

Change HSE culture and performance using VR Transformational Learning

How VR is used to train workers in **safety critical activities** in e.g., Turnarounds, Shutdowns and Construction activities

Care about Human Life

1. Is it possible to change HSE culture in a company by introducing the Life-Saving Rules?

2. Is it possible to reach a 95% reduction in fatalities in major oil company in 15 years by applying Safety systems?

3. Can VR learning influence better learning and behaviour?



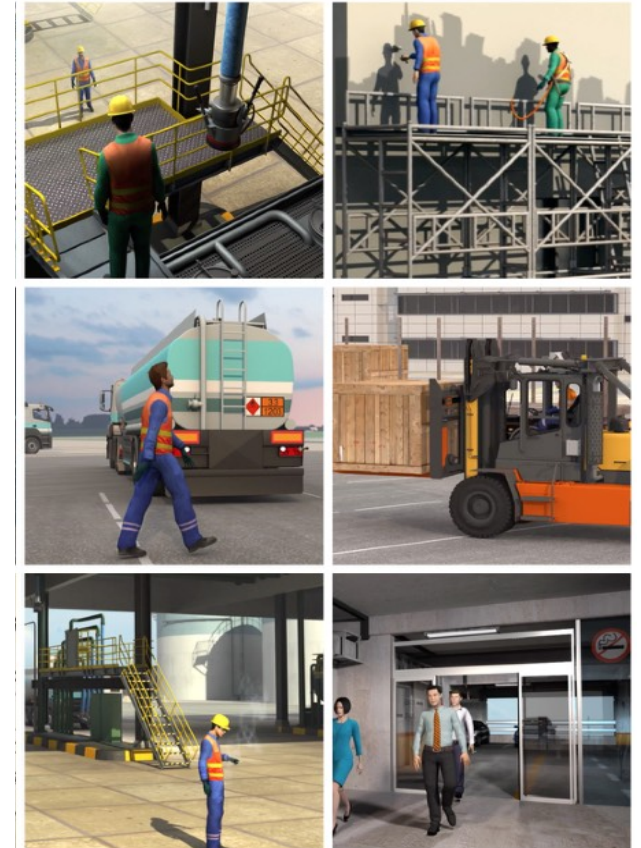
About **Willem Peuscher, MSc, MIEM, MOSHE, LIOH**

1984-2016 **Royal Dutch Shell**, Downstream manufacturing, Upstream, operations, learning, HSE.

2006-today: **Tripod Foundation Board** member (Learning from Incidents)

2017-today: **Board member Safety Leaders Foundation** - improve safety at workplace

2021-Today: Partner **VIRSAT LLC** to improve safety at the workplace by **VR Safety Training**.



VIRSAT LLC

- 100+ years experience in operations, maintenance, construction, logistics and safety
- Internationals
- Professionals in transformational learning tools
- 10 years in games and 5 years VR tools
- High customer satisfaction



Willem Peuscher
Partner
RESEARCH &
DEVELOPMENT

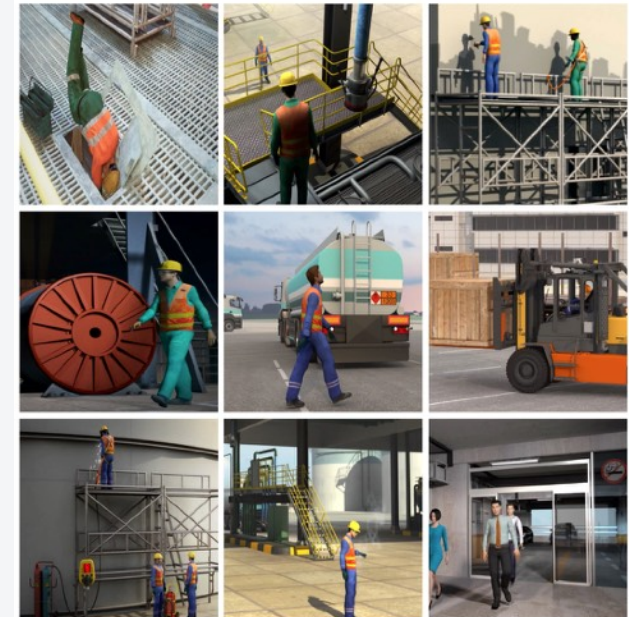


Dick Nijen Twilhaar
Director
PRODUCT INNOVATION
& TECHNOLOGY



Bassam Alkassar
Director
MENA OPERATIONS

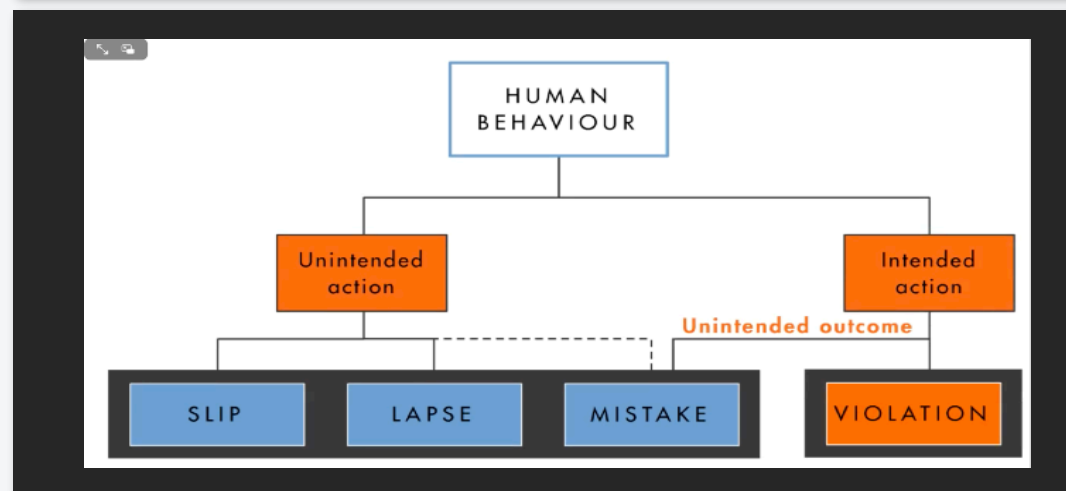
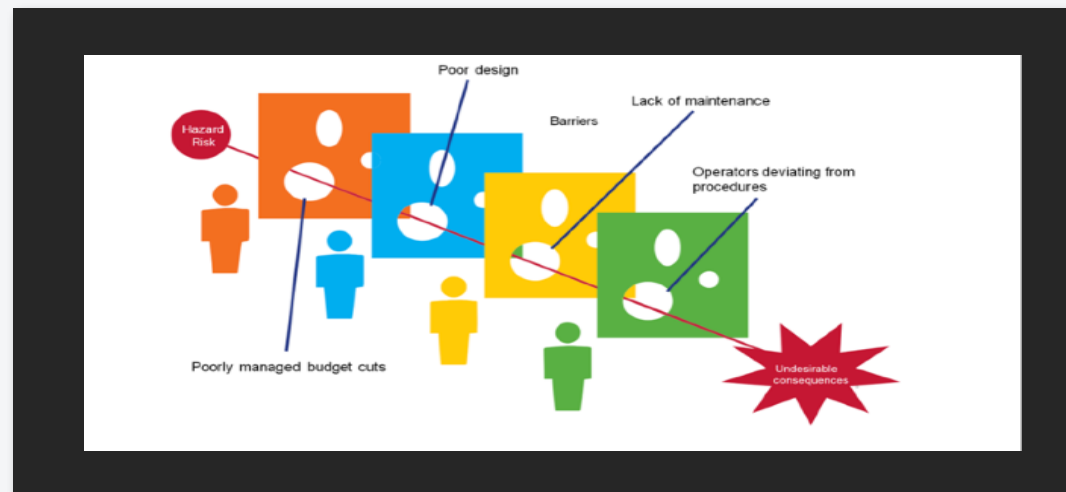
VIRSAT mission is to reduce incidents in the workplace, because we care. VIRSAT helps companies to make significant steps **in safety performance**



Impacting HSE culture and (safety) performance.

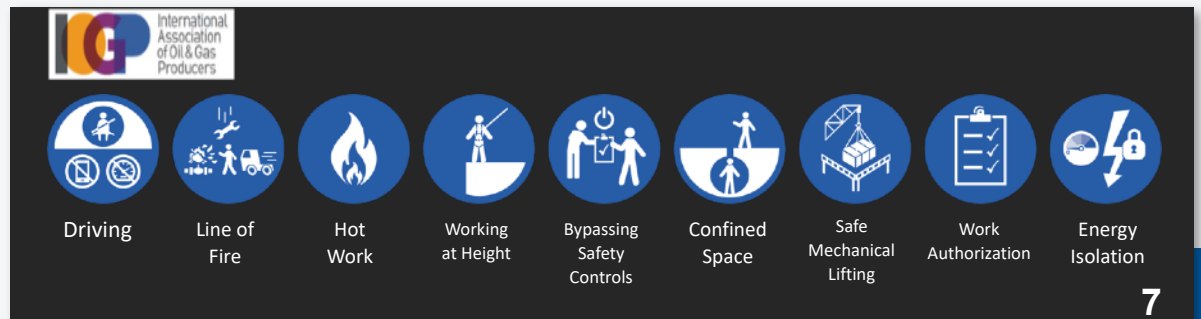
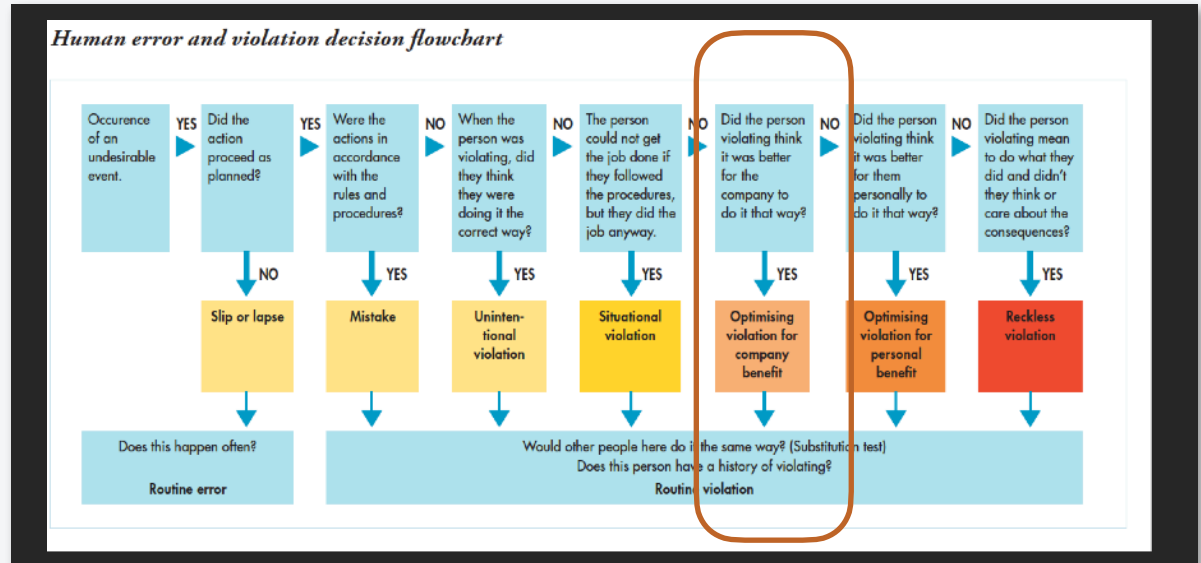
Tripod Beta - incident investigation

- Tripod Beta: investigate unexpected business events and incidents
- Focus on business controls, people and underlying organisational issues
- Behaviour (why people acted as they acted)
- Tripod Foundation Board supports developments to save people's lives and assures quality of Tripod training.
- Notes:
 - Tripod Foundation is linked to [Energy Institute](#) (UK); See [Hearts and Minds](#).



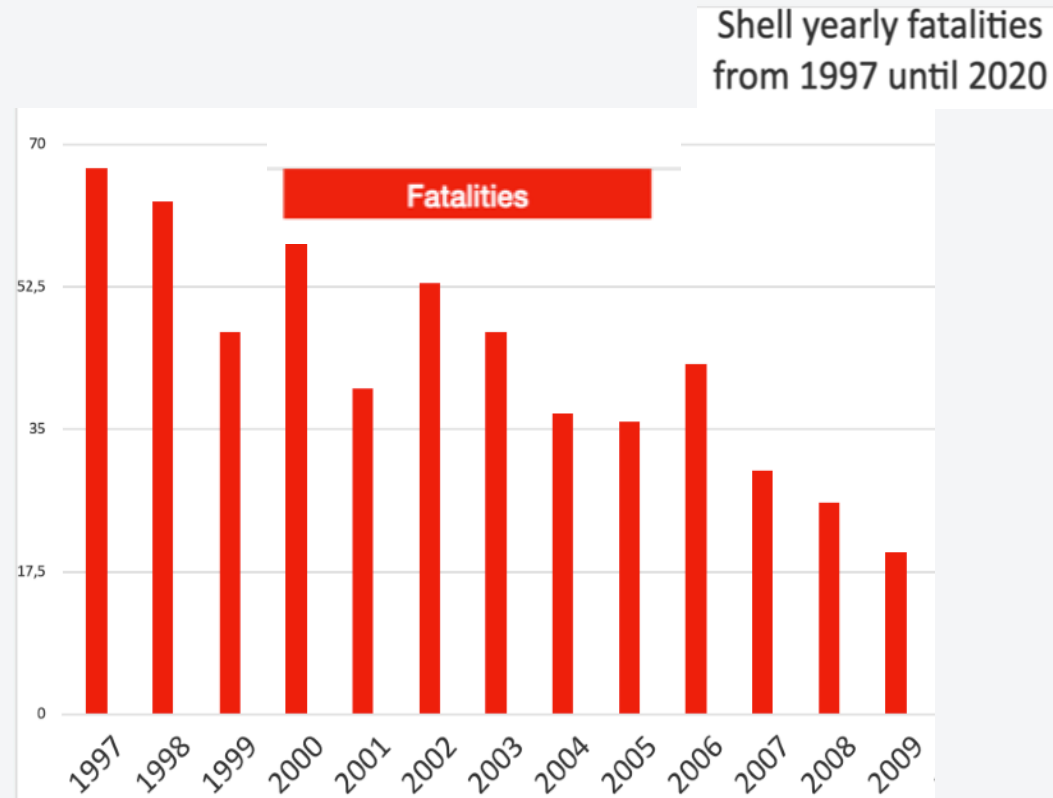
Critical business controls- why these fail

- **2008:** review of 30 years of fatalities Shell: 12 areas covering ~ 70% of fatalities
- **2009:** Prof. Patrick Hudson reviewed why people acted as they acted: mostly violations due to organisational optimising: thought it would benefit the company (quick, simpler...)
- **1 July 2009:** 12 Life-Saving Rules Shell
- **2011:** IOGP reviewed 1500+ incidents
- **2012:** IOGP 18 Life-Saving Rules
- **2013:** SPE Prof Groeneweg/Peuscher: FAR reduction Shell - attributed to Life-saving Rules
- **2018:** IOGP published 9 Life-Saving Rules, as industry standard



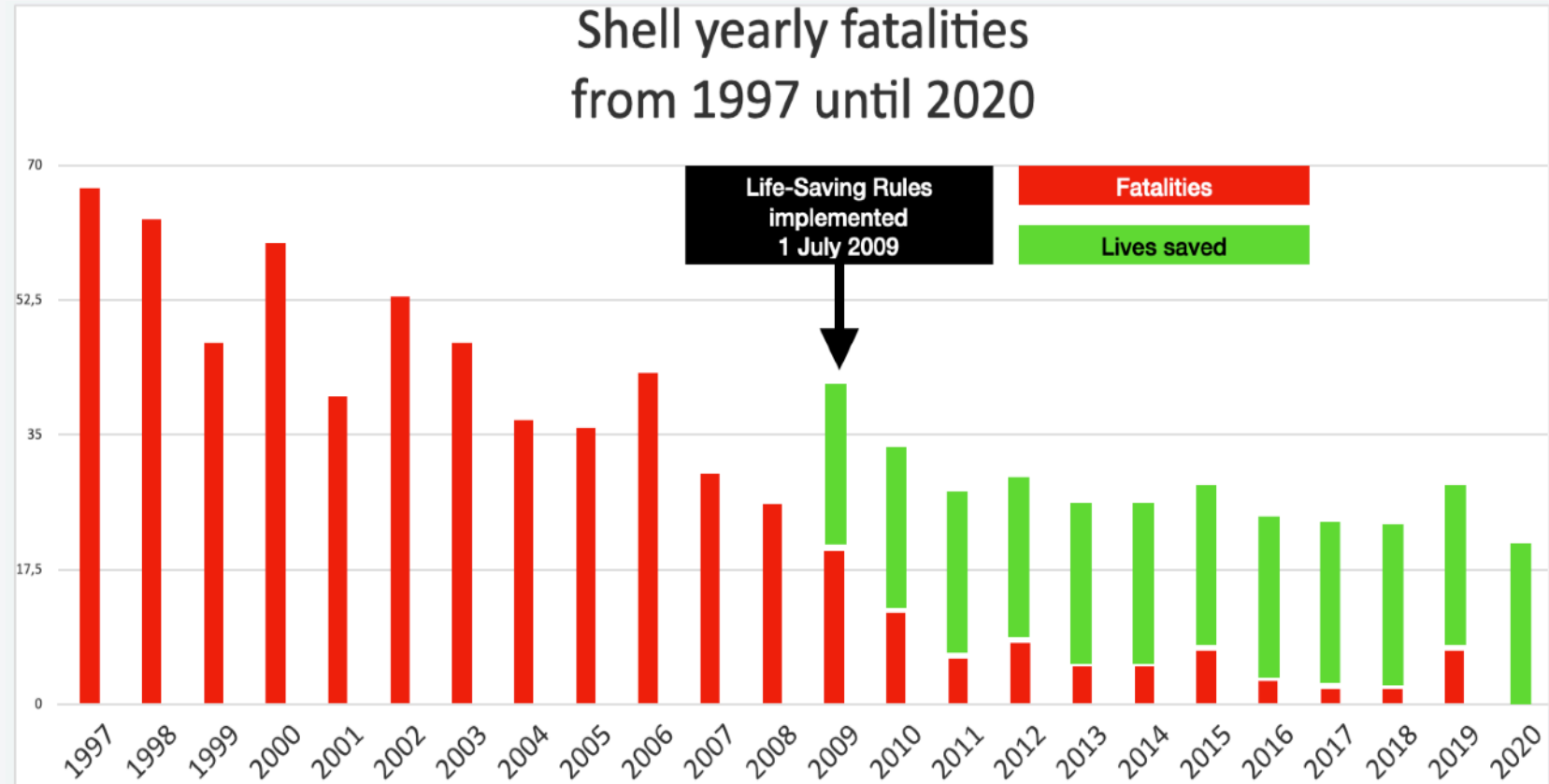
The SUCCESS

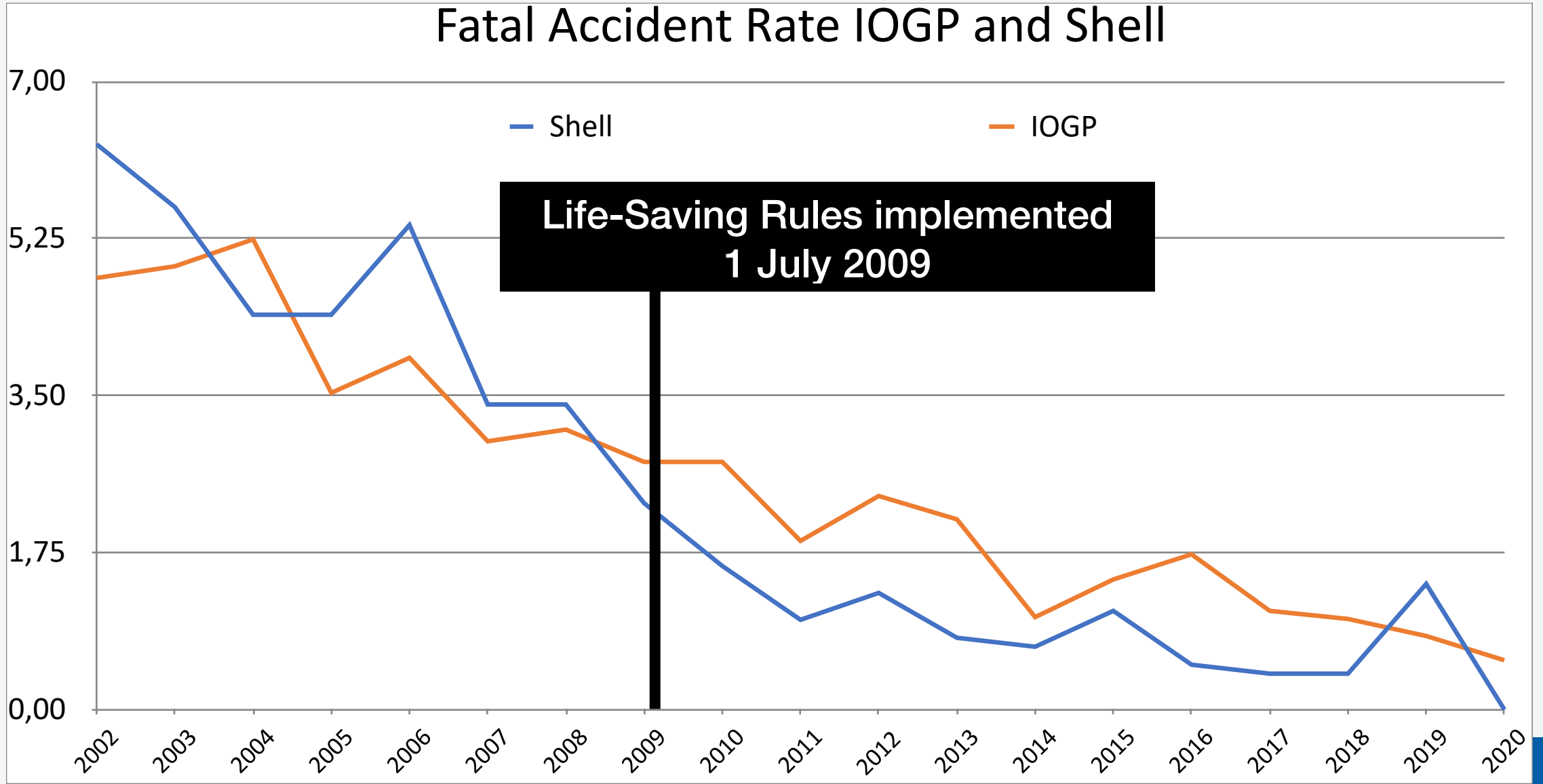
- Workers know what is expected from them, to keep each other safe
- Leaders talk about the same values: safety (to drive overall business performance)



The SUCCESS

- Workers know what is expected from them, to keep each other safe
- Leaders talk about the same values: safety (to drive overall business performance)





Highest risks in industry



Driving



Line of Fire



Hot Work



Working at
Height



Bypassing
Safety
Controls



Confined
Space



Safe
Mechanical
Lifting



Work
Authorization



Energy
Isolation

9 Life-Saving Rules



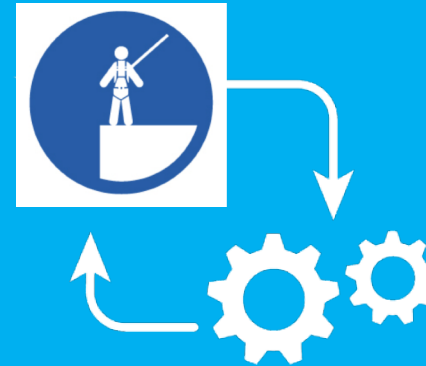
Implementation of the Life-Saving Rules



Visuals
- can make picture of rule = critical control by worker



Compliance is possible; Non compliance = no job



Implementation in whole supply chain: contract clauses to field



Safety leadership, Training, Communication, Staff councils, HR, Legal, Supply chain Field monitoring

How to sustain the critical business controls (e.g. The Life-Saving Rules): **TRAIN THE WORKERS**

**Have a training
strategy**

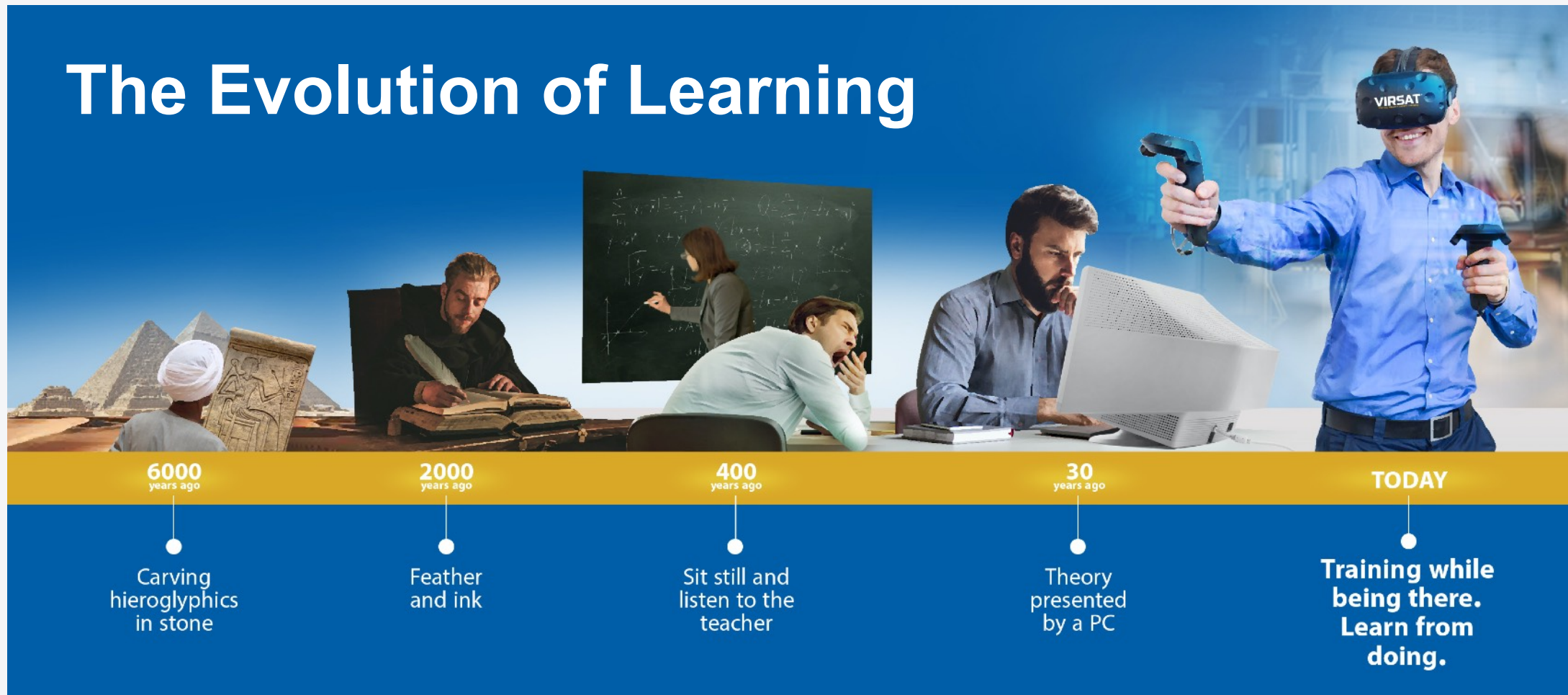
**Focus on
person's role
and risks**

**Focus on
Adult learning
techniques**

**Consider
Gaming as
learning
method**

**Consider VR as
learning
technique**

The Evolution of Learning



Virtual Reality

Innovation to Give You Results

With Front Cameras



FEATURES

- **Showing real-life work situations**
- **3D-360° Vision and spatial sound**
- **Animations can show the invisible:**
 - Actual incidents, explosions, etc.
 - Looking inside equipment, “seeing” pressure, etc.
 - User interaction throughout the animation
- **Latest technology**
 - High Quality VR headsets without cable
 - No dedicated hardware, no internet, no Wi-Fi needed
 - Fully self-contained head-sets
 - Suited for all languages

Supported Devices



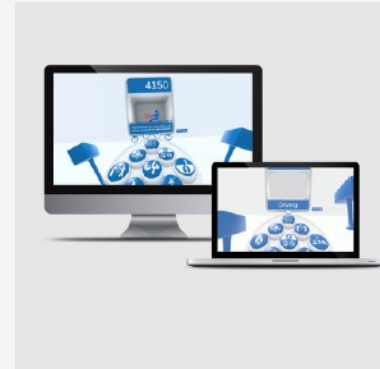
**PICO 4
Headset &
Controllers**

(Life-Saving Rules **Aware**, Life-Saving Rules **Road**, and Life-Saving Rules **Pro**)



**OCULUS Quest 2
VR Headset &
Controllers**

(Life-Saving Rules **Aware**, Life-Saving Rules **Road**, and Life-Saving Rules **Pro**)



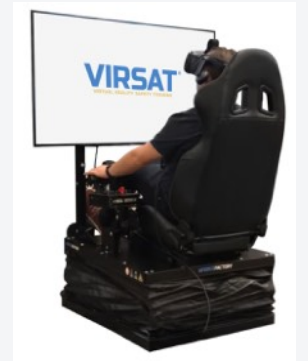
PC

(Life-Saving Rules **Aware**)



**RealWear
Navigator 500**

Explosion-proof
available



**VR
Simulator**

Virtual Reality Benefits

Resolving Major Challenges

Benefits in comparison with e-/classroom learning



Emotional Connection

- **4 times** more emotionally connected with injured/killed people



Focused Audience

- Distracting and multi-tasking reduces with **38%**



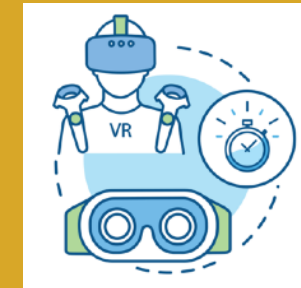
Leading to Action

Willingness to address the issues increases with **40%**



Avoids “Wordy” Approach

- Visual interactions
- Suited for all nationalities, even illiterate workers can use it



Faster

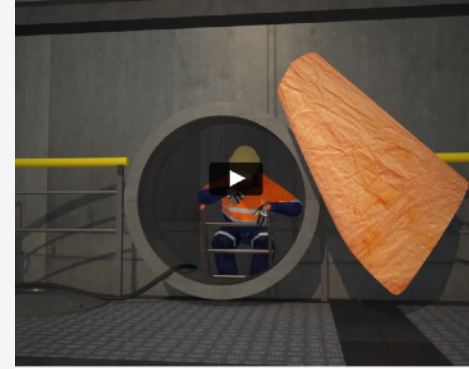
Required training time reduces with **75%**

Safety Learning Applications

VIRSAT's Safety VR Applications



**Personal/Behavioural
Safety**



Safe Maintenance



**Process Safety/Asset
Integrity (LOTO, MOC etc)**



**Road Safety:
Professional Drivers**



Learning From Incidents



**Operational Tools
(Audits, etc.)**

Learning Approach

Behavioural Safety



Basic assumptions for game design

- Workers act with the best work intentions
- However workers might err (mistake) or violate when they think the boss accepts it.
- Many fellow workers are reluctant to make interventions because the other might be more senior/knows it better, or they are uncertain about 'what is right'
- VIRSAT's VR games:
 - Focusses on the **highest risk** in the company
 - Show the **right way** how to deal with these risks
 - Provide work-situations to **exercise interventions**
 - Provide exercises to **recognise hazards**
- **VR technology:**
 - helps to create a safe place to exercise the skills
 - visualise the right work practices, so these better stick
 - helps to train, practice, receive feedback, improve, get competent/certified; Learning insights report. .

3 Pre-Job Safety Training

Safe Maintenance LFI®



Recognise hazards and do interventions : Supervisors. Join a day in a life of a worker

**Learn from Past Incidents:
craftsmen starting a hazardous
job. See the context + incident**

Delivery Option: Use VIRSAT's VR Headsets for On-site Training

VR Headsets Training Solutions

VIRSAT can offer a solution for companies who want to roll out a training to workforce at their worksites

- A VR headset is a small size 'simulator', with real work situations
- VR safety training game software is ready for use on the headsets.
- A travel case with VR headsets is sent to your work locations.
- Simple user info is provided. Help line is available
- It is "Plug and Play".
- Short term lease contracts are possible.
- Sending/returning logistics is included
- Trainee competence certificates can be provided.



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Thank You

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The People Behind VIRSAT

Bonded through their common passion for developing safety strategies and technological innovations, Willem, Dick, and Bassam have established a company called Virtual Reality Safety Training (VIRSAT). The three partners have developed this passion through their vast experience working for major oil and gas companies around the world and witnessing the dire need for an innovative learning process that would support companies in their HSSE policies and implementation. Road safety has been a passion for each of them during their careers.

They experienced real-life fatal incidents, studied the causation and underlying issues and were material in Shell's effort to change their safety performance to a best in class. They realized the positive impact of imagery and animations in the process of teaching and decided to focus their attention on building "transformational learning experiences" through the use of audio-visual animations and VR technology. A whole suit of products is developed as serious game, application, or interactive animation. As these are played on VR Headsets, smartphones and tablets, they become available as and when needed for the drivers, e.g., in driver waiting rooms or in the offices.



Willem Peuscher
Partner
RESEARCH &
DEVELOPMENT



Dick Nijen Twilhaar
Director
PRODUCT INNOVATION
& TECHNOLOGY



Bassam Alkassar
Director
MENA OPERATIONS

VIRSAT cares about human life:



Mission

VIRSAT's mission is to develop, produce and provide innovative, practical and proven learning methods to impact safety competence and human performance of workers in industry.



Vision

Reduce the number of workplace related incidents.



Commitment

Extensive Training Modules

Our solutions are developed with our customers in mind. Our modules are meant to adapt to different requirements across diverse industries. Through this, contractors of companies can also use the same training modules to ensure that their workers are fully aligned with the client's safety measures.

Results-driven Innovative Solutions

VIRSAT is focused on developing solutions that ensures performance and safety improvement of workers in high-risk working environment.

Exceptional Customer Service

Helping our customers establish an effective safety standard for their company and actually having the workers observe the protocols at all times is our top priority.

Safe Maintenance VR Package

1. Basic Safety Training

Understand the
Highest Risks
During Maintenance
Work

All Workers

Safe Maintenance Aware®

2. Operational Safety Training

Recognise
Hazards and Do
Interventions

Foremen, Supervisors,
Inspectors, Managers

Safe Maintenance PRO®

3. Pre-Job Safety Training

Learn from Past
Incidents

Workers Starting a
Hazardous Job

Safe Maintenance LFI®

1 Basic Safety Training

Safe Maintenance AWARE®

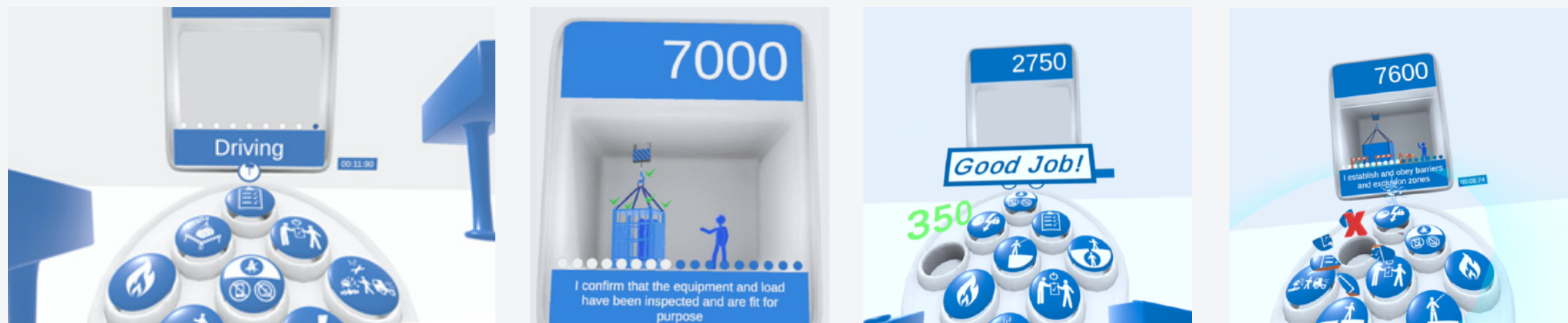
The **Safe Maintenance AWARE®**

- is delivered with VIRSAT's Virtual Reality Headsets.
- is fun to do. Playing the game ensures workers know the maintenance risks and can use them.
- shows that fun and safety can go together very well.



1 Basic Safety Training

Safe Maintenance Aware®



The gamer sees a **work situation** and need to correlate this to a **risk** . The gamer gets bonus points every time he/she gets the answer correctly, or get , the gamer can retry later. If all are right, the game is won and ends. A gamer score is given.

2 Operational Safety Training

Safe Maintenance PRO®

Safe Maintenance Pro® is a Virtual Reality serious game. The trainees join a day in a life of a Driver or Worker. They follow the Driver or Worker and need to intervene when a Life-Saving Rule non-compliance is noticed.

Trainees observe and intervene on the Maintenance Risks. It takes **15-25 minutes** to play the game.

2. Operational
Safety Training

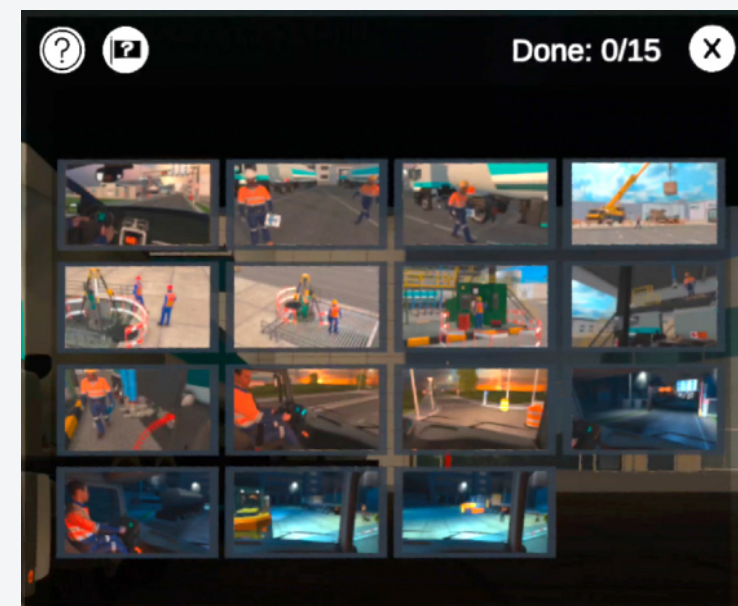
Recognise
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Foremen,
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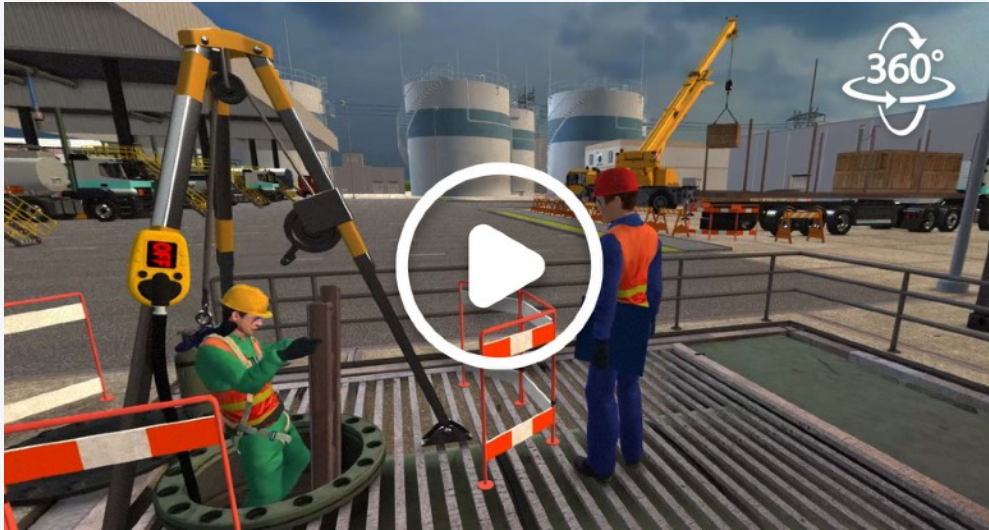
Supported Languages



On a VR headset you can see it 3D 360° with directional sound.



I confirm the atmosphere has been tested and is monitored



The gamer selects a scene and watches an activity like entering a confined space. If the gamer identifies an error or violation, he/she needs to intervene and identify the risk observed and the behaviour observed. A reflection is shown with the right or wrong behaviour. When the gamer finalises all scenes successfully the gamer won the game and gets a congratulation.



Safe MaintenancePRO® - Safety Training Game Demo

Confined Space

The **Confined Space** rule says: “Obtain authorisation before entering a confined space” and “I confirm the atmosphere has been tested and is monitored”.

3 Pre-Job Safety Training

Safe Maintenance LFI®

Safe Maintenance LFI® is a Virtual Reality serious game. The trainees are observer of an activity which develops into an incident. They need to make an intervention to prevent the activity leading to an incident. An explanation is afterwards given on how to prevent this incident. This is then Learning from Incidents (LFI)

Trainees apply the Safe Maintenance LFI® before they do hazardous jobs (a job where the Permit to Work indicates one for the Maintenance Risks are relevant). It takes **5 minutes** to play the game and 5 minutes to discuss the game with the supervisor. The Safe Maintenance LFI® is loaded with a number of the relevant hazardous activities.

Examples are shown in 360°. On a VR headset you can see 3D 360° scenes with directional sound.

3. Pre-Job Safety Training

Learn from Past Incidents

Workers Starting a Hazardous Job



3

Pre-Job Safety Training - Safe Maintenance LFI®



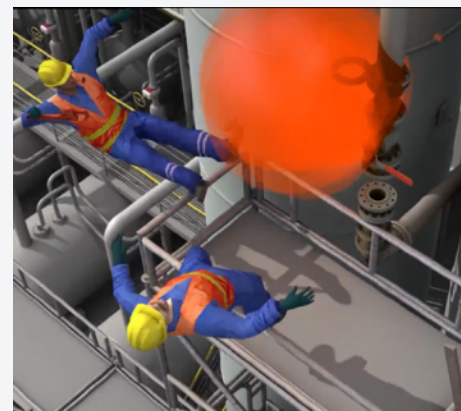
Location



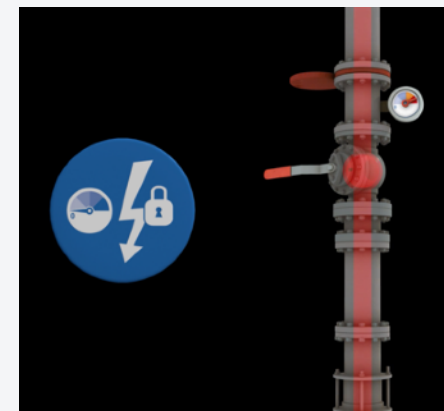
Workplace



Activity



Incident



Causation & Learning

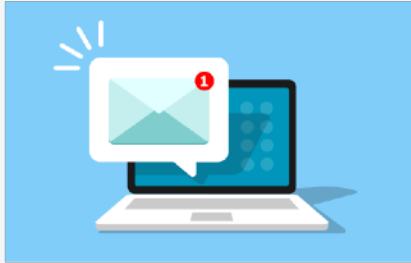
The gamer will first see the location and installation - to understand the context. Then the gamer will be taken to the workplace and the activity at hand. The player needs to spot the hazards. The incident happens. The causation is given. The gamer can discuss what he sees with peers to deepen the understanding.

Logistic Options for VR - At Site



Logistic Options for VR - At Remote Location

1 Staff receives email



2 Email contains QR code



3 Staff can go to various locations where there is a headset.
(The headsets can be placed at driver waiting room, desk at entrance of an office, airline frequent flyer desk, etc.)



5 Staff gets trained with the headset



4 Staff can access the game by scanning the QR code with the VR headset



6 Training results in the headsets are transmitted and combined for a training report

