

# PROCESS-GENERATED CARCINOGENS

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# WORK-RELATED DEATHS IN EUROPE

Numbers and figures about work-related cancer caused by carcinogenic substances in the EU



Mortality



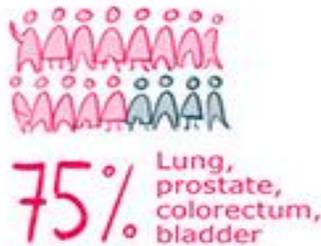
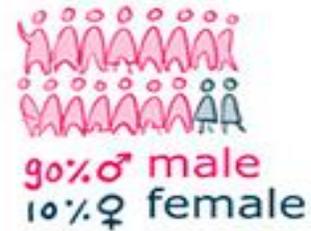
7~12 deaths

every hour...

10~12 new cases



Incidence



Costs



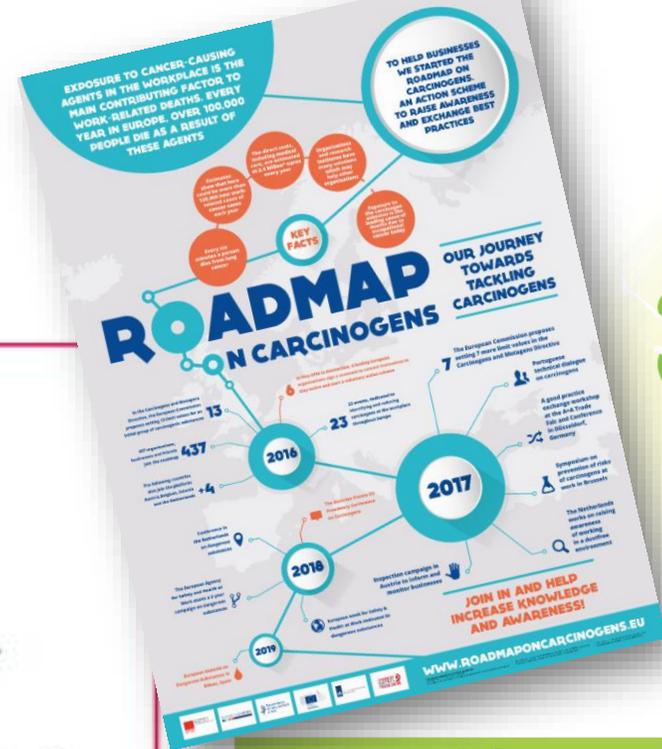
Direct



Indirect



Intangible



Healthy workplaces  
**MANAGE DANGEROUS SUBSTANCES**



**Pillar 1:**  
Creating awareness



**Pillar 2:**  
Providing help



**Pillar 3:**  
Mobilising stakeholders



**Pillar 4:**  
Targeting innovation



Better data



Substitution strategies



Activating industries and sectors



Bridging the gap



Education is key



Guidance to risk management



Involving social insurance organisations



Process-generated carcinogens



Funds for businesses



Cooperation with SLIC



Safe working procedures



Empowering Workers

# CHALLENGE 4.2:

## PROCESS-GENERATED CARCINOGENS

- › Process-generated carcinogens occur as a **by-product** of a work process
- › These need **extra attention** because they will not have labels and there may not be any reference to them in Safety Data Sheets
- › A **large proportion** of workers in the EU are potentially exposed to process-generated contaminants, in particular to RCS and diesel exhaust fumes
- › Challenge team: Austria, Netherlands and ETUC
- › Challenge description: [Challenge 4.2: Process-generated carcinogens](#)

# HAZARDOUS SUBSTANCES NOT ONLY REACH



# › **PROCESS GENERATED CARCINOGENS**

## **DEFINITION**

### **CRITERIA FOR DEFINING A PGC:**

The substance is:

- › Carcinogenic
- › Accidentally generated during a work activity or process (i.e. not manufactured or intentionally used in manufacturing)
- › Generated by physical or chemical degradation of the original material (e.g. combustion or abrasion)

**Not considered PGCs:** evaporation of VOCs (that for instance leads to drying of paint)



# › TWO GROUPS OF PROCESSES THAT GENERATE PGC'S

## Emission from combustion

Welding, smelting, heating, soldering, and curing



### Main substances

(Diesel) engine exhaust  
Chromium VI  
Welding fumes  
Lead fumes  
Rubber fumes  
Bitumen fumes

## Abrasion / ablation

Cutting, drilling, sanding, blasting, planing, grinding, milling, sawing, backwinding (textile) and crushing

Cleaning of metal, paint, stone, hardwood with (2D) lasers

### Main substances

Respirable silica dust  
Hardwood dust  
Chromium VI



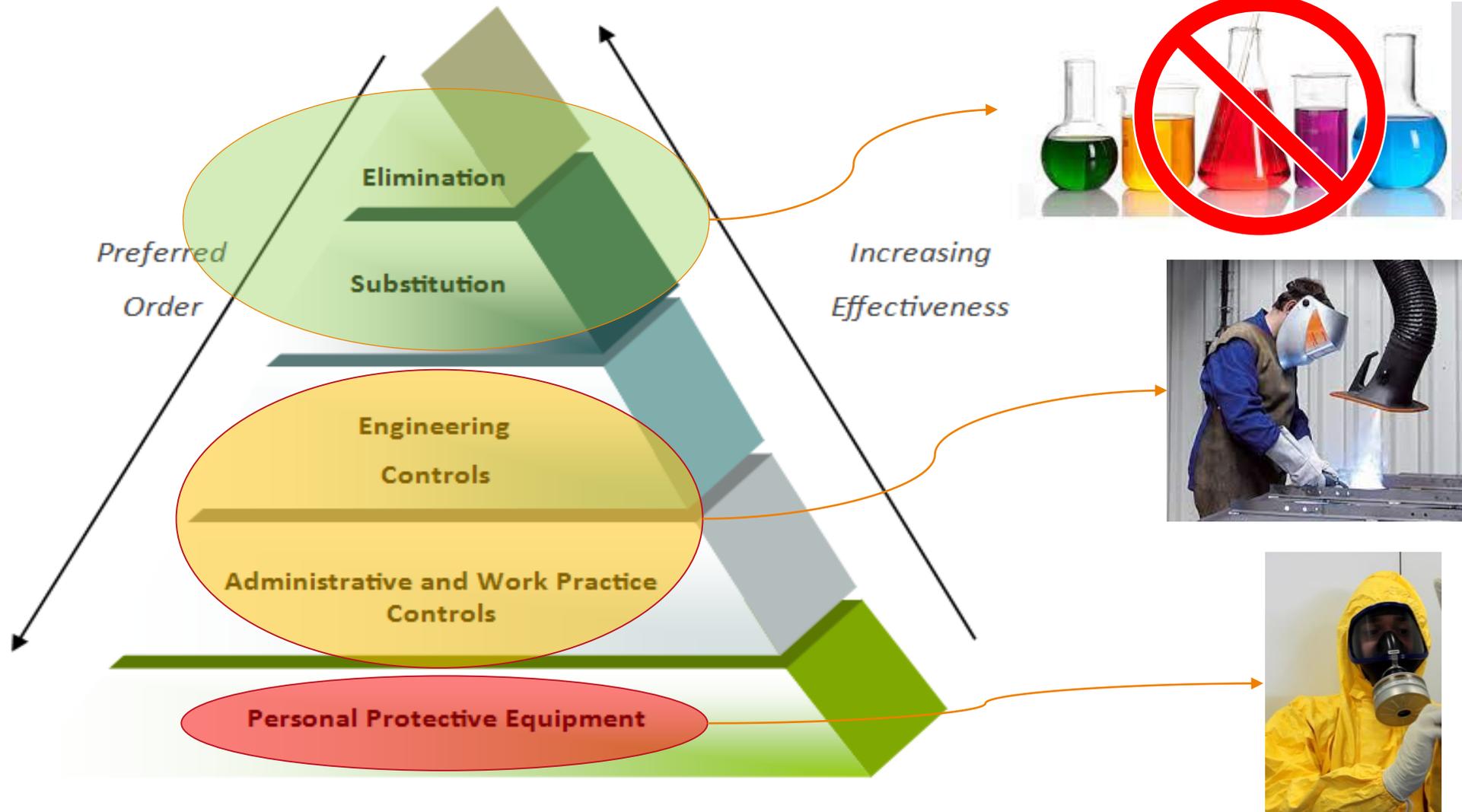
## EXPOSURE IN EUROPE

Substance	Estimated exposed workers in EU	Process
Diesel exhaust fumes	4 million	Emission from combustion
Lead fumes	2,1 million	
Bitumen fumes	0,5 million	
Rubber fumes	0,17 million	
Hardwood dust	3 million	Abrasion
Respirable silica	5 million	
Chromium VI (not all PGCs)	0,9 million	Emission from combustion/Abrasion

### References:

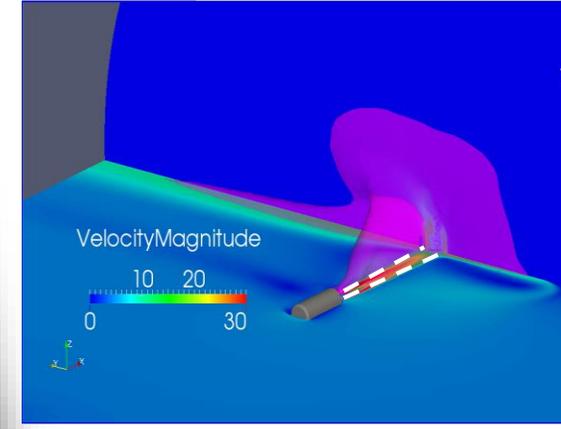
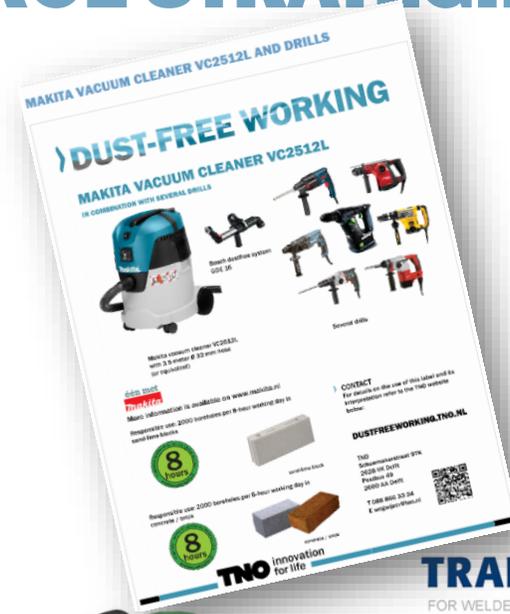
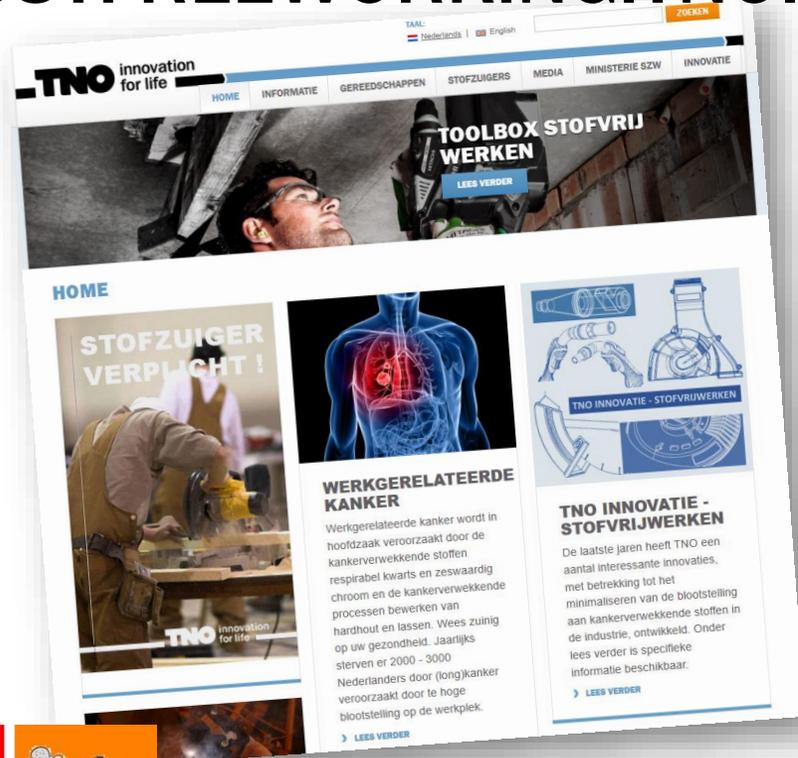
- OSH Wiki, 2020. Process-generated contaminants. Martie van Tongeren, Institute of Occupational Medicine, Edinburgh. Link: Process-generated contaminants – OSHWiki
- Olsson, A., & Kromhout, H. (2021). Occupational cancer burden: the contribution of exposure to process-generated substances at the workplace. *Molecular Oncology*, 15(3), 753-763.
- IARC Monograph 100F. Rubber-manufacturing industry. OCCUPATIONAL EXPOSURES IN THE RUBBER-MANUFACTURING INDUSTRY.
- RoC factsheets

# ELIMINATION AND CONTROL HIERARCHY OF CONTROLS



# CURRENT ELIMINATION AND CONTROL STRATEGIES

## WWW.DUSTFREEWORKING.TNO.NL



**TRANSLAS**  
FOR WELDERS, BY WELDERS

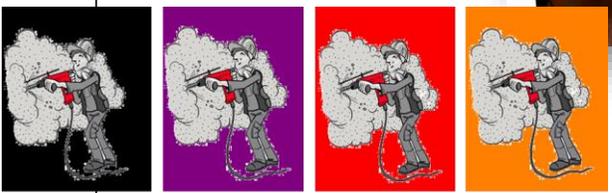


**Tanks**



**ADMAP**  
ON CARCINOGENS 2.0

**TNO** innovation for life



> 500 x OEL    100 - 500 x OEL    50 - 100 x OEL    1 - 50 x OEL



Afzuigtelescoop preventie 90x    Holleboor preventie 60x    Afzuiging preventie 50x

# › BARRIERS/DRIVERS FOR IMPLEMENTATION

- › Sectoral support - practical guidelines, development of good practices, advisors, coaches
- › Enforcement - inspection by labour inspectorate
- › Fulfilment of legal obligations (legislation, exposure limits)
- › Urgency and awareness of the problem
- › Innovation / Research and development
- › Competent supportive structures (experts, consultants, services and institutions)
- › Company policy, procedures and rules
- › Awareness of long term latency, no direct health effects
- › Resources / Money
- › Actual exposure data at the work place
- › Top- and line management involvement
- › General OSH culture in a company
- › Order/pressure by client
- › Effective methods, tools and equipment
- › Adequate knowledge within the firm
- › Company policy, procedures and rules
- › Financial incentives (subsidies, tax deduction etc) for companies to invest
- › Adoption of the 'hierarchy of controls'
- › Pressure from workers (council)

# WORKSHOP 23 NOVEMBER 2021



Around 50 experts and stakeholders participated



Discussed themes

- Current and future elimination strategies, including barriers and drivers
- Innovations and solutions to minimize exposure to PGCs



Report published on Roadmap website

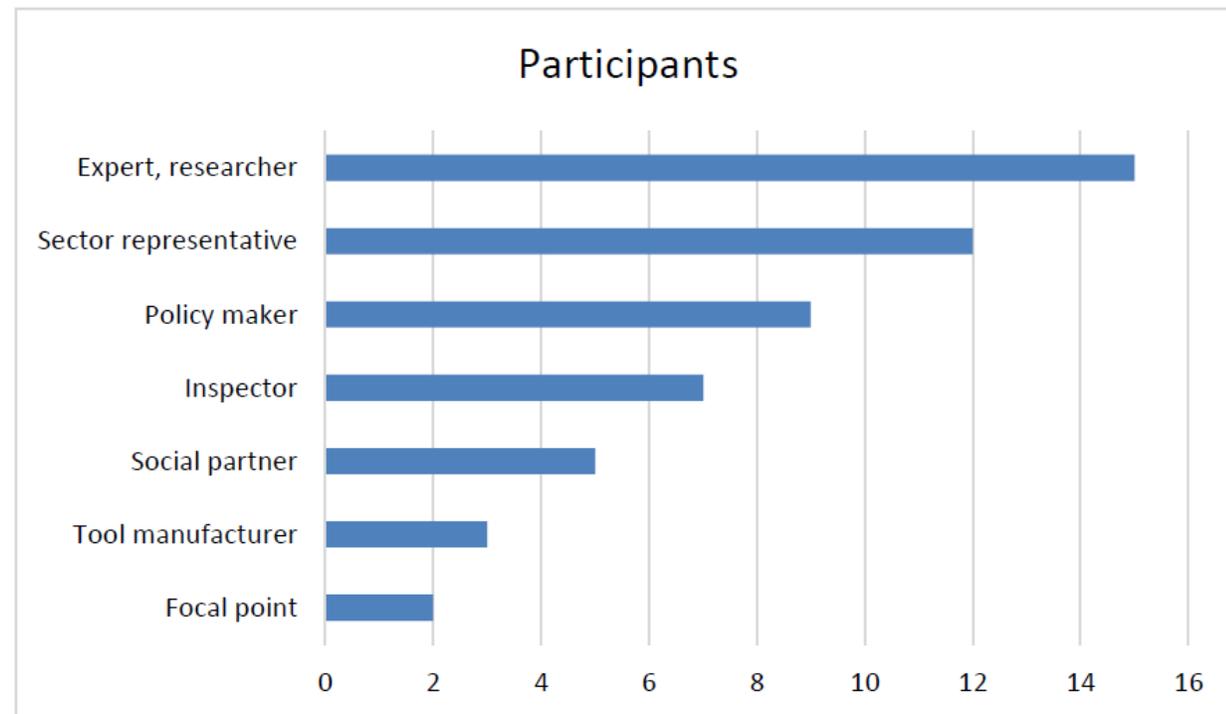


Fig. Visualization of experts seminar participants (n=50) present at the workshop in november, ranged per field.

# WORKSHOP RESULTS

3 themes have been selected:

Awareness



Inspection  
and  
monitoring



Safe  
Company  
Culture



Follow-up 2nd workshop 11 april 2022

# WHY IS THERE STILL A LACK OF AWARENESS ON THE DANGER OF PGC'S?

## Underestimation of health risks by workers (due to long-term latency)

- Coping: downplay of risks to reduce stress levels
- Exposure is invisible



## Education, information and labelling:

- Too difficult, unclear
- Does not fit well with practice
- Workers not aware of compounds they work with

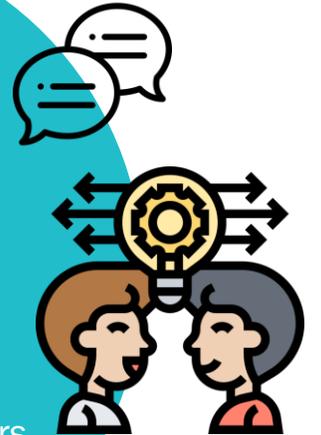
### Also:

- Knowledge of older employees is out of date
- Disinterest in looking for information / sharing information



## Employer perception/attitude

- Downplaying of risks
- Employers think that workers are sufficiently informed, while this is not the case
- Managers might not listen carefully to workers



## Lack of media attention / societal knowledge

- Example asbestos



# BARRIERS AND NEEDS FOR PREVENTION IN COMPANIES

## Barriers for prevention

- Conservative company culture
- Motivation and skills
- Risk awareness
- Lack of measures
- Lack of knowledge
- Other priorities
- Working with different substances
- Role of prevention officer



## Barriers for employers

- Administrative burdens
- Low consciousness among employees
- Unfamiliarity/unclearness in terms of (practical applicability of) measures

## Barriers for workers

- Personal protection measures have low comfort and are time consuming
- Benefits of protection measures are downplayed
- Lack of routine

## Needs for prevention

- *Application of occupational hygiene strategy*
  - Need for STO instead of P
- *Clear responsibility*
  - Employers need to ensure a safe and healthy work environment
  - Employees need to make use of measures that have been made available
- *Knowledge*
  - Employees need to receive practical and clear information
- *Dialogue between employers and employees*
  - Need for better communication between workers and management on hazardous substances
  - Unclear expectations



# WHY COULD THERE BE A LACK OF SAFE CULTURES IN COMPANIES?

## Conscious Behaviour Determinants

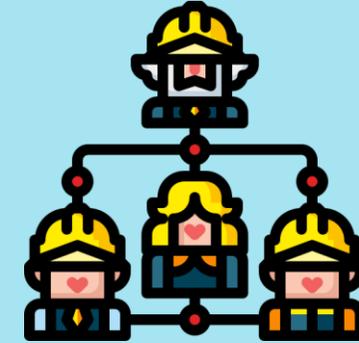
- Public awareness of the consequences of a hazardous substance
- Directly experiences health problems
- Affected relatives
- Control by supervisors

## Unconscious Behaviour Determinants

- Culture (adhering to safety rules is the norm)
- Routine (logical placement of personal protection measures)
- Exemplary behaviour (supervisors and role models)
- Stimulus (strong smell, dust clouds – *only when not used to it yet*)

## Company Culture

- *Informal atmosphere*
  - Conflict avoidance
  - Less calling out
  - Less sanctions
- *'Macho' culture*
  - Less calling out because not wanting to wine
  - Everyone 'knows' what they are doing: we are no children
  - Norms and behaviour in group can influence prevention measures
- *Individual responsibility and motivation*
  - Employers trust on the motivation and capabilities of employees
  - Employers see themselves as responsible and do try to provide safety measures
- *Difference between older and younger employees*
  - Older employees tend to be more careless
  - Younger employees learned about safety measures recently



## WHAT IS NEEDED TO CREATE A **SAFE CULTURE**?

- **Enforcement or education:** both equally necessary
- **Rewarding** good practices
- **Leadership** by senior management to create a proactive and beneficial safety culture or change a negative safety culture
- **Legislative** support
- Appropriate **training** for the industry to produce the desired behaviours and contributing to an effective safety culture
- Safety culture must be created and nurtured by **senior management**, supported by **policies, procedures** and the necessary **resources**, and **communicated** throughout the organization.
- The way in which safety is **communicated** is important so that the message is perceived as being meaningful and representative of the organization's
- **Promoting the understanding** of the function of safety culture in producing the desired behaviours



### Safety Culture Indicators

- Supervisory leadership
- Safety as a value/safety alignment
- Management commitment
- Employee empowerment and involvement
- Accountability
- Communication
- Training
- Owner/client involvement



**THANKS FOR YOUR TIME!**