

# Emergency Escape Routes

## ***IAMC Toolkit***

*Innovative Approaches for the Sound Management of  
Chemicals and Chemical Waste*



UNITED NATIONS  
INDUSTRIAL DEVELOPMENT ORGANIZATION



# Introduction

In order to ensure safety to chemical industry personnel and minimize harm, the companies plan emergency escape routes in their facilities.

This presentation introduces the reader to the emergency escape route planning, indication and correct maintenance to ensure its use in case of need.

# Hazard Management

1. Risk Identification and safety	2. Transport and storage	3. Fire and explosion protection	4. Emergency response
1.1 Chemical classification and labelling	2.1 Internal transport of chemicals	3.1 Fire protection	4.1 Emergency response plan
1.2 Risk assessment	2.2 Internal pedestrian routes	3.2 Fire protection in welding and cutting operations	
1.3 Safety rules	2.3 Storage	3.3 Explosion protection	
1.4 Personal protective equipment		3.4 Container cleaning	
1.5 Skin protection			
1.6 Emergency escape routes			
1.7 Solvents, acids, bases handling			
1.8 Safety in gas tank handling			

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2. Emergency Escape Routes
  - Good practices
  - Design
  - Organization, training and behaviour
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# Context

# Context

- In industry, **undesirable events** can occur and endanger the lives of those present on site:
  - Incidents
  - Failures
  - Fires
  - Explosions
- **Main dangers** in the event of an emergency:
  - Fire, smoke, gas or water leaks
  - Unusable escape routes
  - Disorientation in the dark



Fire in a chemical company

*Source: Londoño G.*



Explosion of propellant powders

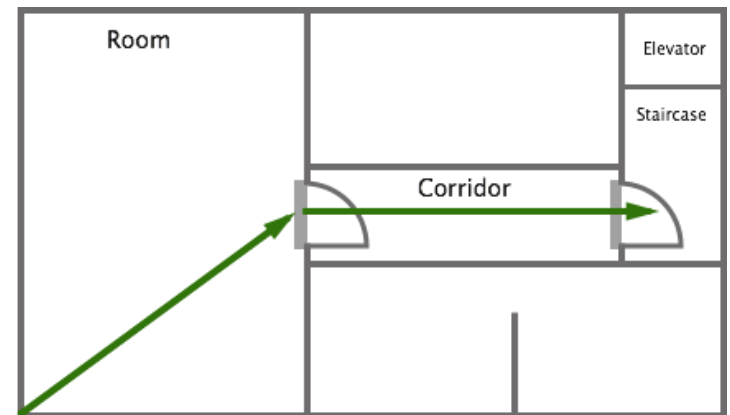
*Source: Londoño G.*

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# Emergency Escape Routes

# What is an Emergency Escape Route?

- ▶ A path is considered an **emergency escape route** if it is:
  - The shortest path which can be taken to safely leave the plants/buildings from any location and reach an open space.
- ▶ A **means of escape** is composed of the following elements:
  - Escape route
  - Premises' exits
  - Corridors
  - Stairways

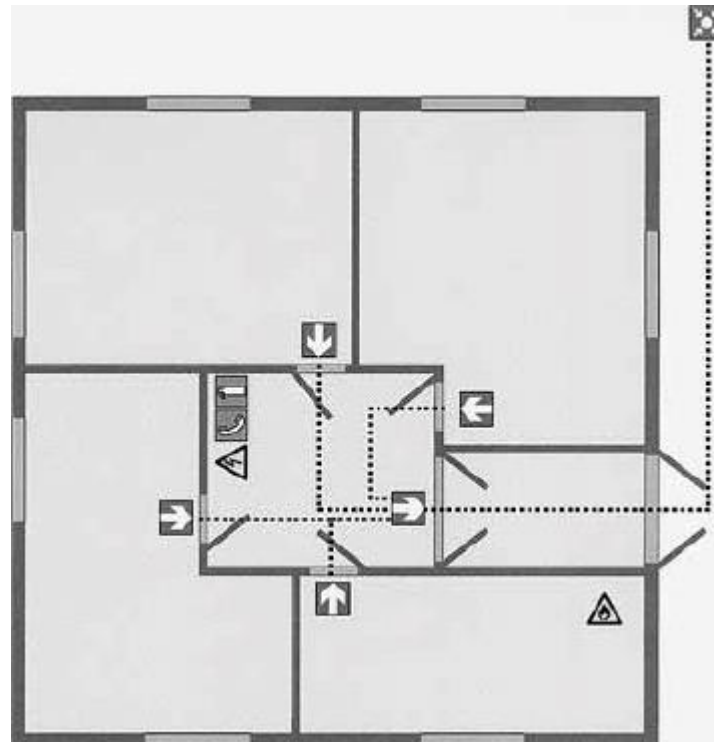


Source: based on ECAP



# Emergency Escape Routes – Good Practices (1)

- ▶ Emergency evacuation plans have to be displayed at strategic locations and should be visible and understandable.



Source: Suva

# Emergency Escape Routes – Good Practices (2)

- The escape routes are clearly indicated and equipped with specific signs.
- The escape routes (corridors, doors, etc.) are free of obstacles.
- The escape routes can be used without any risk.
- The exit doors are keyless and open in the direction of the escape route.



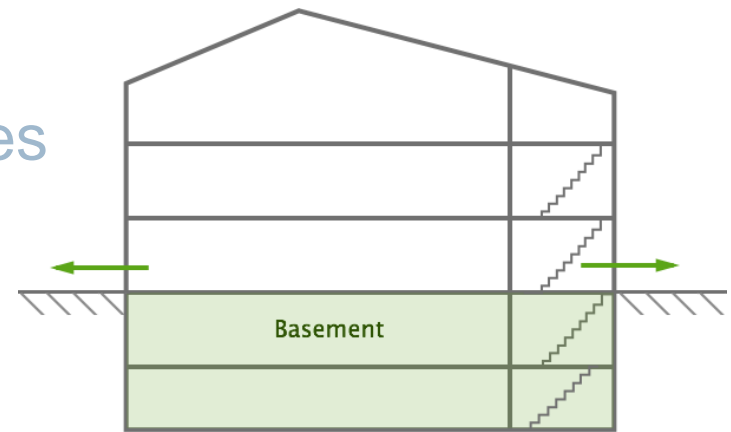
Source : Suva



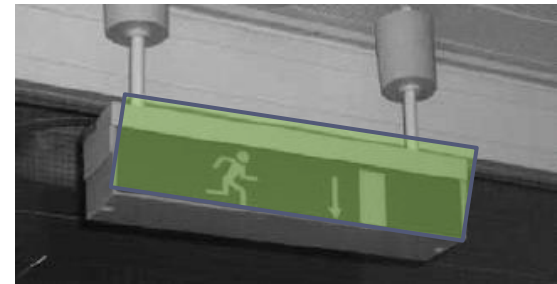
Source: Suva

# Emergency Escape Routes – Good Practices (3)

- ▶ One is able to escape from any basements or storeys in the event of a fire.
- ▶ The lighting of the escape routes is in good condition.
- ▶ In case of a power failure, the escape routes are always easily recognizable (e.g. emergency lighting, phosphorescent signs).



Source: based on ECAP



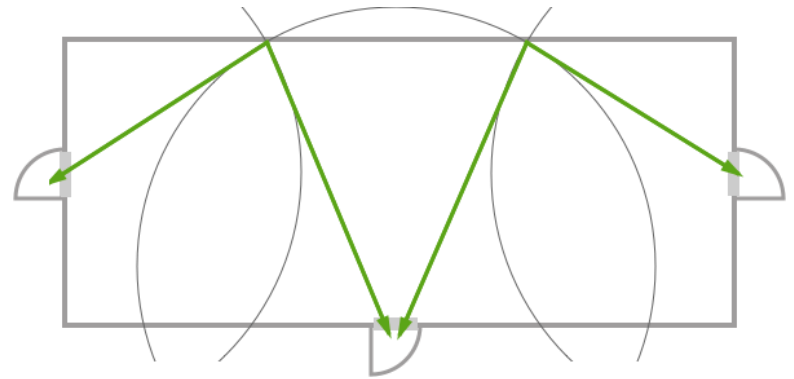
Source: Suva

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# Design of Emergency Escape Routes

# Dimensioning of Emergency Escape Routes

- ▶ When dimensioning emergency escape routes, several parameters have to be considered:
  - ❑ Number of occupants
  - ❑ Number of storeys
  - ❑ Type of construction
  - ❑ Situation
  - ❑ Surface
  - ❑ Allocation of the buildings, installations and firebreak compartments

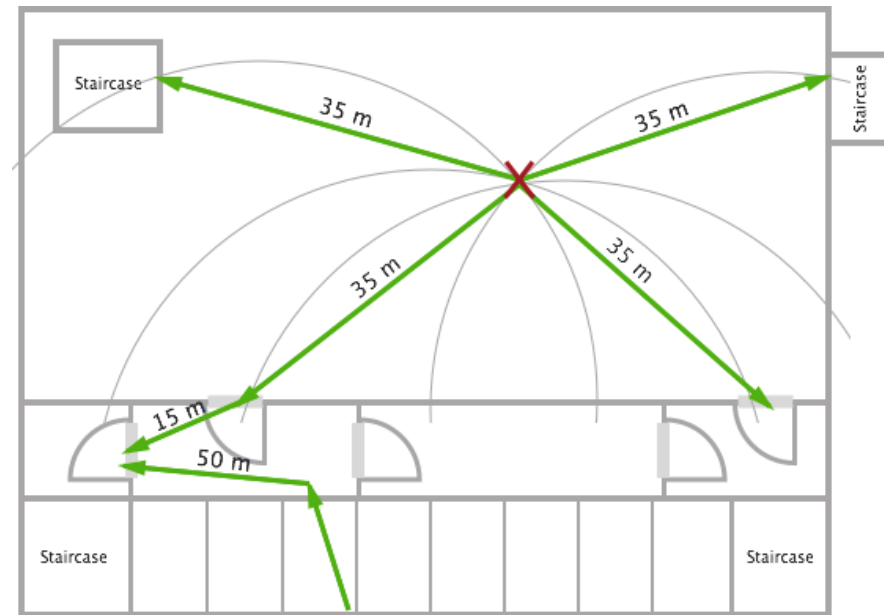


Measuring the shortest distances with an arc

Source: based on ECAP

# Dimensioning of Emergency Escape Routes

- ▶ If the emergency escape routes give access to:
  - Only one stairway, the gross floor area should not be larger than 600 m<sup>2</sup>.
  - Several stairways, the gross floor area should not be larger than 900 m<sup>2</sup>.
- ▶ The stairways should be as far as possible from each other to offer independent escape directions.



Source: Based on ECAP

# Dimensioning of Emergency Escape Routes

- ▶ Stairways and staircases:
  - The minimum width for stairways should be 1.2 m.
  - Staircases should be firebreak compartments (resisting at least a fire of one hour).
- ▶ Corridors:
  - The minimum width for corridors should be 1.2 m.
  - Corridors can be firebreak compartments.
- ▶ Doors:
  - Doors should open in the direction of the escape route.
  - The exit doors can be opened without external help (e.g. key) and also from the outside (for rescue teams).
  - Each door should have an average clearance of 0.9 m.

# Design of Emergency Escape Routes

- ▶ The design of the escape routes is approved by the competent authority and recorded.
- ▶ If the emergency escape routes are to be modified (e.g. transformation of the building), the competent authorities have to be consulted.



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# Emergency Escape Routes

# Organization, Training and Behaviour

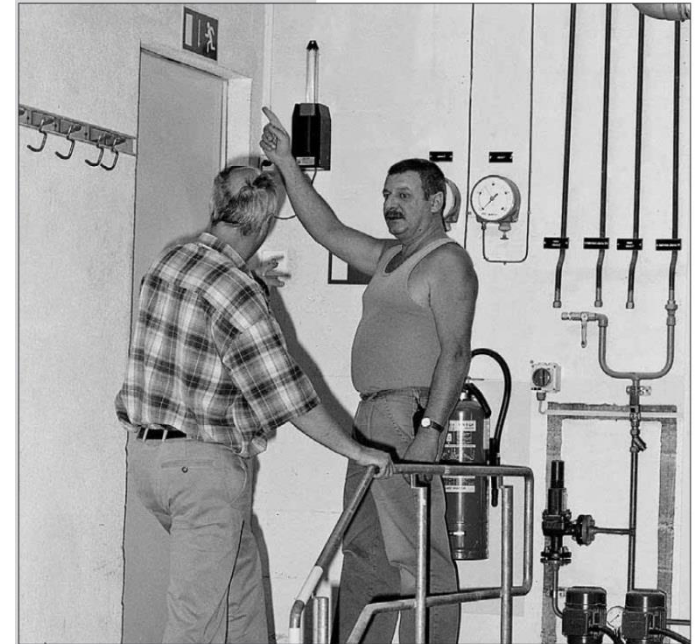
- ▶ The use of the emergency escape routes is included in the training programme of the emergency response plan.
- ▶ Short-term employees and third parties intervening on site are informed of the rules to observe in the event of an emergency evacuation.



Source: Suva

# Organization, Training and Behaviour

- ▶ A designated person periodically checks the escape routes and their safety features.
- ▶ Superiors monitor compliance with the rules, correct non-compliance and encourage workforce to ensure safety:
  - Obstacle-free escape routes
  - Access to the exit doors clearly indicated

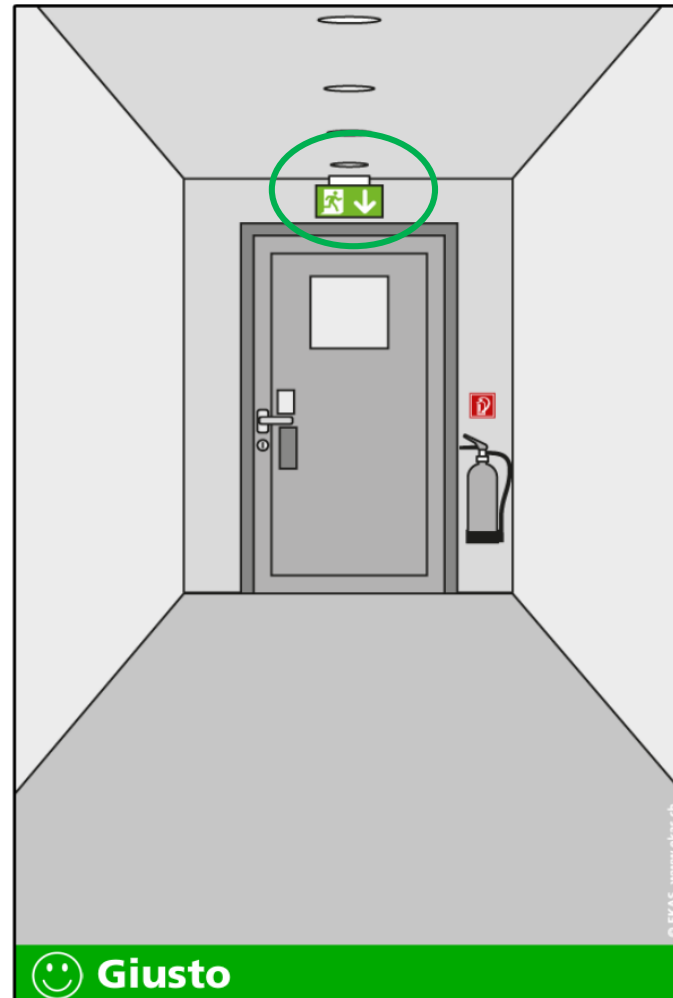
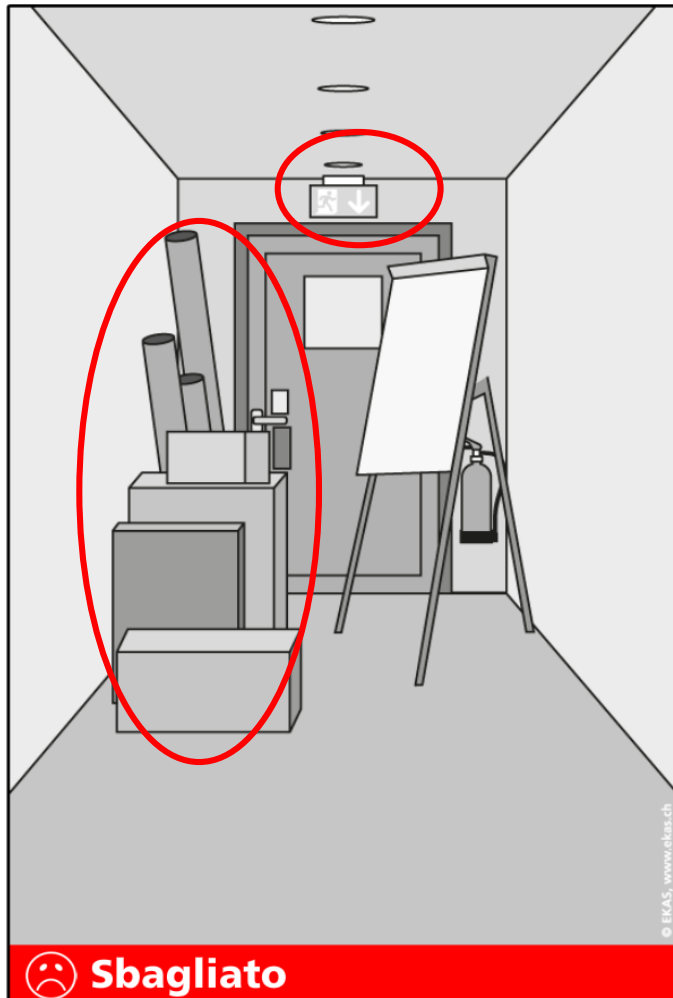


Source: Suva

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# What not to do ...

# What not to do ...



Source : CFST

# Key messages

- A path is considered an emergency escape route if it is the shortest path which can be taken to safely leave the plants/buildings from any location and reach an open space.
- A designated person periodically checks the escape routes and their safety features.
- If the emergency escape routes are to be modified (e.g. transformation of the building), the competent authorities have to be consulted and the workers informed.

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# Sources

# Sources

- ICSD Engineers, Switzerland/ISSPPRO, Germany, 2015
- ECAP: Voies d'évacuation et de sauvetage, Switzerland, 2013
- Suva: Liste de contrôle: Voies d'évacuation, Switzerland, 2011
- Suva: Liste de contrôle: Portes et portails, Switzerland, 2010
- Suva: Explosion – Risques et mesures de prévention, Switzerland, 2009



# Images

- CSD Engineers, Switzerland, 2015
- Suva: Explosion – Risques et mesures de prévention, Switzerland, 2009
- Suva: Liste de contrôle: Voies d'évacuation, Switzerland, 2011
- ECAP: Voies d'évacuation et de sauvetage, Switzerland, 2013
- CFST: Sécurité au travail et protection de la santé, Switzerland, 2012
- Londoño G. for NCPC Colombia

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