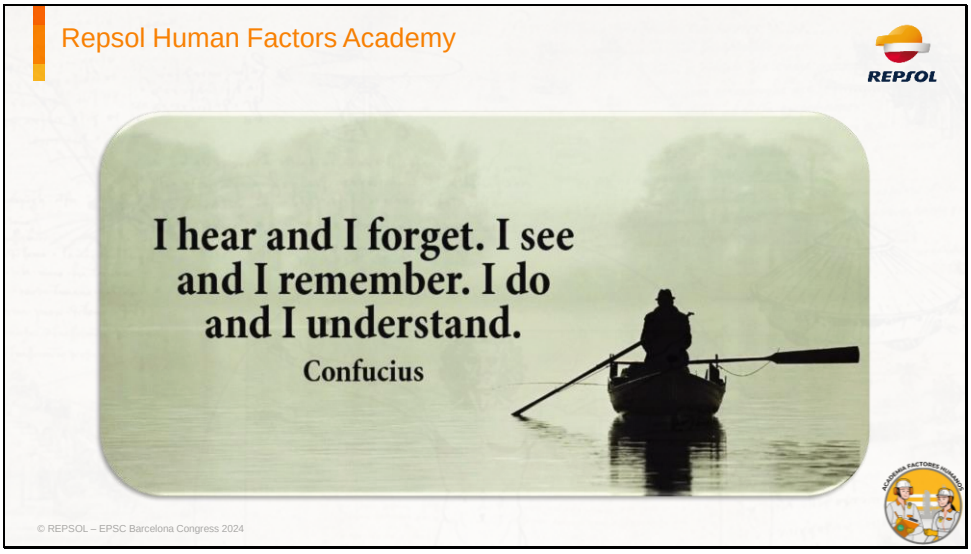
IN-PLANT TRAINING

- Real plant equipment
- Specific plant key procedures
- Annual training sessions

Maintenance contractors

HUMAN FACTOR ACADEMY

- Pilot training in 2 contractor companies (TECAFRIC & NERVIÓN)

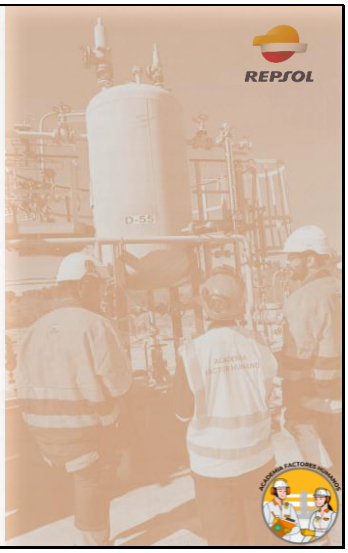


Our Human Factors Academy is not just teaching.
We also do training, but that is not all.
We need to take this cultural change to the workplace so we do shadowing or in other word, coaching.

As a wise man said:
“I hear and I forget. I see and I remember. I do and I understand”

Repsol Human Factors Academy

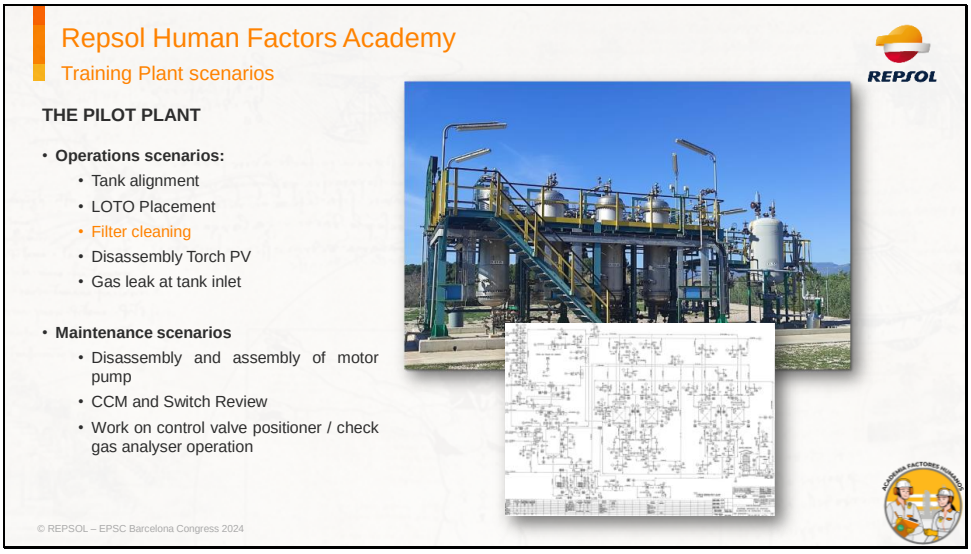
¿QUESTIONS?



Briefly explain the work to be done and the pilot plant.

We have an old acrolein plant with 4 reactors, our D55 tank, valves and instrumentation. The work is usually simulated trying to maximize movements in the plant, at different heights and locations to make it as realistic as possible

The plant, as is evident, is isolated and de-energized but during the session we generate in the attendants the conditions to execute the exercise as in the real plant. In addition to the work itself, we create noise situations and other error precursors that we may want to add after the designing phase



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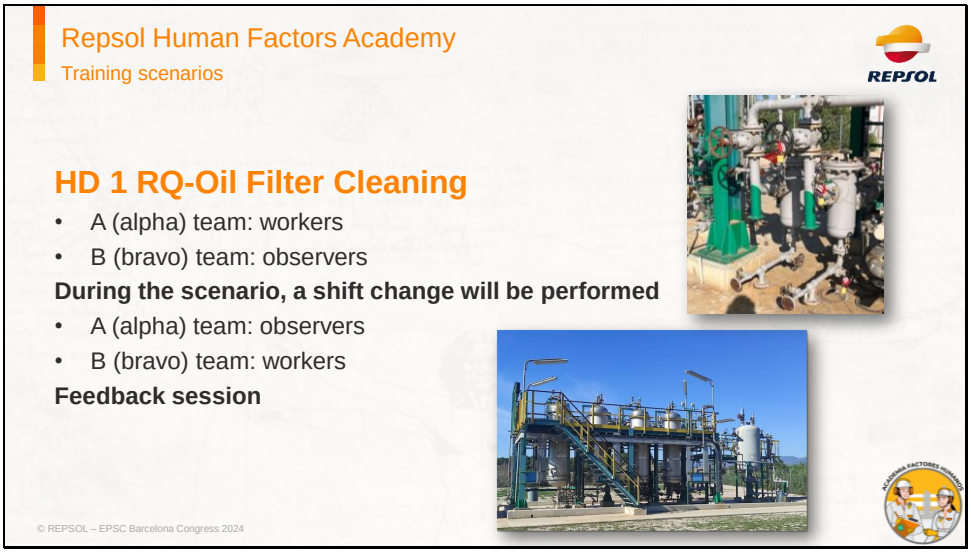

Briefly explain the work to be done and the pilot plant
We share in the pre-work meeting with the executors, the necessary documentation such as the p&id, procedures, LOTOS and isolations equipment and whatever they request for the execution.
We create initial conditions and let them prepare and go to the plant to execute the work.
We have specific malfunctions created for the different units in each scenario and some generic ones that can always be used as beacons, housekeeping etc...

Repsol Human Factors Academy

Training scenarios

HD 1 RQ-Oil Filter Cleaning

Main malfunctions/traps:

1. Housekeeping EG0
2. Wrong LOTO installed in F-5B Filter Instead of F-5A
3. Cross labelling of inlet-outlet valves
4. Non-matching plant-write equipment names
5. Miscommunication with panel on XV valves for inlet to tank
6. Incomplete beaconing
7. Information omitted in the LV-412 status during turnover
8. Damaged PDT-423A pressure transmitter cover
9. Non-existent blind cover in an open line
10. Wrong use of PPEs

Briefly explain the work to be done and the pilot plant