Modern Safety Management – Holistic approach

Dr Georgios D. Panopoulos
Management Force Group
Objectives

Physically (unconsciousness) SAFETY is embedded into one’s way of living and working, into one’s organisation business.

The challenge today is where safety must be approached in a structured way, measured and evaluated and be part of the planning for any business.

The objectives are to discuss in first place why safety and in second place how much safety.
Structure

- Introduction
- Approach to safety
- Basic criteria
- Holistic approach
- Safety Management System (SMS)
- The new H&S regulations
- Apply the new H&S Reg’s in a Project
Inception

Does safety matters?
YES!

Of course!

The cost of ...

Well it depends!

Personally ...

Subject to the conditions ...

The Law says that ...

In many cases ...
Rate Safety In Albania
Road Safety

Minimise road accidents &
Minimise consequences

By applying

lower speed limits

?
What Is Safety For You?

Anything you said and definitely not a paint of terror! Like some of the ones to follow...
Definitions

- SAFETY (Seguricë, Sicherheit, Sécurité, Sicurezza, Ασφάλεια)
- HAZARD
- TYPE OF HAZARDS
- RISK
- RISK FOR WHOM & WHERE
- EXPOSURE AT RISK
- LIKELIHOOD
- SEVERITY
- RISK ASSESSMENT
The Result

“Every system is producing the results it is designed for”

Donald Mark Berwick

...the premise being that both the intended and unintended consequences are designed into our systems.
The Safety Criteria

Traditionally there are three criteria for doing safety:

- MORAL
- ECONOMICS
- LEGAL

Now a fourth appears, SustainAbility
Considering these within ....
SAFETY BASIS

- MORAL
- ECONOMICS
- LEGAL
- SUSTAINABILITY

Occupational Health & Safety (OH&S)

VISION & POLICY

To achieve the Vision of a healthy work environment free of Incidents, Injuries and Accidents,

1. Needless to say, we comply with local legislation and all directives related to Health and Safety at work.
2. We are committed to do our best to safeguard the OH&S of all our direct and indirect employees in all activities where we have management control.
3. We aim at continuous improvement of our OH&S performance by managing it as our top Business Priority.
4. We manage OH&S as an integrated system of goals, with clear responsibilities and accountabilities.
5. We continuously strive to embed safe and sound behaviour throughout the organization in our everyday activities and to create an environment in which everyone and all of us are responsible for our own and our colleagues' safety.
6. All employees are expected to follow safe-work practices, obey rules and regulations and work in a manner that upholds the high safety standards developed and endorsed by the Group.
7. We use our influence to the best of our ability to persuade our suppliers, contractors and third parties to adopt similar OH&S policy.
8. We willingly engage with stakeholders and third parties who may seek our advice.
Safety Is A Moral Duty

• Employers
• Self – Employed
• Individuals
• Bus Drivers
• School Masters
• Playground Operators
• Parents
• ...
• Owners - Clients
• Designers
• Manufacturers
• Project Managers
• Contractors
• Subcontractors
Safety Is A Legal Duty

• It is the employer’s duty to protect employees and others from their activities
• Employees have a duty to protect themselves and others complying with the instructions provided and report any risks to their superiors
• EU directive for health and safety at work in implementation as of 1.10.2006
• EU directive for health and safety in construction sites as of 1.1.2007
• Albanian Law no 10237 enforced since 18.2.2010 for H&S at work
• Albanian Law, Council of Ministers Decree no 312 enforced since 5.5.2010 for coordination in construction sites
Safety Is A Legal Duty
Self-assessment

Do you expect the other to comply first while everyone in this room is questionable where he/she abides by law?

Driving;
Housekeeping;
Taxation;
Designing;
Supervising;

Would you find impossible to comply fully?
The EU Law Travel

1. Big firms look for excellence and business optimisation
2. Gurus present their models
3. Models are broadly accepted by the market
4. Models become a standard
5. A standard becomes a law requirement
Compliance starts in east when west prepares the next bulk of legislation

Law is born west and travels east
The Business Case

In what grounds can one justify the prevention cost?

To the recent past the most used phrases were

“Accidents cost”

“Safety pays”
From Accident Cost to Safety Cost

\[
SC = PC + AC + MfwoAC
\]

\[
SC = aS^2 - bS + c
\]

\[
dSC/dS = 2aS - b
\]

If \( dSC/dS = 0 \) then \( SC = \text{min} \)

- **Prevention Cost (PC)**
- **Safety Cost (SC)**
- **Accident Cost (AC)**
- **Management Failure with No Accident Cost (MFwAC)**
- **Returns Cost (RC)**

**Graphical Representation:**
- **COST** axis: SC, SC1, SCmin, New SCmin, AC1, MfwnAC1, PC1
- **Number of Accidents** axis: SPI/IRI
- **Safety Performance** axis: onslaught of the X axis

**Equation:**

\[
SC = \text{PC} + \text{AC} + \text{MfwoAC}
\]

\[
SC = aS^2 - bS + c
\]

\[
dSC/dS = 2aS - b
\]

If \( dSC/dS = 0 \) then \( SC = \text{min} \)
FUNDAMENTAL HYPOTHESIS
safety pays

Average management failure with no accident cost, in industry (for optimum prevention (cost))
FUNDAMENTAL HYPOTHESIS
safety does not necessarily pay

Average management failure with no accident cost, in industry (for optimum prevention cost)

Number of Accidents

100% of optimum prevention cost for zero accidents, equal to 100% of optimum safety cost for zero accidents

Optimum safety cost area

Area of Increasing cost

Optimum prevention cost

Average accident cost in industry

Optimum safety cost
How much safety
ALARP
As Low As Reasonably Practicable
e.g. by HSE at http://www.hse.gov.uk/risk/theory/alarpglance.htm
INTERVENTION SCENARIO

<table>
<thead>
<tr>
<th></th>
<th>WITH INTERVENTION</th>
<th>WITHOUT INTERVENTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>PREVENTION</td>
<td>1.17</td>
<td>0.63</td>
</tr>
<tr>
<td>MFWNA</td>
<td>0.00</td>
<td>0.58</td>
</tr>
<tr>
<td>ACCIDENT</td>
<td>0.17</td>
<td>0.37</td>
</tr>
<tr>
<td>IMAGE</td>
<td>0.04</td>
<td>0.12</td>
</tr>
<tr>
<td>TOTAL SAFETY COST</td>
<td>1.38</td>
<td>1.7</td>
</tr>
</tbody>
</table>

https://www.google.gr/
PARETO LAW APPLIES

K1-K4 SAFETY COST BY MAGNITUDE and cumulative percentage

COST CATEGORY
SAFETY PERFORMANCE

Safety Performance (SP) is measured/expressed in various ways.

To include economic parameter (holistic approach), SP can be expressed as the ratio of:
the existing risk defined as the potential failure cost $Cr$, over the actual fiscal cost of maintaining this performance $Cp$.

Thus

$$SP = \frac{Cr}{Cp}$$

For optimum prevention cost:

$$SP_{op} = \frac{Cr}{Cp_{op}}$$
SAFETY PERFORMANCE IMPROVEMENT

For $\Delta C_{\text{p}_{\text{op}}}$

the Improvement (change) of the Safety Performance (ISP) achieved over a certain period of time, it is given by the ratio of:

the reduction (change) of the potential failure cost $\Delta C_r$ achieved over this period, over

the money spend on top of (or less than) the standard expenditure over that specific period $\Delta C_{\text{p}_{\text{op}}}$

Thus

$$\text{ISP} = \frac{|\Delta C_r / \Delta C_{\text{p}_{\text{op}}}|}{1}$$
IMPROVEMENT SAFETY PERFORMANCE

\[ \Delta Cr / \Delta Cp_{op} \]

- N/A
- (0, 0)
- < 1
- (−, +)
- > 1
- (+, −)
- (−, −)
ALARP
(As Low As Reasonably Practicable)

- INTOLERABLE REGION
  - ISP >> 1

- ALARP REGION
  - ISP >=< 1

- ACCEPTABLE REGION
  - ISP << 1
The Value of Prosperity and Profit

Amongst the societies, the prosperity and the profit vary subject to the level of needs that the specific Society stands as a whole.
Safety Profits & Societal Prosperity

Level of safety

Implementing the new era

Company safety cost

Society Safety burden

West

Goliath Companies

David Companies

East
CONCLUSIONS
On The Economic Case

• Contractors may improve their safety performance, via efficiency of prevention cost.

• Safety pays, but not necessarily in sort terms and limited scope.

• Chance dominate final output on a project level.

• Chance does not influence company/sector output long term; neither sector or society one.

• Need to evaluate/consider the “safety principle” unless it has been already quantified by social – economic policy makers.

• Contractors have to know what the safety cost is if – chose amongst the family of curves applying.
CONCLUSIONS on the economic case extrapolating data

• Cost of Safety should interest social partners, not only Employers (Contractors).

• Safety cost should be fairly allocated to involved parties, including society at large.

• Insurers have also a great interest on the cost of safety.

• For public works, safety is a parameter of a fair competition and a good for all.

• Safety in construction has a latent cost for society at large.
The New Era

• The protection of human life in the western societies became a standard over the last decade
• Safety becomes a corner stone in doing business
• Safety becomes a significant factor, which is fully considered from the conceptual phase of a project
• Holistic approach is adopted by Society and Companies
The Business Travel
Reset our objectives
<table>
<thead>
<tr>
<th></th>
<th>Pure Luck</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><img src="image" alt="Diagram" /></td>
</tr>
<tr>
<td>Heinrich, 1950</td>
<td>Industrial accident prevention, 3rd edition</td>
</tr>
<tr>
<td></td>
<td>Heinrich, 1950 Sample 330</td>
</tr>
<tr>
<td></td>
<td>Sample 1753498</td>
</tr>
<tr>
<td></td>
<td>Sample almost 1000000</td>
</tr>
</tbody>
</table>
Bird, 1969
Practical loss control leadership
F.E.Bird Jnr and
G.L.Germain, 1985

1 severe
10 No severe
30 Damages only
600 Near misses

Safety measures
regulations
Procedures
Safety Management System
Safety Management System (SMS) 1

- Policy
- Organising
- Planning & Implementing
- Measuring Performance
- Reviewing SMS
- Safety audits

MFOR54 (BS 8800)
Applying a SMS in Business

Level 0
Description, Policy and strategic goals

Level 1
Review & Revise
evaluating
Planning & Implementing
Organising
Policy

Level 2
Safety Procedures for Operation
Safety Procedures for construction

Level 3
Works Safety Instructions
SMS Designers
- Designer 1
- Designer 2
- Designer 3
SMS Suppliers
- Supplier 1
- Supplier 2
- Supplier 3

SMS Constructors
- Constructor 1
- Constructor 2
- Constructor 3
- Constructor v SMS

Legal Framework
- Decommissioning
- O&M
- Start up
- Construction
- Designing

Legend
Instruction line
Info line

At site

(MFOR54, OHSAS 18001, BS 8800, ΕΛΟΤ 1801)
Safety Management System (SMS) 2

Continual Improvement

OH&S Policy

Planning

Implementation & Operation

Checking & Corrective Action

Management Review
Global Business and local Environment

CONTINUAL IMPROVEMENT

Hardware – infrastructure & raw materials (input) → Operation maintenance procedures (process) → Production (output)

Continual improvement

byproducts
Safety Management Systems
Roles & Responsibilities (liabilities)

- BoD
  - Policy
  - Resources
  - Authorisations
  - Review
  - Implement Policy
  - Organise & planning
  - Monitoring and evaluating performance
  - Proposals to BoD

- TOP MANAGEMENT
  - Implement Policy
  - Supervise
  - Train & inform Employees
  - Inform Managers

- MIDDLE AND LINE MANAGEMENT
  - Follow the instructions
  - Comply with the rules
  - Be trained
  - Inform supervisors

- WORKFORCE
  - Follow the instructions
  - Comply with the rules
  - Be trained
  - Inform supervisors
Safety Management Systems
behavioral issues

- BoD
- TOP MANAGEMENT
- MIDDLE AND LINE MANAGEMENT
- WORKFORCE
INDIVIDUALS

Different people
Different cultures
Different priorities
Different mentalities
Different capabilities
Different knowledge
Different needs
Different ethics

\[ V_{SC} = \sum_{i=1}^{n} v_{Ci}, \]

Were \( i = 1, 2, 3, \ldots, n-1, n \)
\( n = \) population
SAFETY PERFORMANCE (ENERGY)

(X) Managerial capacity (energy)

(Y) Technical capacity (energy)

(Z) Cultural based capacity (energy)
SAFETY PERFORMANCE

- Policy
- Resources
- Authorisations
- Review

- Implement Policy
- Organise & planning
- Monitoring and evaluating performance
- Proposals to BoD

- Implement
- Supervise
- Train & inform Employees
- Inform Managers

- Follow the instructions
- Comply with the rules
- Be trained
- Inform supervisors
OPTIMISING SAFETY PERFORMANCE

- Policy
- Resources
- Authorisation
- Review

- Implement policy
- Organise & planning
- Monitoring and evaluating performance
- Proposals to BoD

- Implement
- Supervise
- Train & inform Employees
- Inform managers

- Follow the instructions
- Comply with the rules
- Be trained
- Inform supervisors
ICSI PRINCIPLE for CULTURAL CHANGE

KNOW → TELL

UNDERSTAND → EXPLAIN

DIGEST → SHOW/PRACTICE

ACCEPT → CONVIENCE
Improving Safety – Moving Furtherer

The movers’ (safety) energy must be greater than the energy needed to change the behavior of the individuals involved.

Tools and techniques employed may increase the performance of the movers (reduce lost energy)
Minimum Criteria for Success

1. Insist and consist
2. Insist and consist
3. Insist and consist
REVIEW

• Safety is rather a cultural than a technical matter
• Safety is a multidisciplinary task
• There are legal, moral and business reasons to do safety
• The approach must be holistic
• Managing safety requires a clear safety policy and defined targets and responsibilities
• Hierarchy must be fully involved. They all have a role. Participation and contribution.
• Safety is unlimited; how much safety is the first question to answer; what is the business case comes next (not necessarily)
• Big organisations are also good in safety – produce and sell safety
REVIEW

- OHSAS 18001 is a good guidance Europe – wide
- Systems should be measurable – define factors and indicators to measure performance
- A system must ensure a continual improvement
- Safety department (safety engineer) is the director of the orchestra. The others are the musicians. No musicians no concert.
- Training is a key element in changing culture and improve performance
- Consistence and insistence is a criteria for safety excellence
- Make your organisation an organisation that learns and ensures continual improvement; use holistic approach to assess the safety case
Shall we discuss a SMS outline?
L0: Policy
L1: Manual
L2: Procedures
L3: Instructions
Make an exercise

Work out safety in a project.
PROJECT SAFETY MANAGEMENT (THE SEQUENCE)

• Once upon a time ...
PRELIMINARY PHASE (LEVEL 0)

People decided to build a new plant. They defined then the minimum safety standards to follow, determining the risk inherent to the operation phase, or the selection of the equipment and technology determined itself the risk to be inherited.

Specifications for main equipment, design factors, technology, etc are the result of a thorough Risk Assessment already performed by the industry, since main equipment, design philosophy etc have been assessed by manufacturers, practice and law.
RISK ASSESSMENT - LEVEL 0

Level 0

Design basis, core specifications, selection of land/location
DESIGN PHASE (LEVEL 1)

Developing (Detailing) the design, specific safety studies are carried out to assess and/or quantify associated risks and confirm design and design specs as well as operational needs.

- Hazard and Operability Studies
- Hazard Identification (Hazid)
- ATEX (explosive atmospheres)
- Safety Integrity level (SIL)
- Quantitative Risk Assessment
- Health and Safety File (HSF)
- Stress analysis
- Fire study
- Earthquake study
- Signing and labeling study
RISK ASSESSMENT - LEVEL 0

Level 0
- Design basis, core specifications, selection of land

LEVEL 1
- Safety Studies, Quantitative and Qualitative Risk assessment
ROUTINE OPERATION & MAINTENANCE (LEVEL 2)

Considering:

• Safety Studies findings and recommendations;
• Operational philosophy;
• Management systems in place;
• Staffing;
• Works given out/outsourced (contractors)
• and the alike,

then a Plant’s Qualitative Risk Assessment is prepared and it is incorporated into the OPS manuals and the management procedures.
RISK ASSESSMENT - LEVEL 2

Level 0
Design basis, core specifications, selection of land

LEVEL 1
Safety Studies, Quantitative and Qualitative Risk assessment

LEVEL 2
Qualitative RA for the routine status of the Plant, incorporated into the Ops manuals and Management Systems procedures
ROUTINE & NON-ROUTINE OPERATION & MAINTENANCE WORKS (LEVEL 3)

Based on the standard stuff, confirm/revise Plant’s RA on spot for the particular:

• Systems included
• Personnel
• Environment
• Equipment
• Layout – alignment
• Procedure to be followed
• Weather, timeschedule, ... ; and

prepare for that work a specific RA based on the method statement and vice versa
RISK ASSESSMENT - LEVEL 3

Level 0

Design basis, core specifications, selection of land

Level 1

Safety Studies, Quantitative and Qualitative Risk assessment

Level 2

Qualitative RA for the routine status of the Plant, incorporated into the Ops manuals and Management Systems procedures

Level 3

Qualitative Work Specific RA, based and interlinked with the particular work and its specific method statement, together with the standard system in place (e.g. PtW, LoTo, etc)
### BASIC STRUCTURE OF A RA

<table>
<thead>
<tr>
<th>CONDITION/EQUIPMENT/ACTIVITY</th>
<th>SAFETY MEASURES (CONTROLS)</th>
<th>LIKELIHOOD &quot;L&quot; (of a specific outcome)</th>
<th>SEVERITY &quot;S&quot; (of that specific outcome)</th>
<th>OTHER FACTORS &quot;OF&quot; (e.g. exposure)</th>
<th>RISK &quot;R&quot; ( R = L \times S \times OF )</th>
<th>MITIGATION</th>
<th>( L' )</th>
<th>( S' )</th>
<th>( OF' )</th>
<th>( R' ) (residual risk)</th>
</tr>
</thead>
</table>

\[
\sum_{i=1}^{n} P(A_i) = 1
\]

\[
P(A_i) \text{ is the likelihood (probability) of an event } A_i, \text{ where } i=1,2,3,...n
\]

\[
P(B_j) \text{ is the likelihood (probability) of a possible outcome, where } j=1,2,3,...m
\]

The total assessed likelihood \( L \) or calculated probability of a specific outcome is given below

\[
P(B_j) = \sum_{i=1}^{n} P(B_j/A_i)
\]

Whilst the \( L \) of a specific outcome of a specific event is

\[
P(B_j) = P(B_j/A_i)
\]
ALARP
(As Low As Reasonably Practicable)
It should be borne in mind that reducing the risks from an existing plant ALARP may still result in a level of residual risk which is higher than that which would be achieved by reducing the risks ALARP in a similar, new plant. Factors which could lead to this difference include (holistic approach):

- practicability of retrofitting a measure on an existing plant,
- the extra cost of retrofitting measures compared to embedded them in a new plant,
- the risks involved in installation of the retrofitted measure; and
- the projected lifetime of the existing plant.
Preplanning & Design phase

Operation & Maintenance phase

Level of Safety

Cost of Safety
CONSTRAINTS

• LOCAL MARKET
• COUNTRY SAFETY CULTURE
• PLANING (including design and timeschedule)
• BIDDING – FAIR PRICE
• REQUIRED INVESTMENT
• BIDDING – UNDERSTANDING THE H&S REQ’S

• OURSELVES
CONTRACTORS POLICY CORNERSTONES

The are four corner tones in managing contractors. The Owner has to demonstrate clearly that he (the Owner):

1. Has in place a clear Safety Policy
2. Has in place contract specific tender H&S requirements including contractor’s minimum H&S requirements and the project/scope specific effective HSP/SMS
3. Has in place a competent and committed organisation dully authorised and possessing an arsenal to manage the Project’s Safety and battle risk generation from day one.
4. Regardless initial delays and costs, Owner applies the H&S procedures from day one, including Contractor’s evaluation.
SAFETY ENERGY

«Δός μοι πά στῶ καὶ τὰν γὰν κινῆσω»

“Give me place to stand and I will move the earth”

Archimedes 3rd century bc
Go back to our exercise
New Safety Regulations

• It is the employer’s duty to protect employees and others from their activities
• Employees have a duty to protect themselves and others complying with the instructions provided and report any risks to their superiors
• EU directive for health and safety at work in implementation as of 1.10.2006
• EU directive for health and safety in construction sites as of 1.1.2007
• Albanian Law no 10237 enforced since 18.2.2010 for H&S at work
• Albanian Law, Council of Ministers Decree no 312 enforced since 5.5.2010 for coordination in construction sites
New Safety Regulations

1. Health and Safety Coordination during the Design phase
2. Health and Safety Plan during the Design phase
3. Health and Safety File during the Design phase
4. Project (Plant) Safety Studies
5. H&S Management of Change
6. Health and Safety Coordination during the Construction phase
7. Health and Safety Plan during the Construction phase
8. Health and Safety File during the Construction phase
9. Revise/update/confirm Project (Plant) Safety Studies
10. Confirm Project (Plant) Risk Assessment
Health & Safety Coordination during the Design phase

• Ensure that H&S issues associated with the design (philosophy, configuration, machinery, process, operational philosophy and procedures) are identified and addressed satisfactorily.

• Ensure also that other H&S issues associated with the constructability and operability in general are identified and addressed satisfactorily.

• Not review the design, not redo the design

• Manage changes

• Appoint the H&S coordinator(s)/Team

• Develop Health & Safety File and Health & Safety Plan
Health & Safety Coordinator Design phase

• A person or a team that Ensure that H&S issues associated with the design (philosophy, configuration, machinery, process, operational philosophy and procedures) are identified and addressed satisfactorily.

• Ensure also that other H&S issues associated with the constructability and operability in general are identified and addressed satisfactorily.

• Not review the design

• Not redo the design

• Manage changes
Health and Safety Plan during the Design phase

1. The law

2. The practice
   - Structured
   - Friendly
   - Practicable & Operable
   - Specific but flexible
   - Updated
   - Content
   - Traceable
   - Value for money
   - Useful to Contractors and Supervisors
Health and Safety File during the Design phase

1. The law

2. The practice
   - Friendly
   - Practicable & Operable
   - Specific but flexible
   - Updated
   - Content
   - Traceable
   - Value for money
   - Manageable by Contractors and Supervisors
   - Useful to operators
Project Safety Studies

- Hazard and Operability Studies (HAZOP)
- Hazard Identification (HAZID)
- ATEX (explosive atmospheres)
- Safety Integrity level (SIL)
- Quantitative Risk Assessment
- Stress analysis
- Fire study
- Earthquake study
- Signing and labeling study
- Lighting
- Lightning protection
- ...

...
(H&S) Management of Change

1. Identify systems and subsystems affected and their owners
2. Identify associated H&S issues
3. Pre-assess H&S impact if any
4. Revise studies/drawings etc
5. Redo/revise associated safety studies if necessary
6. Confirm H&S impact and mitigation measures
7. Verify/confirm change
8. Record the change and impacts
9. Communicate
10. Confirm response
Identify the key players in a project. Discuss their main H&S responsibilities during the design phase.
Health & Safety Coordination during the Construction phase

• Ensure that H&S issues associated with the construction methods (techniques, equipment, materials, personnel, prefabrication, shifts, logistics, etc) and site master plan design are identified and addressed satisfactorily.

• Ensure also that other H&S issues associated with the project environment and personnel in general are identified and addressed satisfactorily.

• Design input/design frozen

• Manage changes

• Appoint the H&S coordinator(s)/Team

• Update Health & Safety File and revise Health & Safety Plan
Health & Safety Coordinator
Construction phase

- A person or a team that ensures that H&S issues associated with the construction of the project are identified and addressed satisfactorily.
- Ensure also that other H&S issues associated with the environment in general of the project are identified and addressed satisfactorily.
- Identify involved entities and ensure coordination between them
- Ensure HSF is updated/completed
- Ensure HSP updated/revised
- Monitor that HSP is implemented
Health and Safety Plan during the Construction phase

1. The law
2. The designers
3. The practice
   • Structured
   • Friendly
   • Practicable & Operable
   • Specific but flexible
   • Updated
   • Content
   • Traceable
   • Value for money
   • Useful to Contractors/subcontractors and Supervisors
Health and Safety File during the Design phase

1. The law
2. The designers
3. The practice
   • Friendly
   • Practicable & Operable
   • Specific but flexible
   • Updated
   • Content
   • Traceable
   • Value for money
   • Useful to operators
Project Safety Studies

- Revised and updated if necessary
- Confirmed before start up (commissioning)
(H&S) Management of Change

1. Identify systems and subsystems affected and their owners
2. Identify associated H&S issues
3. Pre-assess H&S impact if any
4. Revise studies/drawings etc
5. Redo/revise associated safety studies if necessary
6. Confirm H&S impact and mitigation measures
7. Verify/confirm change
8. Record the change and impacts
9. Communicate
10. Confirm response
Let's map a Health and Safety Plan for the construction phase. Select a project:

- location
- category
- purpose of intent
CONTROL GATE #1 of N

Safe pass®
Permit to enter
Spec’s
Planning &
Timeschedule
Arrangements
Custody
Monitoring
Risk assessment
Emergencies
Ex. Assistance

OK
IN

NOT OK

personnel
materials
vehicles
equipment
tools
visitors
External assistance
AOB
Trespassers

Re-planning
Documentation
Training
Equipment ...

personnel
visitors
delivery
visitors
constructor
SAFETY ENERGY

“Δός μοι πά στῶ καὶ τάν γὰν κινήσω”

“Give me place to stand and I will move the earth”

Archimedes 3rd century bc
Closing

Thank you for your attention

I hope it was well worth it for you being here tonight

Please keep us posted for any changes we helped to make in your organisation

Dr Georgios Panopoulos
Safety is an element of civilisation