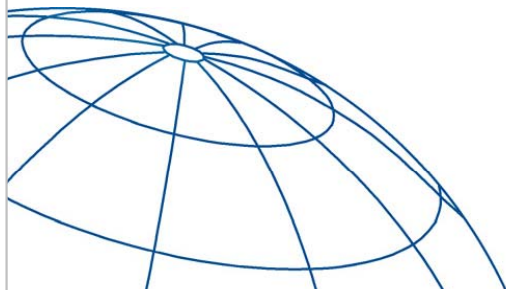


**Consulting Services for the  
“Programme for the Promotion of Renewable Energies:  
German-Armenian Renewable Energy Fund (GAF-RE)  
Phase III”, BMZ ID 2012.7029.7**

**Small Hydropower Projects (SHPP)  
Health, Safety and Environment (HSE) also (EHS)  
Operation & Maintenance**

Yerevan, 28.06.2017



**BMZ**



Federal Ministry  
for Economic Cooperation  
and Development



CENTRAL BANK OF ARMENIA

**KFW**



WATER & INFRASTRUCTURE

# Health, Safety and Environment (HSE) also (EHS) Operation & Maintenance

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Rev No.	Rev-date	Contents / amendments	Prepared / revised	Checked / released
0	28.06.2017	Final	Urs Gantenbein	Fabian Knapp
1				
2				

## Facts and Figures to Remember

### Why to address & implement Health & Safety Systems?

The ILO (International Labor Organization) reports in its statistics:

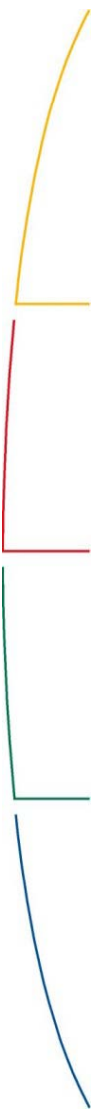
- Every minute, more than 600 workers have a work-related accident
- Every minute, 4 worker die from work-related accidents
- Every day, 6,300 people die as a result of occupational accidents or work related diseases

This results in a total number of world wide more than:

- **2.3 million deaths per year, and**
- **317 million accidents occur on the job annually**

### Why to address & implement Environmental Systems?

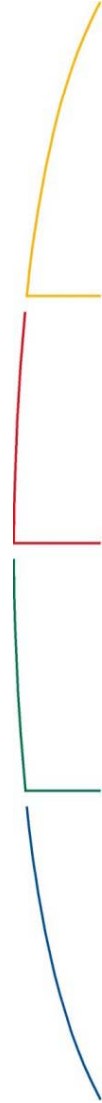
- The environment is not ours, we borrowed it from the generation of our kids, so we have to care for it



## Responsibility for (Implementation of) a E-H&S System

**Its is the Owner's and Top Management's responsibility to:**

- **Define a Environment, Health & Safety System,**
- **Implement a Environment, Health & Safety Plan and Procedures**
- **Monitor adherence to and effectiveness of the Environment, Health & Safety System**
  
- **Typical implementation steps for a EHS System consists of following :**
  - Setting a policy
  - Organizing, developing of EHS plan and corresponding procedures
  - Planning, training and implementation
  - Evaluation (monitoring, review, measurement, investigation)
  - Auditing
  - Action for improvement (preventative and corrective action)



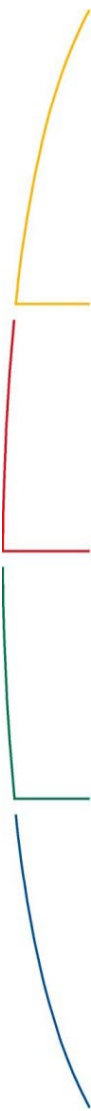
# The Key Elements of a H&S Management System

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**A Health & Safety Management System shall be based on the ILO-OSH 2001\* Guideline;**

ILO = International Labour Organization

\*[http://www.ilo.org/wcmsp5/groups/public/@ed\\_protect/@protrav/@safework/documents/normativeinstrument/wcms\\_107727.pdf](http://www.ilo.org/wcmsp5/groups/public/@ed_protect/@protrav/@safework/documents/normativeinstrument/wcms_107727.pdf)



## The Key Elements of a E-H&S Management System

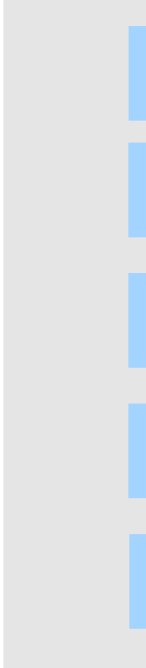





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- Identification & Consideration of applicable legislative requirements
- Develop a Environment - Health and Safety Management Plan for the HPP or construction site and implement a Health and Safety Management System based on this plan (by the Owner or Mgmt.)
- Implementation of the developed Environment Health and Safety managements measures
- Provide appropriate working conditions, equipment and systems
- Qualify and train the O&M staff (including sub-contractor)
- Implementation of warning and mandatory signs
- Identification and provision of PPE (Personal Protective Equipment)
- Supervision, auditing and monitoring; re-training as required
- Documentation and reporting

## Management of Health & Safety

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**It is the Employer's responsibility to provide the basic of:**

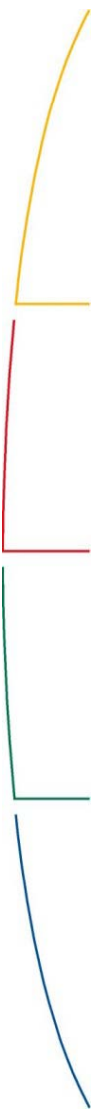
- 
-  **A safe place of work**
  -  **Safe plant, systems and equipment**
  -  **Safe systems of work**
  -  **Training and supervision**
  -  **Competent employees**

**In order to provide an effective sustainable basis to these requirements the Employer shall be living and adhering to these basics / leading by example!**

# The Key Elements of a E-H&S Management System

**Auditing is a specific type of monitoring to ensure that the personnel in the HPP follows the H&S plan and procedures. Auditing is required to:**

- Determine whether E-H&S measures, e.g. E-H&S plans and procedures , have been implemented and objectives are achieved. E.g. that safe work practices are followed and Personal Protective Equipment (PPE) is used. That oil spills (if they occur, are immediately controlled, removed and reported, etc.
- Check that adequate risk controls are in place
- Learn from H&S failures
- Provide information that can be used to review and improve aspects of the E-H&S management system





## Principles of Control (Prevention)

The principles of prevention are as follows:

- **Avoiding risks, where possible to design out the risk**
- **Evaluating unavoidable risks (risk assessment)**
- **Controlling hazards at source, e.g. sound shielding of machinery**
- **Adapting the work/task to the worker, e.g. perform work during day light, in teams, etc.**
- **Replacement the dangerous by less/non-dangerous materials, e.g. use of other, less dangerous, chemicals**

## Examples for Emergency Procedures

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### Fire and Evacuation

The H&S Policy should provide a mandatory commitment with respect to emergency procedures in case of fire and evacuation:

- In the event of a fire, immediately sound the alarm
- Only attack the fire if trained to do so – do not put yourself at risk
- Dial emergency number and call for fire brigade
- Evacuate the building by the nearest exist
- Do not collect personal belongings
- Do not re-enter the building until told that it is safe
  
- Nomination of the responsible person for approval of emergency response plan, for maintenance of fire extinguishers, for test of fire alarm,  
for test of emergency lighting

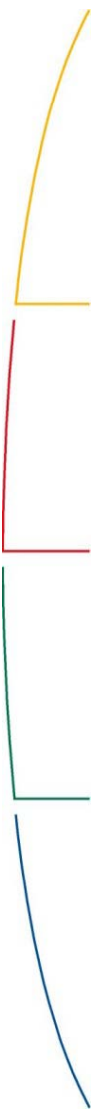
## To remember Cost Facts

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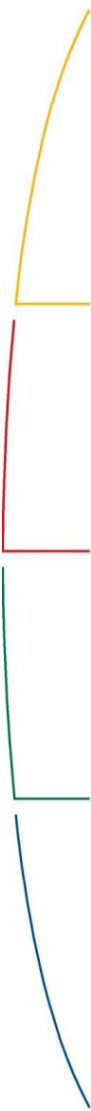
**Direct costs:** normally insured

**Indirect costs are around 10 times the amount of the actual incident**

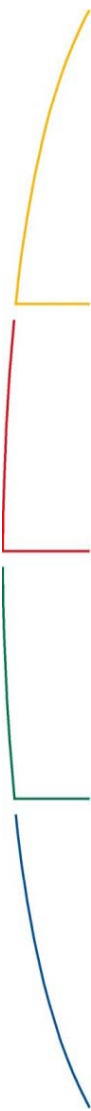
- Product and material damage
- Lost production time
- Legal costs
- Overtime
- Investigation & administration time
- Fines (Not to forget)
- Loss of expertise and experience
- Bad publicity (Not to forget)



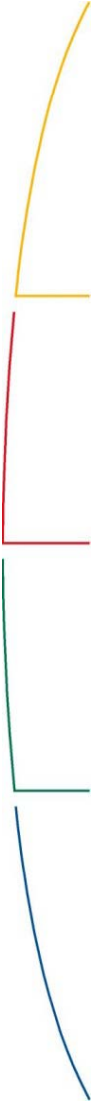
**Thank you very much  
for your attention**



# Example



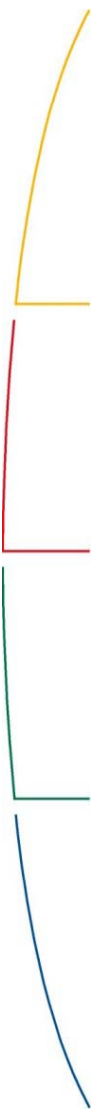
# Example



# Management of Health & Safety

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## **BACK-UP! SLIDES**



# The Key Elements of a E-H&S Management System II

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## Policy

- Set clear aims and objectives/targets
- State intentions/define approach
- Lay down criteria, principles for action and response
- Management commitment

Not to forget: **The Policy is the starting point for the EHS Management System!**

## Organizing for Health & Safety

- Allocate responsibilities for health & safety
- Establish effective communication systems
- Establish commitment at all levels



# The Key Elements of a H&S Management System III

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## Planning and Implementing

- **Key element of Health & Safety: Assessment of the risks**
- **Introduction of controls/safety systems of work/documentation**

## Evaluation

### Monitoring and measurement

- **Provision of data on achievements/lack of achievements**
- **Use of active (inspections)/reactive (accident investigation)**

### Review

- **Evaluation of performance**
- **Review of options for remedial actions to improve performance to set new targets**

# Hierarchy of Control

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The general principle of control hierarchy is ERICPD:

- **Elimination**  
Firstly to eliminate the risks associated with the hazards.
- **Reduce**  
Reduction the amount of the hazard or the exposure to the hazard.
- **Isolate**  
Isolation of the hazard is the principle to prevent contact with the hazard.
- **Control**  
Permit to work system.
- **Personal Protective Equipment**  
Supply of PPE. Only applicable if the previous steps does not allow the execution of the task without a remaining significant risk.
- **Discipline**  
Means the implementation of instructions to workers, training of workers and competent supervision.

## Principles of Control (Prevention)

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There are 3 different types of control focusing on different work levels:

- **Technical measures, e.g. machinery guarding or replacing an older machine by a newer and more safer equivalent.**
- **Behavioral interventions, e.g. use of supervision or the selection of staff that is more competent and has better skills.**
- **Procedural controls, e.g. use of instruction, method statement, training, permit to work...**

# Auditing and Monitoring

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**Auditing is a specific type of monitoring to ensure that the Project is in compliance with the contract requirements.**

**Auditing is required to:**

- **Determine whether E-H&S measures, e.g. HS plans, have been implemented and objectives are achieved**
- **Check that adequate risk controls are in place, review reporting**
- **Learn from E-H&S failures**
- **Provide information that can be used to review and improve aspects of the E-H&S management system**