



# Convention Project Chemical Safety





# GTZ – German Technical Cooperation

## Convention Project Chemical Safety

Bonn, Germany

By order of the:

> German Federal Ministry for Economic Cooperation and Development  
(BMZ)

In technical cooperation with the:

> German Federal Ministry for the Environment, Nature Conservation  
and Reactor Safety (BMU)



## Convention Project Chemical Safety

- > was created in July 1997 for a duration of 3 years (first phase)
- was extended until May 2004 for a second phase
- Will be extended until May 2007 for a third phase
- > is working in developing countries world-wide





## Project Background

### World Summit Rio 1992

Chapter 19 of the Agenda 21 on the environmentally sound handling of toxic chemicals

### The Rotterdam Convention or PIC (Prior Informed Consent) Convention

- > Signed 1998 in Rotterdam
- > Regulates the control of determined dangerous chemicals and pesticides in international trade

### The POPs Convention (Persistent Organic Pollutants)

- > Signature in Stockholm in 2001
- > Regulates the prohibition or reduction of determined persistent organic chemicals (e.g. DDT, Dieldrin, Dioxins/Furane and PCB)





# Convention Project Chemical Safety

## One major activity:

- > Development of partner-demanded modules for safe use of chemicals in enterprises
- > Chemical Management for companies





Convention Project Chemical Safety



Deutsche Gesellschaft für  
Technische Zusammenarbeit (GTZ) GmbH

# Chemical Management for Companies





**The guide has been developed in close cooperation with the**

- **German Indonesian Environmental Program**
- **German Federal Institute of Occupational Safety and Health – Martin Tischer**

**and**

- **Is based on the approach of the ILO Safe Work Chemical Control Toolkit**



## Why Chemical Management?

Improve Chemical Management in order to:

- > Reduce costs
- > Improve worker's health and safety
- > Reduce environmental impacts
- > Enhance competitiveness





## Target groups for Chemical Management

- > **Companies where chemicals represent a major portion of their running costs**
- > **Consultants / trainers**
- > **Industry associations, business chambers, and similar**
- > **Institutions involved in private sector promotion and/or environmental policies**



## How can the CM Guide help companies?

- > **Uses a step-by-step approach (continuous improvement!)**
- > **Considers operating conditions of companies in developing countries; can also be used by small & medium enterprises**
- > **Integrates multiple wins (economics, environment, worker's health & safety, organisational capacities)**



## Objectives of Chemical Management

- > Improve Chemical Management within companies using a step-by-step approach**
- > Enhance skills for offering consultancy / training to companies**
- > Further promote Chemical Management based on success stories**

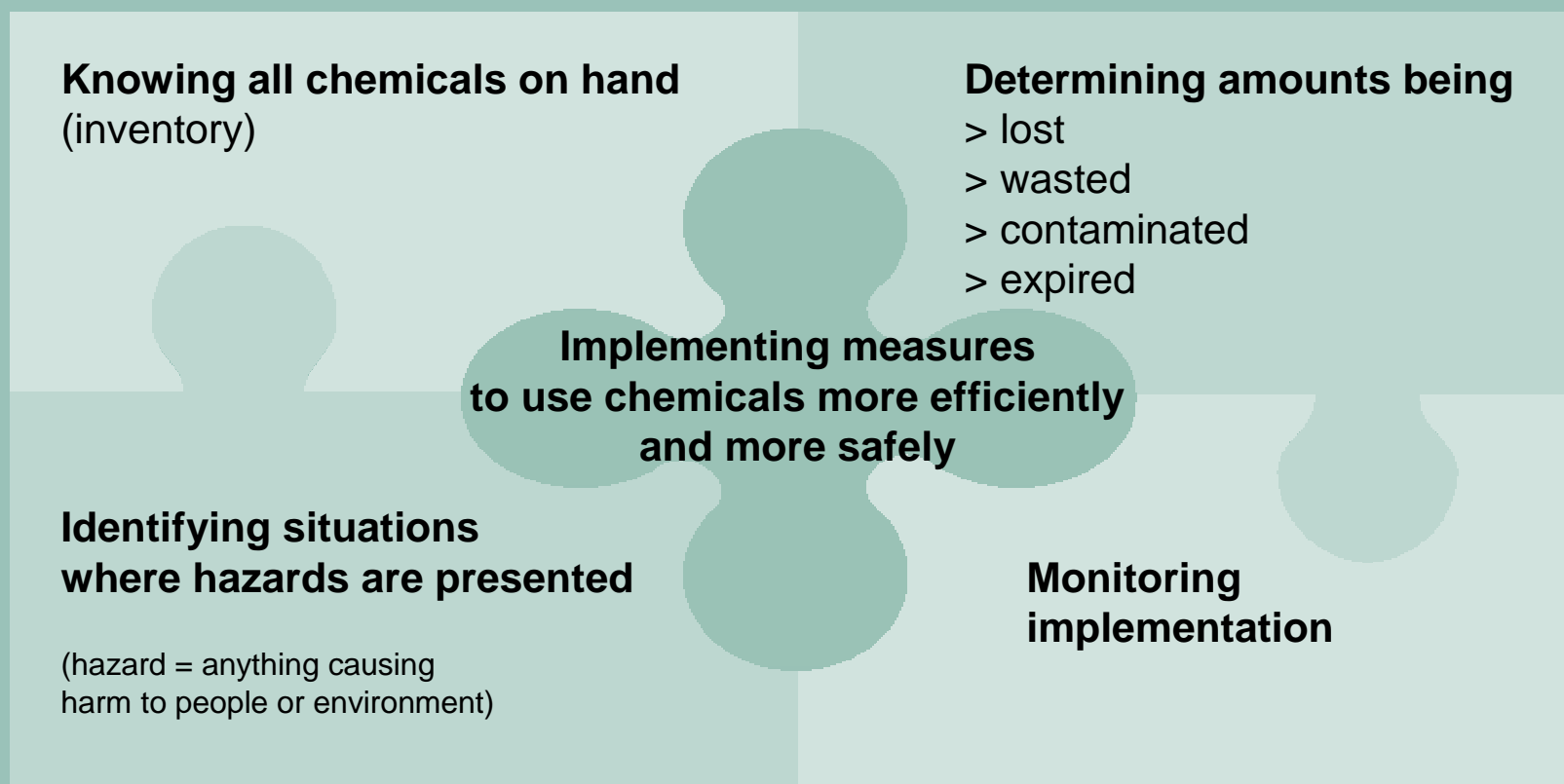


## Typical conditions in companies handling chemicals

- > **Lack of information (characteristics, quality, quantity, hazards of chemicals)**
- > **Poor labelling; unknown substances**
- > **Low quality or inadequate characteristics of purchased chemicals**
- > **Absence of systematic procedures, documentation, no follow-up**
- > **Lack of priority put on chemical management**
- > **Reactive approach!**



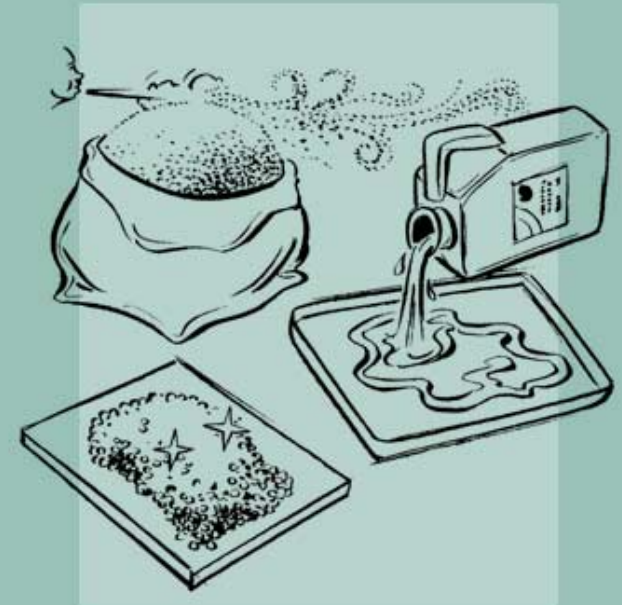
## What does Chemical Management involve?





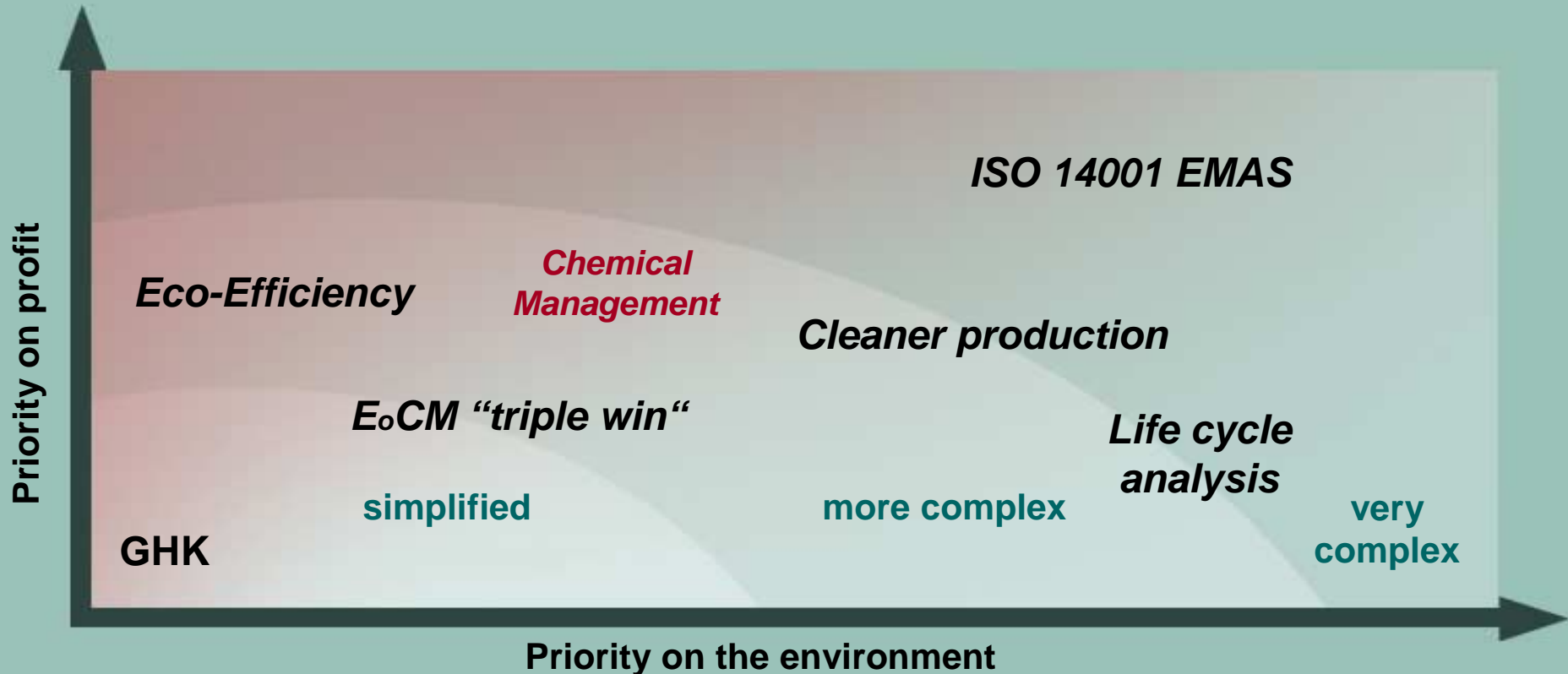
## Results of Chemical Management

- > **Gain costs by reducing losses of raw materials and avoiding accidents**
- > **Reduce hazards and improve safety to protect human health and the environment**



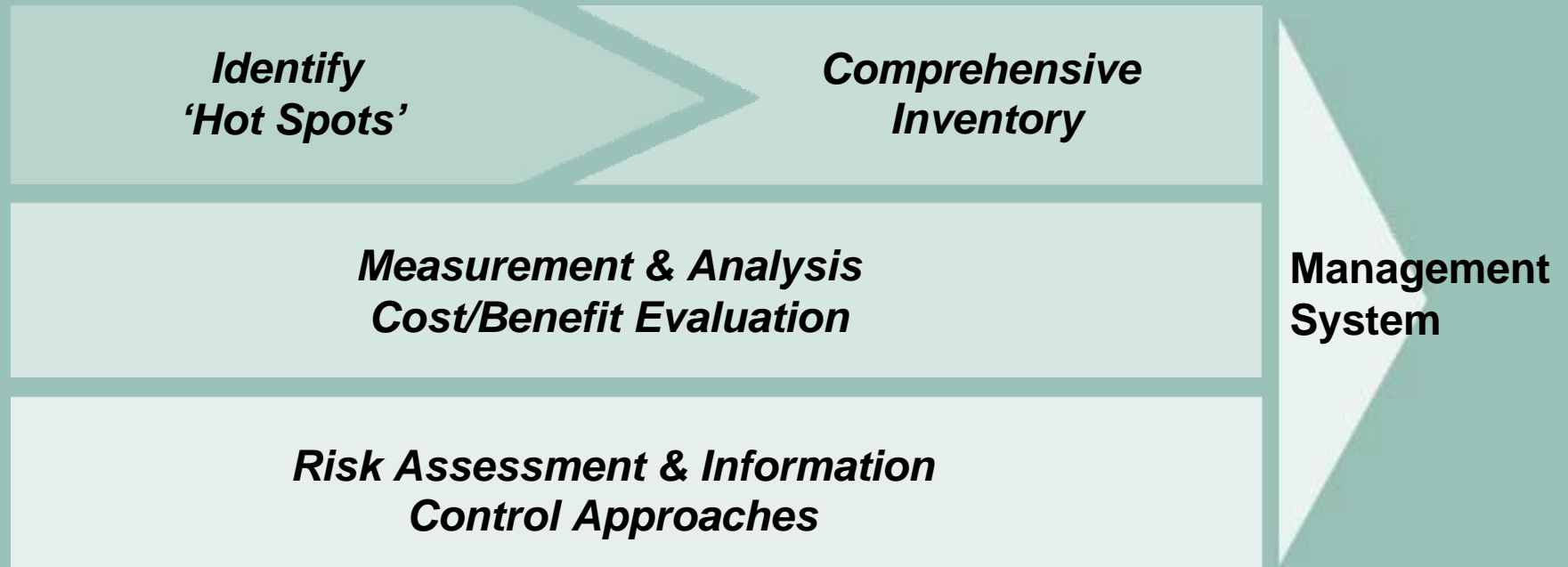


## Chemical Management and other approaches





## A step-by-step approach to Chemical Management





# Chemical Management

## First module = Identify hot spots:

- > Where do we lose chemicals and why?  
(raw material = money)
  - > Can we reduce the loss and how?
- > Where do we see hazards for the workers  
and for the environment?
  - > Can we reduce these hazards and if so, how?





## Chemical Management

### Second module = Chemicals Inventory:

Make a comprehensive inventory of the chemicals used in the factory:

- > Systematically identify all chemical substances that are stored and in use in the factory.
- > Create a structured base of information that can be used to identify and make improvements on an continuous basis.





# Chemical Management

## Objective

- > Create a system of continuous improvement in the companies
- > Multiply experiences



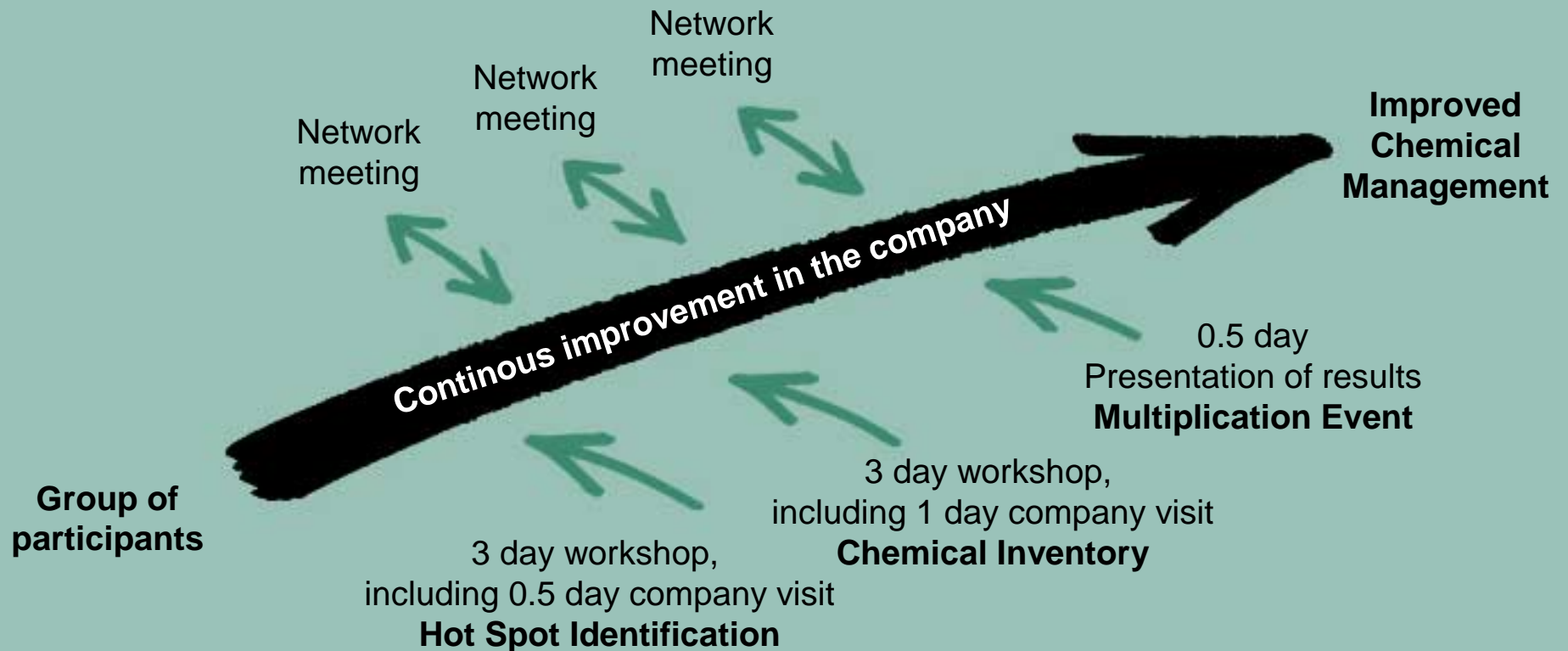


## Training approach

- > Lack of information (characteristics, quality, quantity, hazards of chemicals)**
- > Working with mixed groups of entrepreneurs, institutions and consultants**
- > Accompanying the companies over a certain period**
- > Mix of theory & field work**
- > Interactive training (group work & presentation, interactive discussion)**



# Chemical Management





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# Chemical Management Guide





## How can the CM Guide help companies?

- > **Relies on self-interest of industrialists to take action**
- > **Does not depend on country's political/regulatory framework; does not replace legal requirements**
- > **Provides key concepts & tools to analyse working practices**
- > **Outlines basic management systems to support action & follow-up**



## Structure of the CM Guide

### Part I – Benefits of improved chemical management

### Part II – Going into action

- > First module – Identifying ‘Hot Spots’
- > Second module – Make a comprehensive inventory



# Structure of the CM Guide

## Part III – Tools

- 1 – Basic concepts for doing risk assessment
- 2 – Description of control approaches
- 3 – Using Material Safety Data Sheets (MSDS)
- 4 – Risk Phrases (R-Phrases) for hazardous substances
- 5 – Safety Phrases (S-Phrases) for hazardous substances
- 6 – Symbols used for labelling



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Example from a Factory

In Semarang, Central Java, Indonesia



## **Factory Metal works**

**Semarang, Central Java**  
**Metal works, galvanizing industry**  
**Since 25 years**  
**Approx. 1100 employees,**  
**working in 3 shifts per day**

**Galvanizing pipes, strip plats, telephone poles for the national market.**



## Results from Hot spot analysis I

1. Control oil spillage on the floor from refilling and oil containers should be closed after use
2. Rearrange storage of chemicals based on their types and characteristics
3. Label chemicals properly and place warning about their danger at the walls
4. Train workers operating chemicals on proper management
5. Reduce loss of fluxing liquor and improve drying process of materials during fluxing process and reduce spillage during the process
6. Repair blower in the galvanizing room in order to reduce the vapours spread in the area



## Results from Hot Spot analysis II

7. Reuse of rinsing water which contains HCl
8. Reuse ash blowing from the galvanizing room
9. Provide protection gear to workers (e. j. people unloading HCl and reduce spillage during unloading (hose should be cleaned and emptied into container)
10. Modify chimney for HCl emissions
11. Reduce lime spillage during unloading and the used amount of lime during production process



## Benefits from recommendations I

<b>Oil spillage</b>	<b>Loss of oil due to spillage is aprox. 1l per day = 840 €per year</b> <b>Oil on the floor is a risk for workers health and safety</b>
<b>Arrangement of chemicals/ and improvement of labelling</b>	<b>Mismanagement of chemicals is a loss of raw materials and a danger for workers health and safety and the environment</b>
<b>Training of workers handling chemicals</b>	<b>Increasing awareness raising of potential hazards and dangers due to chemicals – prevention of accidents and disasters</b>



## Benefits from recommendations II

<b>Improvements during fluxing process</b>	<b>Fluxing liquid contains <math>ZnCl_2</math> and <math>Na_2Cr_2O_7</math>, Spillage is a danger for environment and workers health and safety Loss of raw material per year: <math>ZnCl_2</math> ~ 1.6 tons, <math>Na_2Cr_2O_7</math> ~ 9 tons <math>ZnCl_2</math> = 2,000 €, <math>Na_2Cr_2O_7</math> = 16,875 €</b>
<b>Repair blower in galvanizing room</b>	<b>Increasing the ventilation in the galvanizing room has impact on workers health and safety</b>
<b>Reuse of rinsing water containing HCl</b>	<b>Leads to savings of about 55 tons HCl per month ~ 34,000 € per year Water costs ~ 1,980.-- € per year</b>



## Benefits from recommendations III

<b>Reuse of ash blowing</b>	<b>201 tons are lost per year, they contain a significant amount of zinc</b>
<b>Unloading of HCL, spillage</b>	<b>Unloading without protection gear it is dangerous for workers health and environment Each time of unloading they loose about 10 l of HCl ~ 1.125 € per year</b>
<b>HCL emissions</b>	<b>Chimneys have been elevated and changed to anti corrosive PVC</b>
<b>Lime spillage</b>	<b>Due to changes of mixing process the use of lime was reduced from 25 tons to 9 tons per month</b>



## Benefits for the companies

1. Gain costs by reducing losses of raw materials and avoiding accidents.
2. Have resources to invest in improvements for production process.
3. Improve quality of product due to lower chemical residues and improved production procedures.
4. Be more compatible on the national and international market.
5. Reduce risk to have products for export rejected because they coincide with international standards.
6. Reduce hazards and improve safety to protect human health and the environment.



**Thank you for your attention!**