

B/S/H/

# Machinery Safety and Risk Assessment

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T-MEA-CIS Region (Turkey-Middle East-Africa-CIS)

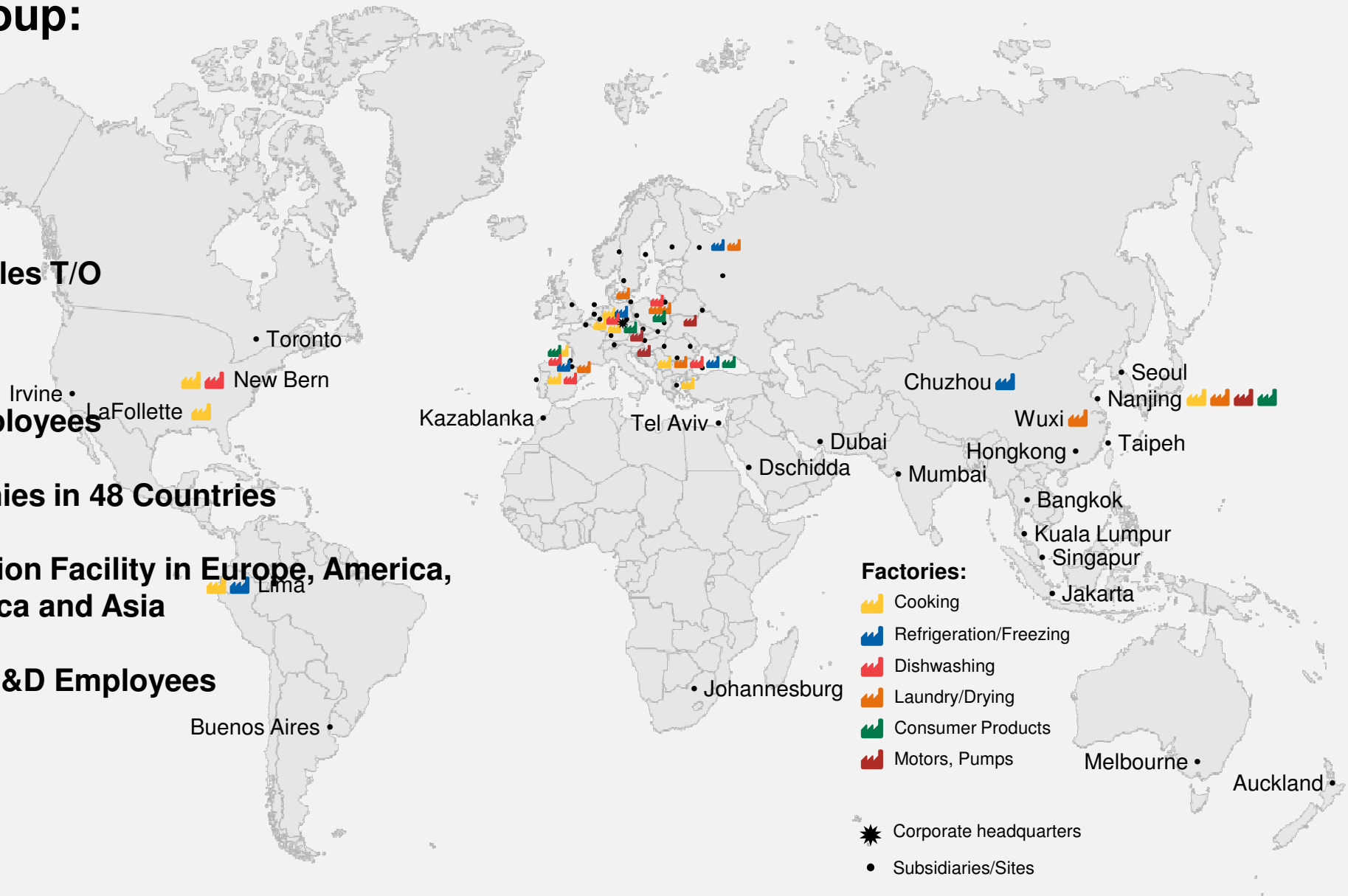
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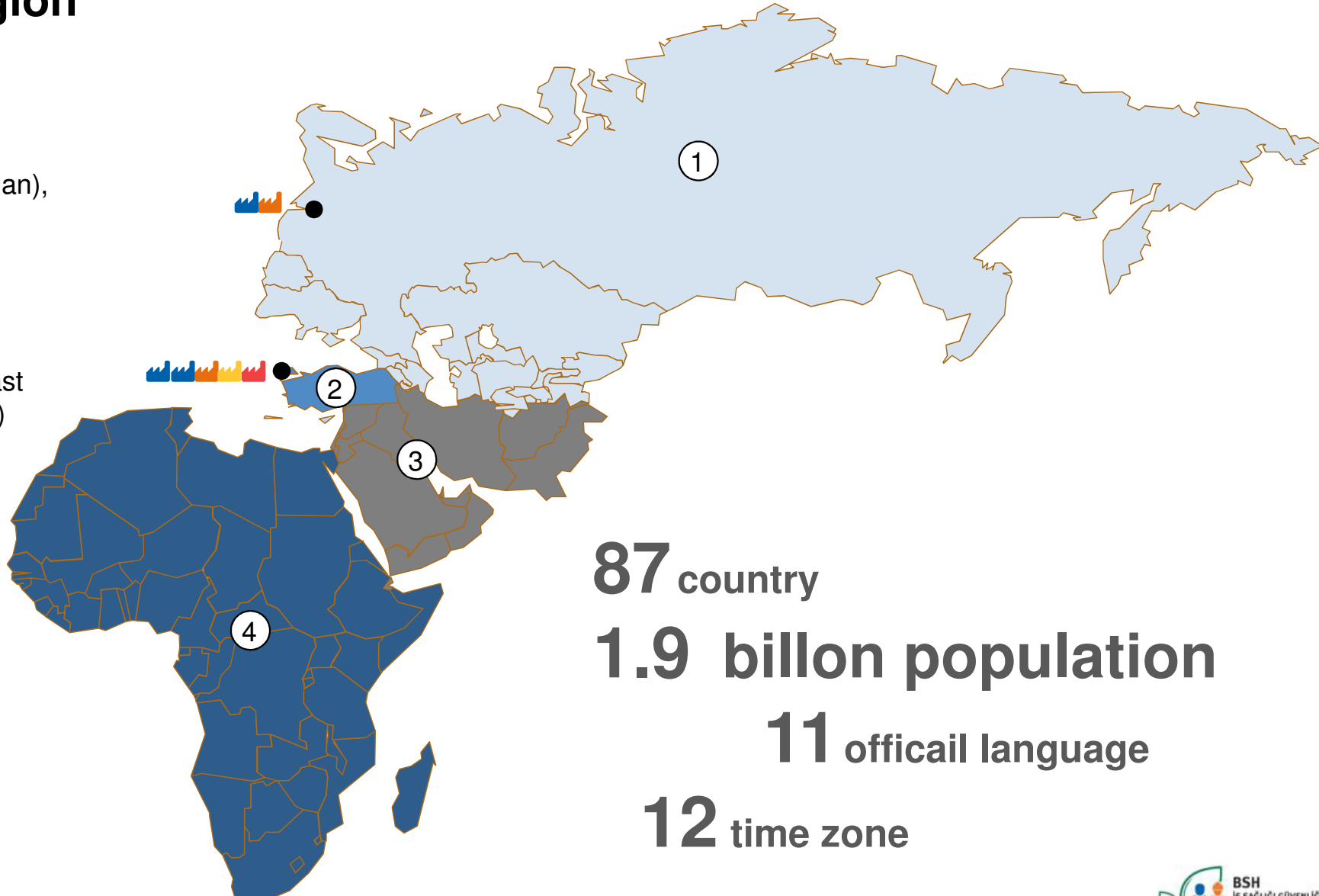
## BSH Group:

- 12,6 B € Sales T/O
- 14 Brands
- 56.000 Employees
- 80 Companies in 48 Countries
- 41 Production Facility in Europe, America, Latin America and Asia
- Ca. 3.500 R&D Employees



## T-MEA-CIS Region

- ① CIS (Russia, Belarus,, Kazakhstan, Azerbaidjan), Ukraine, Georgia
- ② Turkey
- ③ Middle East/ Near East (KSA, Iran, Irak, UAE)
- ④ Africa (Morocco, Algeria, Tunesia, Egypt, Kenia, Nigeria, Ghana, Angola, South Africa)



**87** country  
**1.9** billion population  
**11** officail language  
**12** time zone

-  Cooking
-  Dishwashing
-  Laundry
-  Refrigeration

## Main Brands in BSH/TR



**BOSCH**  
**SIEMENS**



**GAGGENAU**



**PROFILO**



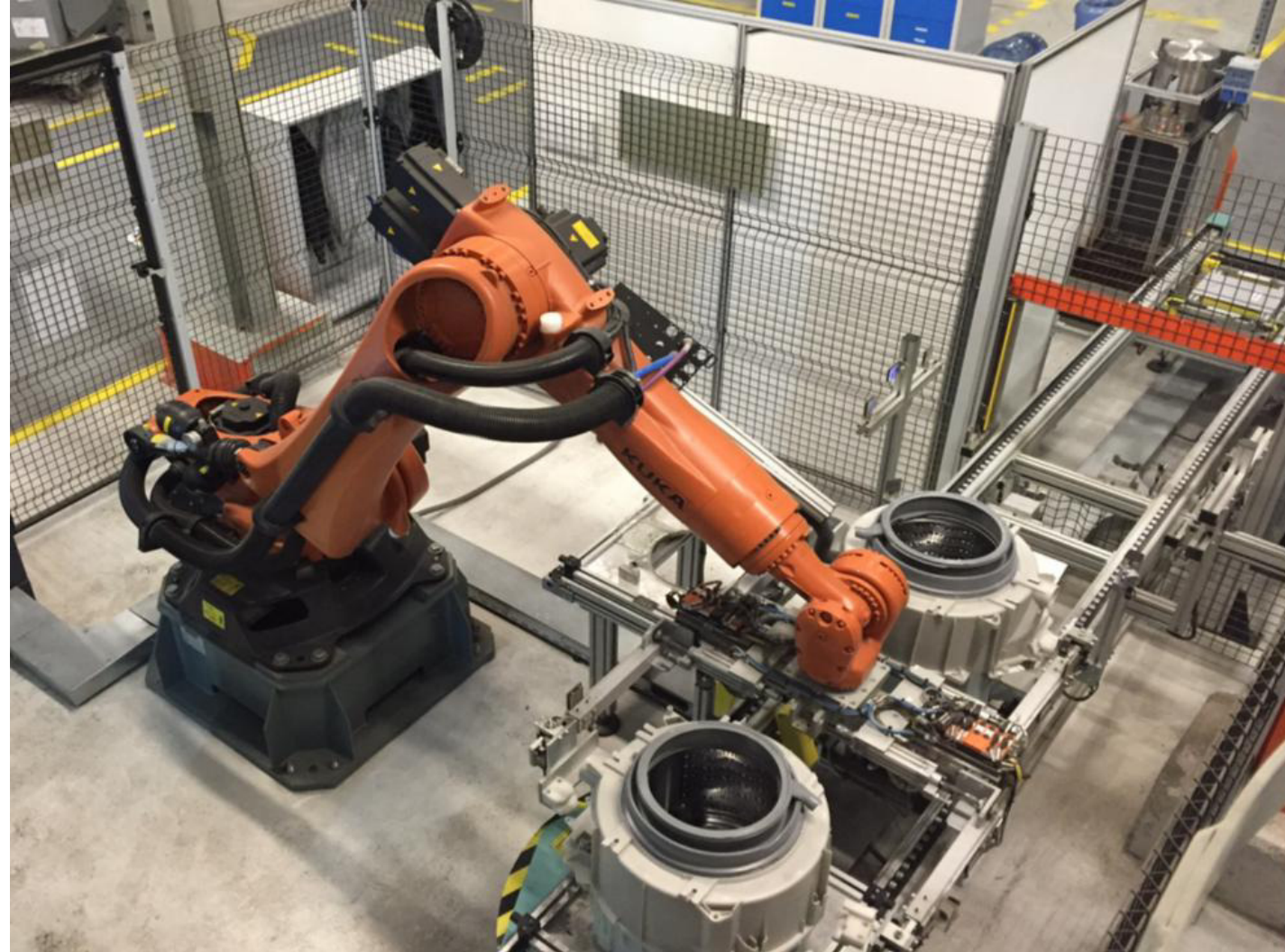
## 100 years ago, what was produced?



## How was the production at the beginning of the industry ?



## How was the production yesterday?



## How is the production today? -> Industry 4.0





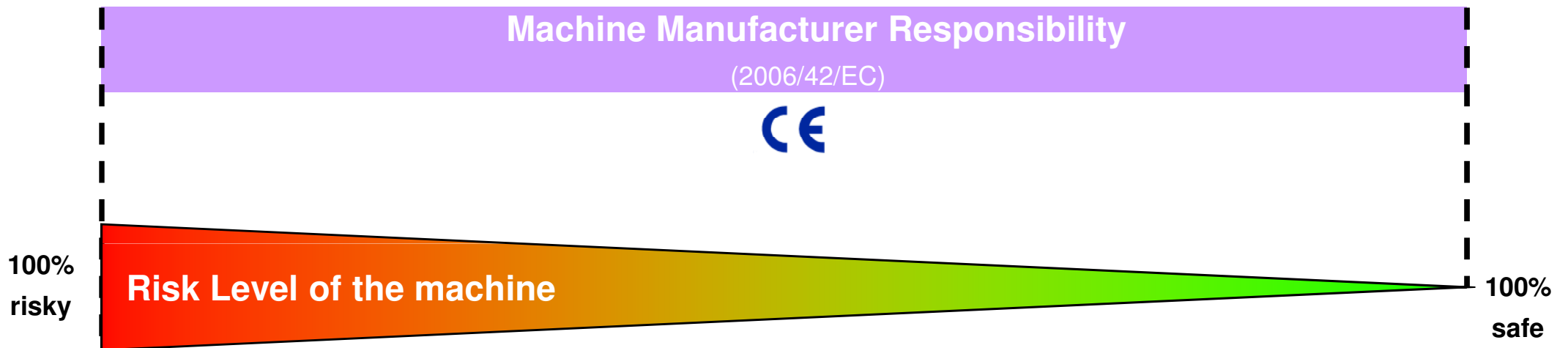
## For Sustainable Development...



from: Pilz-TR



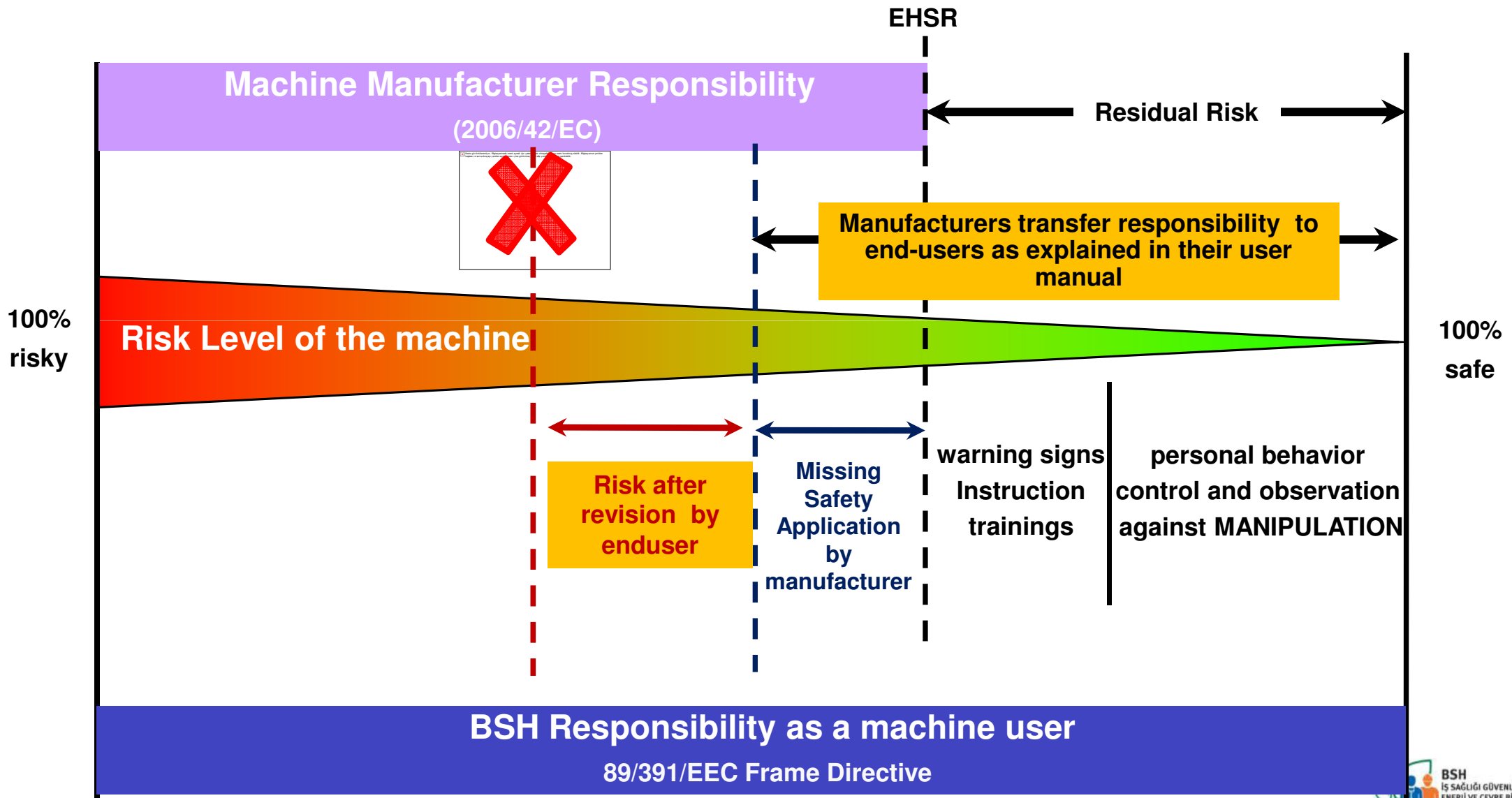
## Responsibilities in case of an accident on the machine



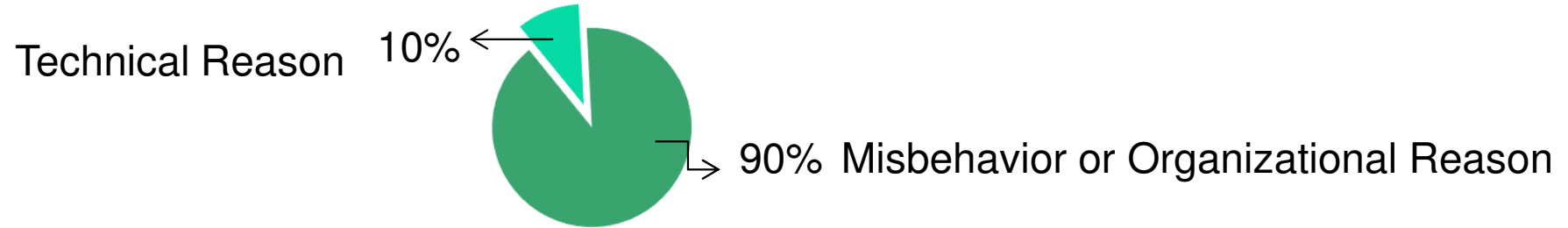
Some of machinery users generally think that;

**“There is no user responsibility for new machinery, because of CE”**

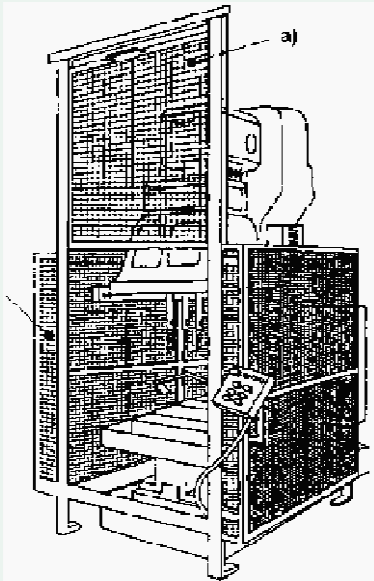
## Responsibilities in case of an accident on the machine



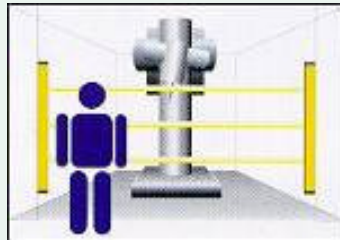
## Reason of the accidents and Priorities for safety measures (hierarchy)



### 1. Physical Guards



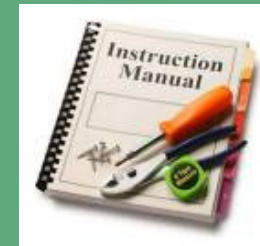
### 2. Protection Devices



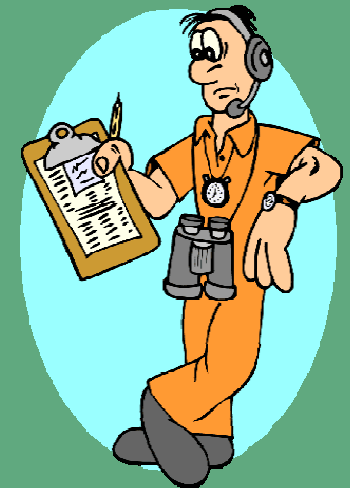
### 3. Personal Protection Equipments



### 4. Prohibits Instructions Trainings Registrations

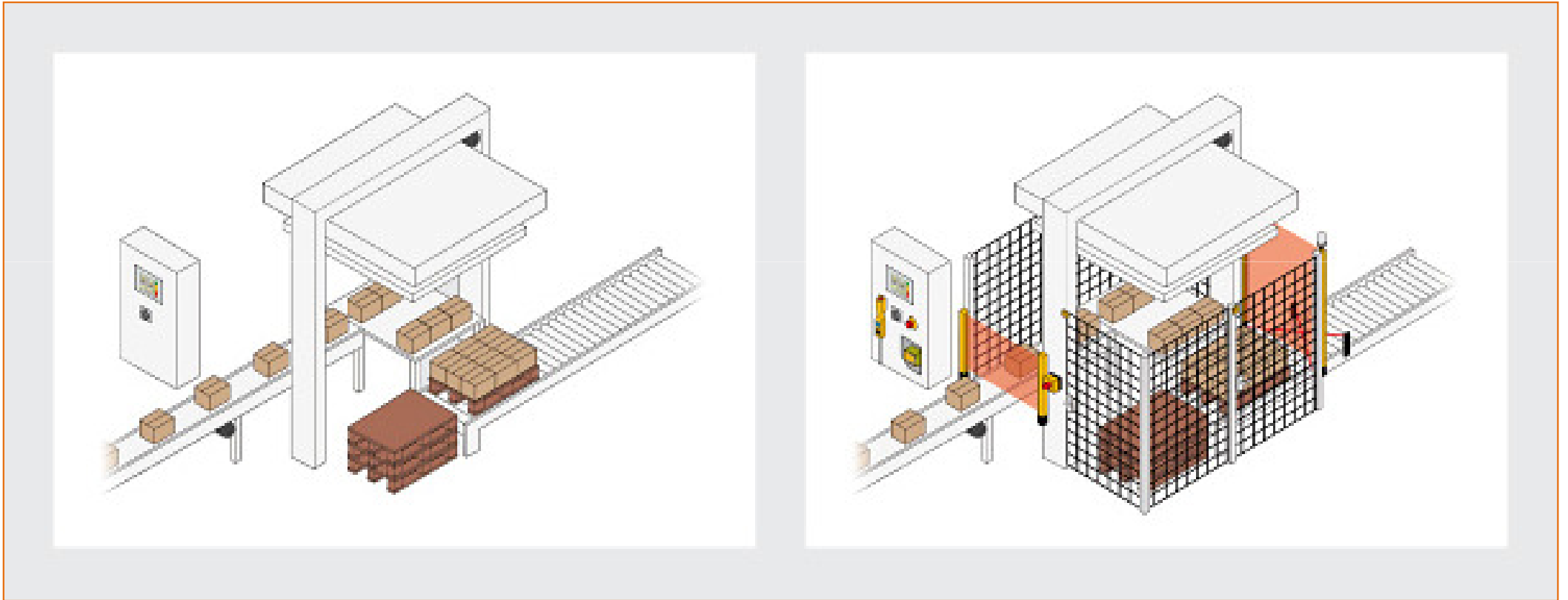


### 5. Observation Penalties



## Safety Retrofit

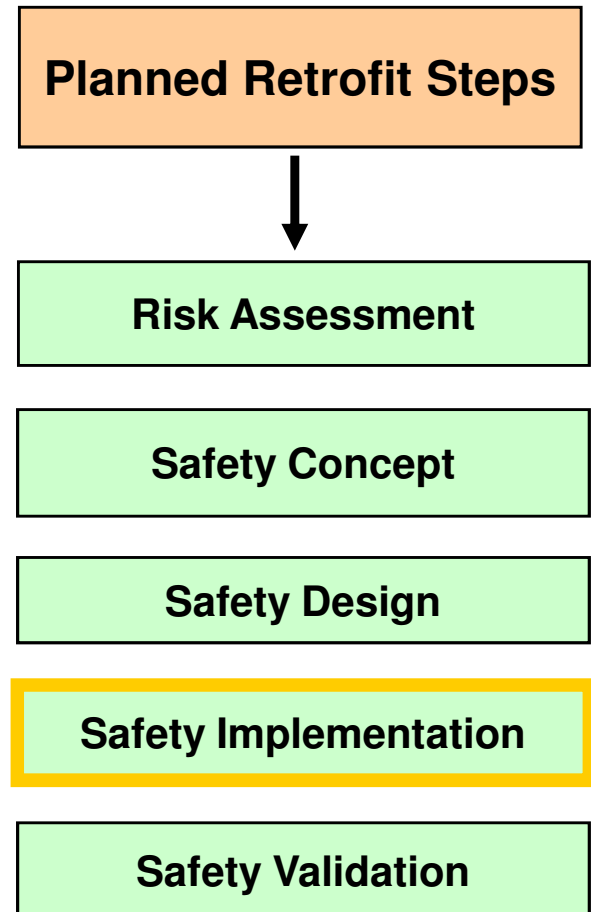
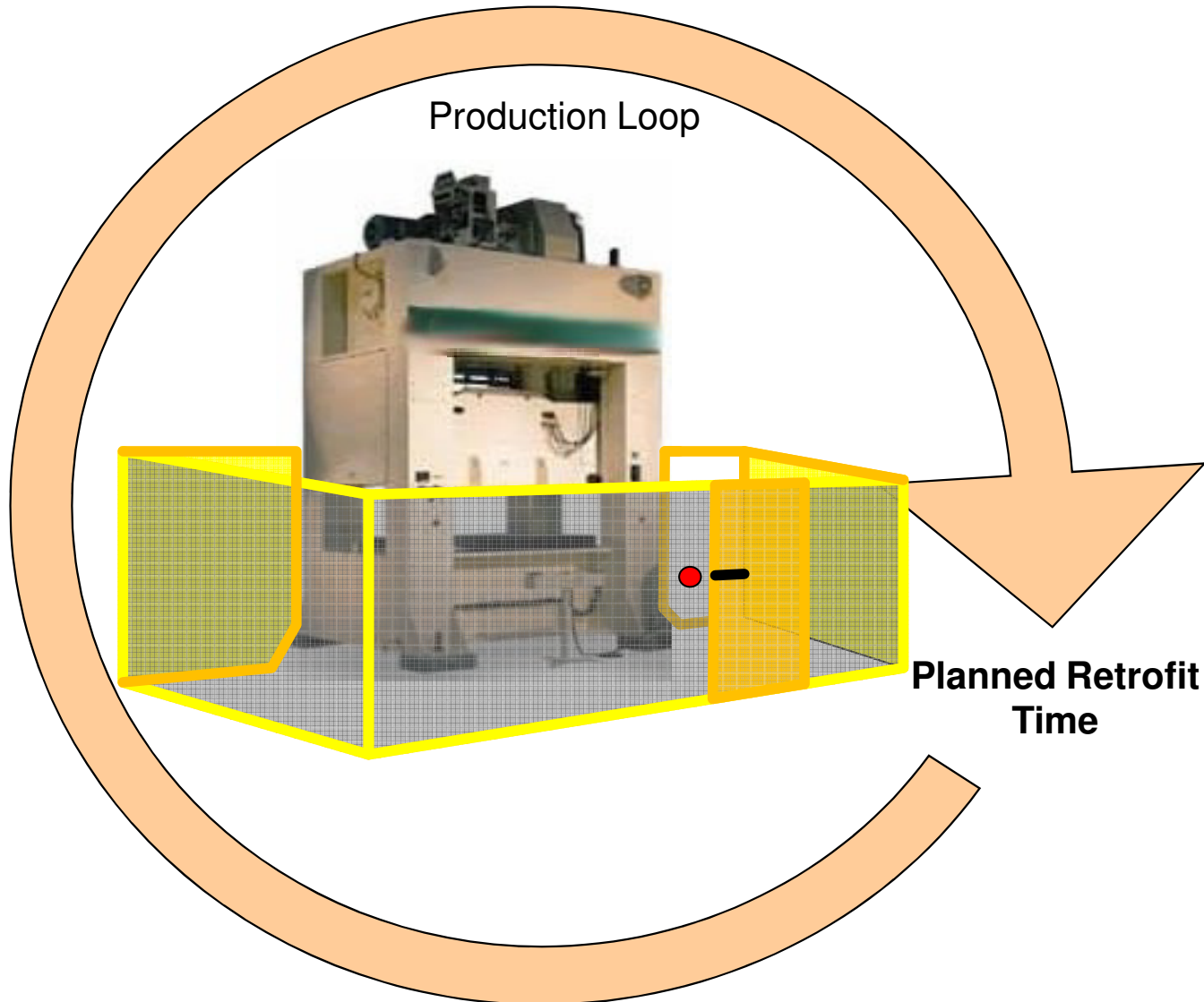
### - Implementation of Safety measures at existing machines



**Before**

**After**

## Safety Retrofit

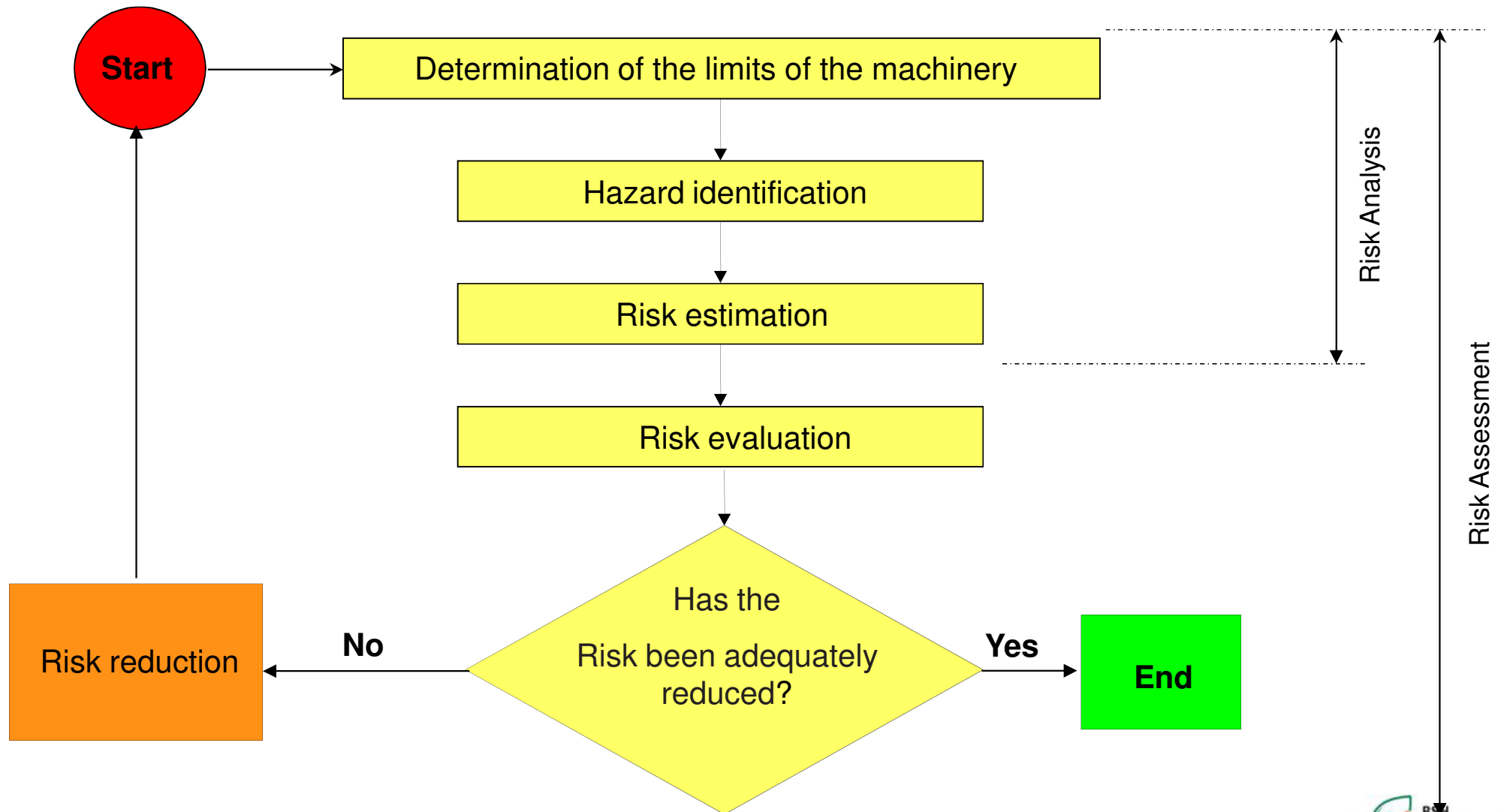


## EN ISO 12100 - Risk Assessment and Risk Reduction

<p>EUROPEAN STANDARD NORME EUROPÉENNE EUROPÄISCHE NORM</p>	<p><b>EN ISO 12100</b></p>
<p>ICS 13.110</p>	<p><b>ГОСТ Р 54125-2010 (ИСО 12100:2010) Безопасность машин и оборудования. Принципы обеспечения безопасности при проектировании</b></p>
<p>Safety of machine assessment a</p>	<p>ГОСТ Р 54125-2010 (ИСО 12100:2010)</p>
<p>Sécurité des machines - Principes généraux de co - Appréciation du risque et réduction du risque 12100:2010)</p>	<p>НАЦИОНАЛЬНЫЙ СТАНДАРТ РОССИЙСКОЙ ФЕДЕРАЦИИ БЕЗОПАСНОСТЬ МАШИН И ОБОРУДОВАНИЯ Принципы обеспечения безопасности при проектировании Safety of machinery and equipment. Principles for safety ensuring while designing</p>

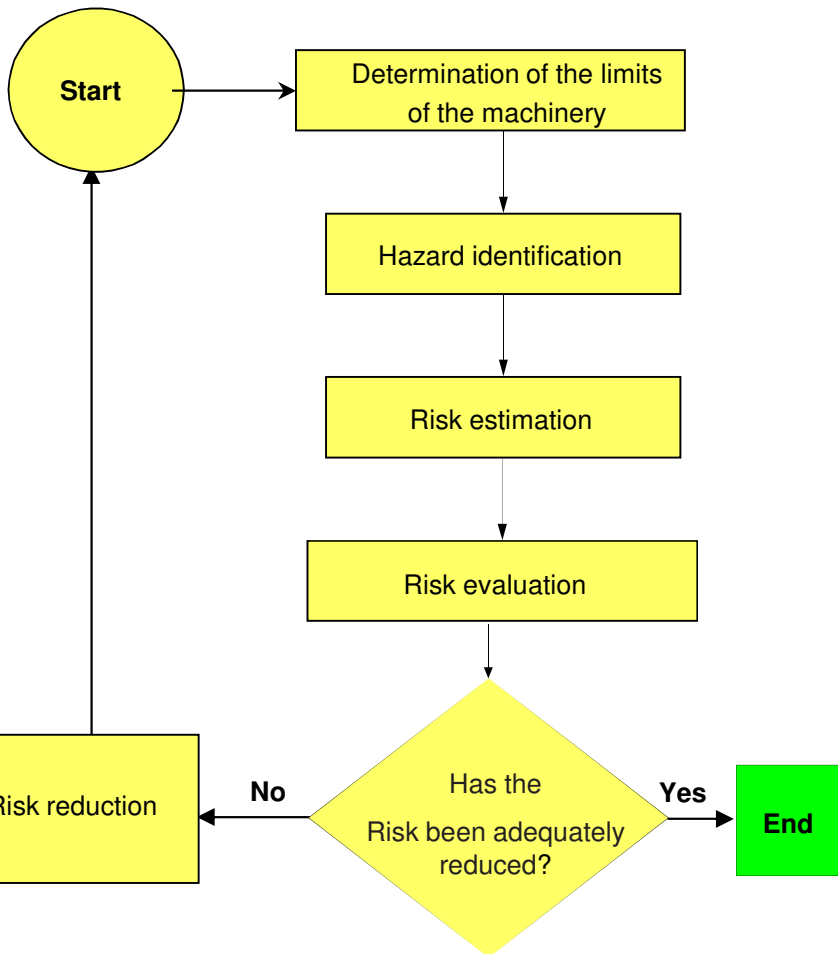


## EN ISO 12100 - Risk Assessment



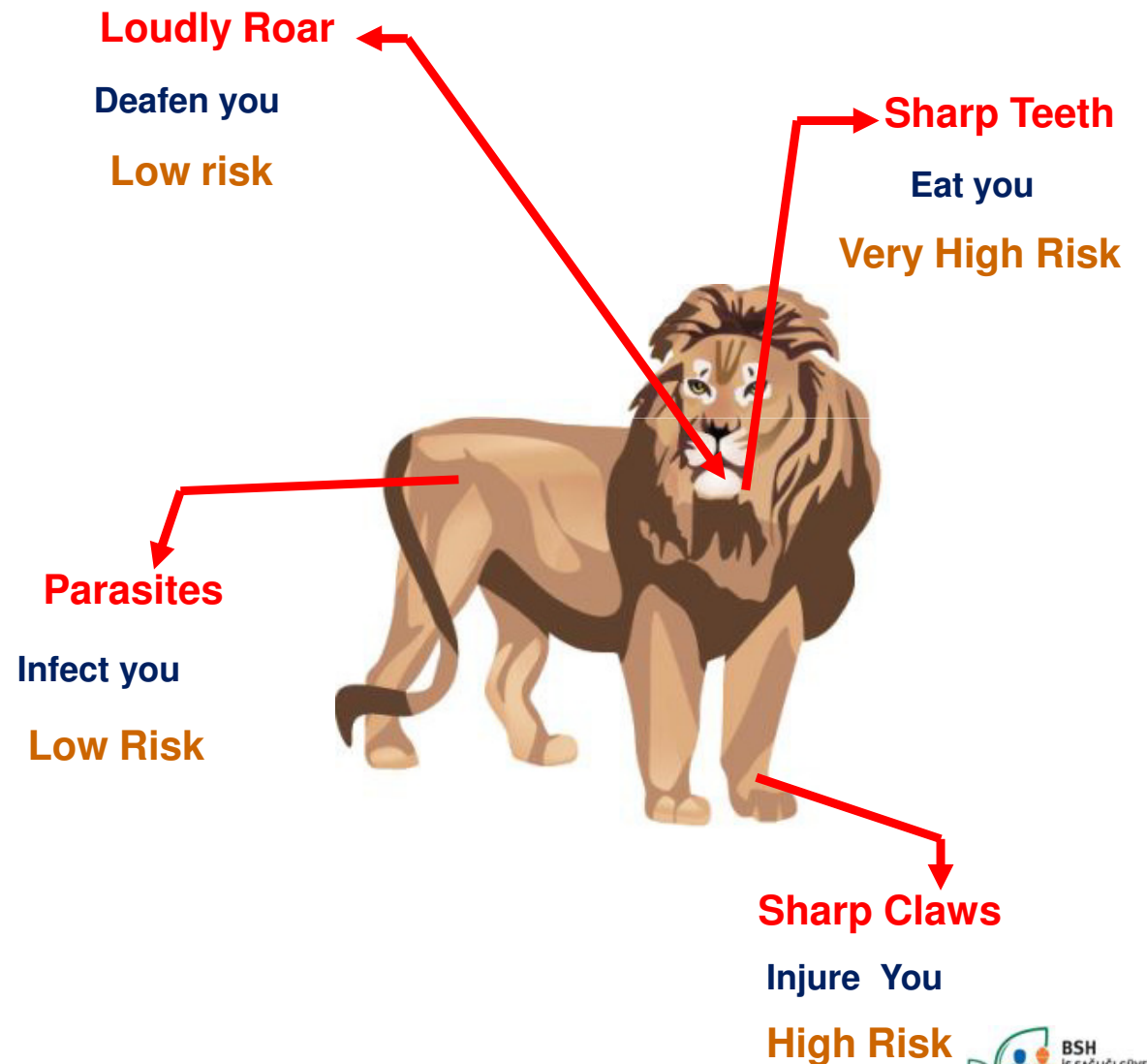
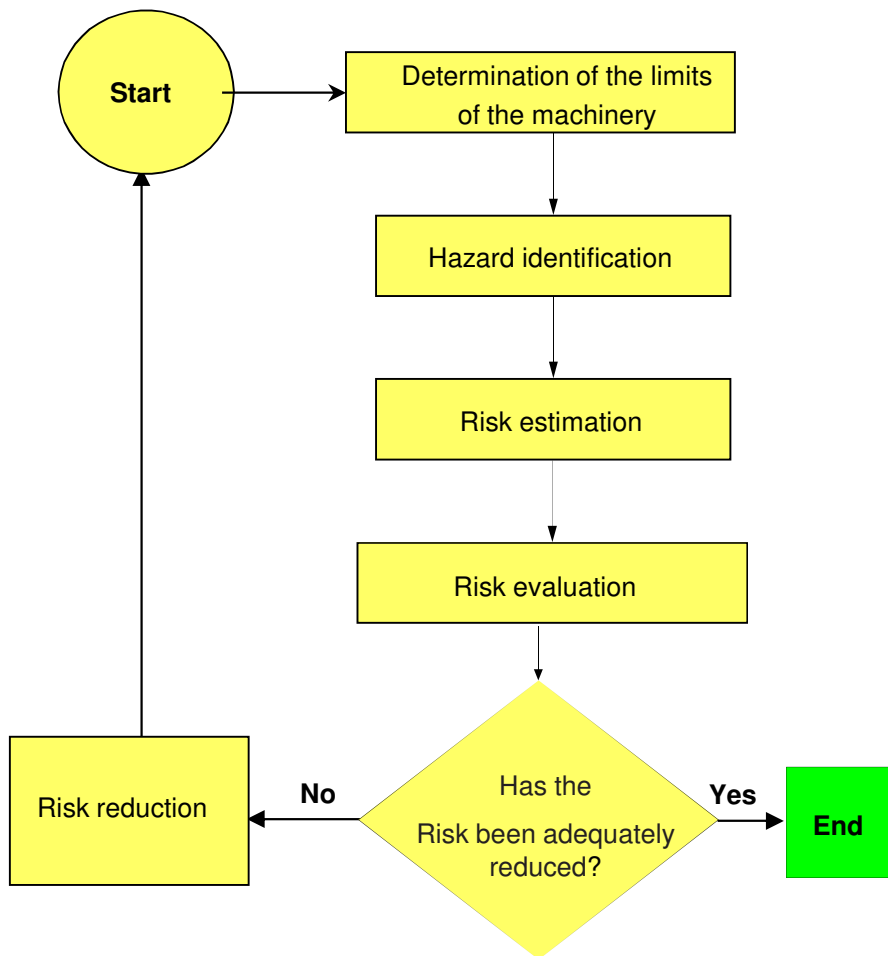


## EN ISO 12100 – Determination of the limits of the machinery



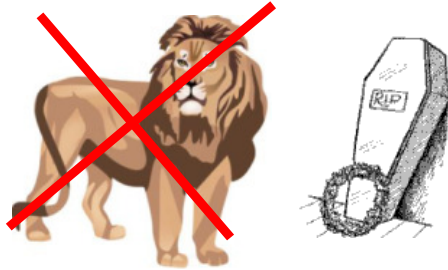
**Name** : Lion  
**Date of Birthday** : 2008-03-12  
**Size** : 3 Meters Long  
**Weight** : 150 Kg  
**Training** : None  
**Instruction** : None  
**Expected Life** : 15 Year  
**Approach Speed** : 55 km/h  
**Range of movement** : 3 km  
**Raw Material** : Meat, Bone

## EN ISO 12100 – Risk Evaluation



## Risk Reduction Hierarchy

### 1 – Eliminate



### 2. Substitute



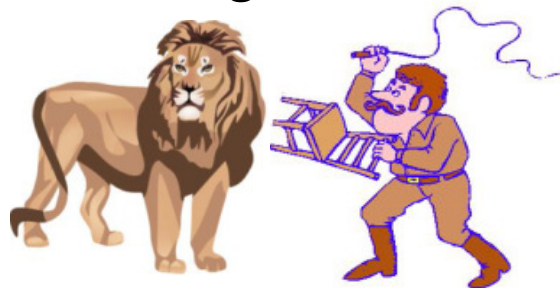
### 3 – Engineering Solution



### 4 – Administration Control



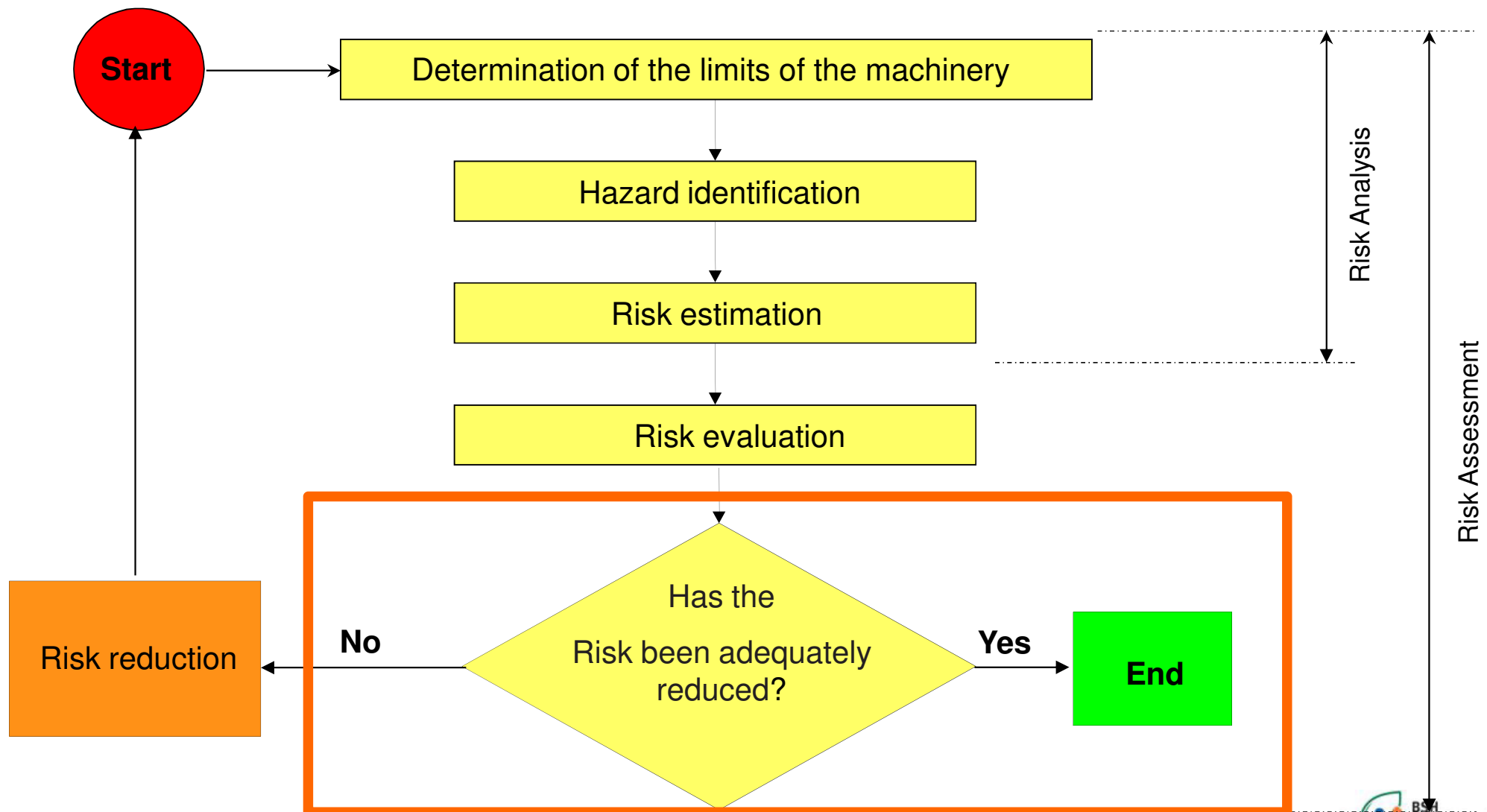
### 5 – Training



### 6- Personal Protection Equipment (PPE)



## EN ISO 12100 - Risk Assessment



## Risk Evaluation

### Hazard Rating Number system (HRN)

- Preferred Methodology used by BSH Çerkezköy for Risk Estimation
- Numerical values are assigned to the following factors in order to evaluate the risk related with a hazard

$$\text{HRN} = \text{LO} \times \text{FE} \times \text{DPH} \times \text{NP}$$

- The likelihood of occurrence (LO)
- The frequency of exposure (FE)
- The degree of possible harm (DPH)
- The number of persons at risk (NP)

The HRN is used to decide if the risk is acceptable or not according to the predetermined acceptable level.

HRN factor goes between 0 and 13500

$$\text{HRN} = \text{LO} \times \text{FE} \times \text{DPH} \times \text{NP}$$

**Likelihood of Occurrence**

0.033	Almost impossible
1	Highly Unlikely
1.5	Unlikely
2	Possible
5	Even Chance
8	Probable
10	Likely
15	Certain

**Frequency of Exposure**

0.5	Annually
1	Monthly
1.5	Weekly
2.5	Daily
4	Hourly
5	Constantly

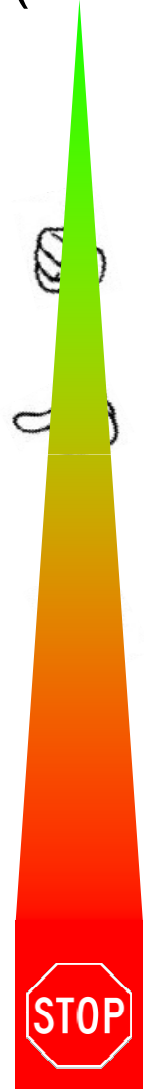
**Degree of Possible Harm**

0.1	Scratch / Bruise
0.5	Laceration / cut / mild ill health effect
1	Fracture minor bone – fingers, toes
2	Fracture major bone – hand, arm, leg
4	Loss of 1 or 2 fingers / toes
8	Leg / hand amputation, partial loss of hearing or eye
10	Amputation of 2 legs / hands, total loss of hearing/ sight in both ears/ eyes
12	Critical or permanent illness
15	Fatality

**Number of Persons at Risk**

1	1- 2 persons
2	3-7 persons
4	8-15 persons
8	16-50 persons
12	> 50 persons

## HRN (Hazard Rating Number)



Key	HRN	Risk	Comments
	0-1	<b>Negligible Risk</b>	Presents no risk to health and safety, no control measures required
	2-5	<b>Very Low Risk</b>	Presents very little risk to health and safety, no significant control measures required, may necessitate the use of Personal protective equipment and/or training
	6-15	<b>Low Risk</b>	Risk to health and safety is present, but low. Control measures should be considered.
	16-50	<b>Significant Risk</b>	The risk associated with the hazard is sufficient to require control measures. These measures shall be implemented at the next suitable opportunity.
	51-100	<b>High Risk</b>	Potentially dangerous hazards, which require control measures shall be implemented urgently.
	101-500	<b>Very High Risk</b>	Control measures shall be implemented immediately, corporate management shall be notified.
	501-	<b>Extreme Risk</b>	Control measures shall be implemented immediately. Machine shall be stopped or the specific hazardous task shall not be performed until necessary safety measures are put in place. Corporate management should be notified.

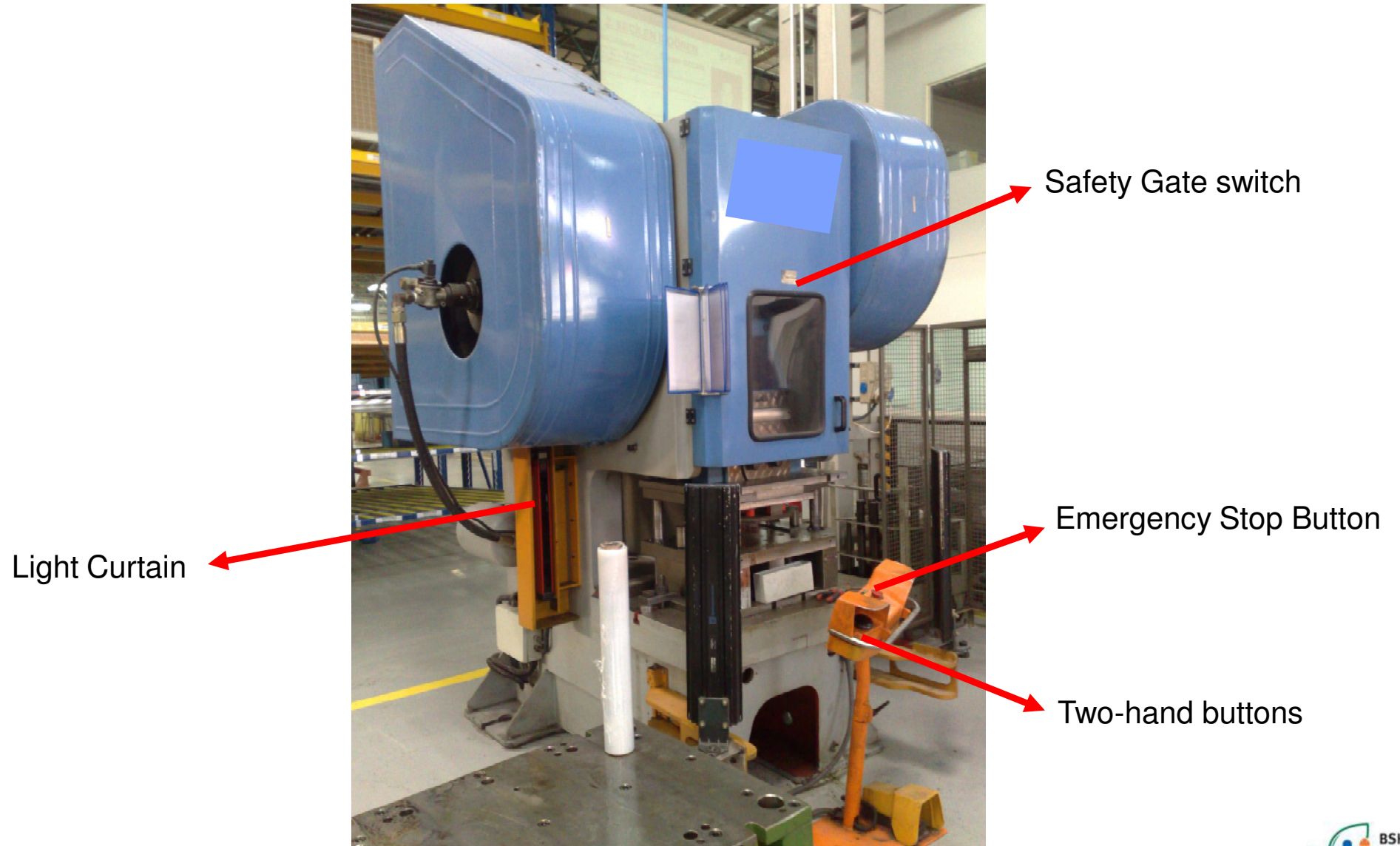


## EN ISO 12100 – Example

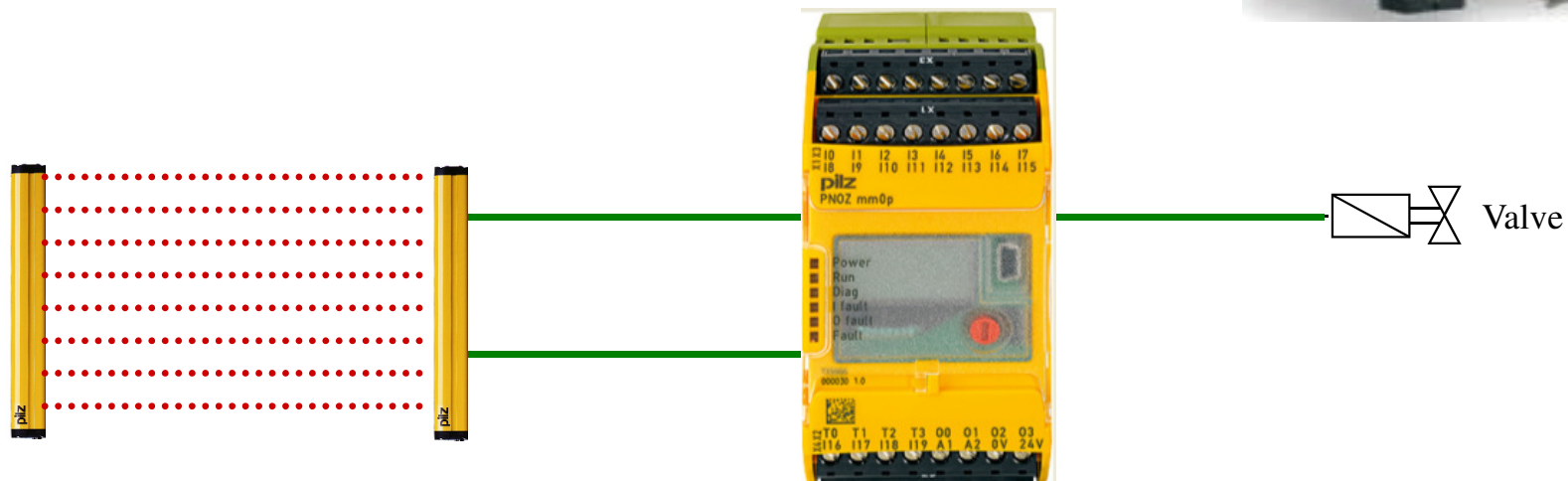


LO	->	8	5	1
FE	->	5	5	5
DPH	->	4	0,5	0,1
NP	->	1	1	1
		X	X	X
HRN	->	<b>160</b>	<b>12,5</b>	<b>0,5</b>

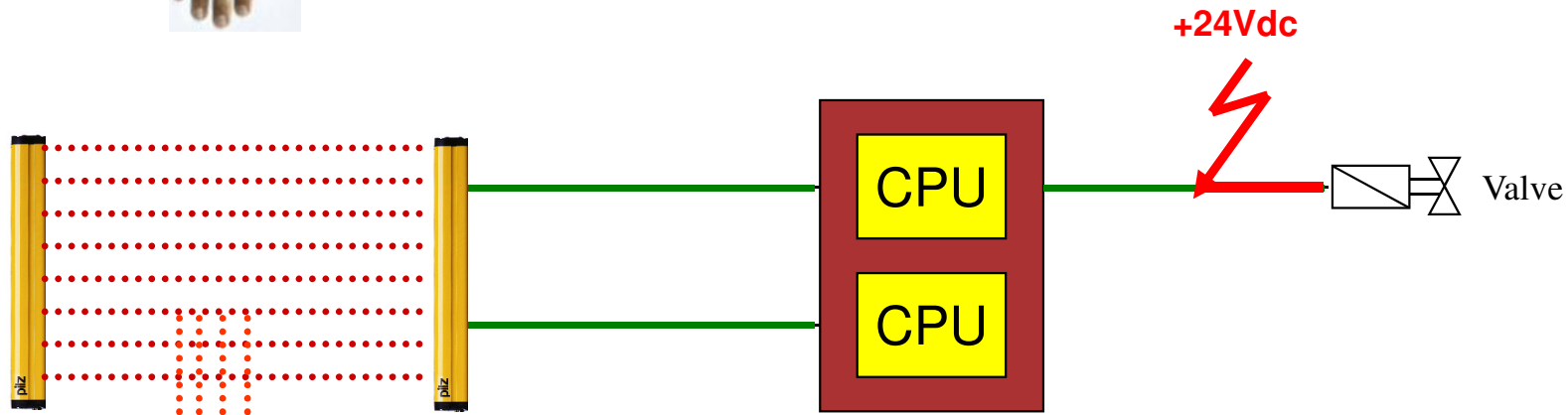
## RA example for Mechanical Presses



## RA example for Mechanical Presses



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## RA example for Mechanical Presses

EN 692

**5.4.2.3** Where the provision is necessary for **redundancy** and **monitoring** of the clutch/brake control system,

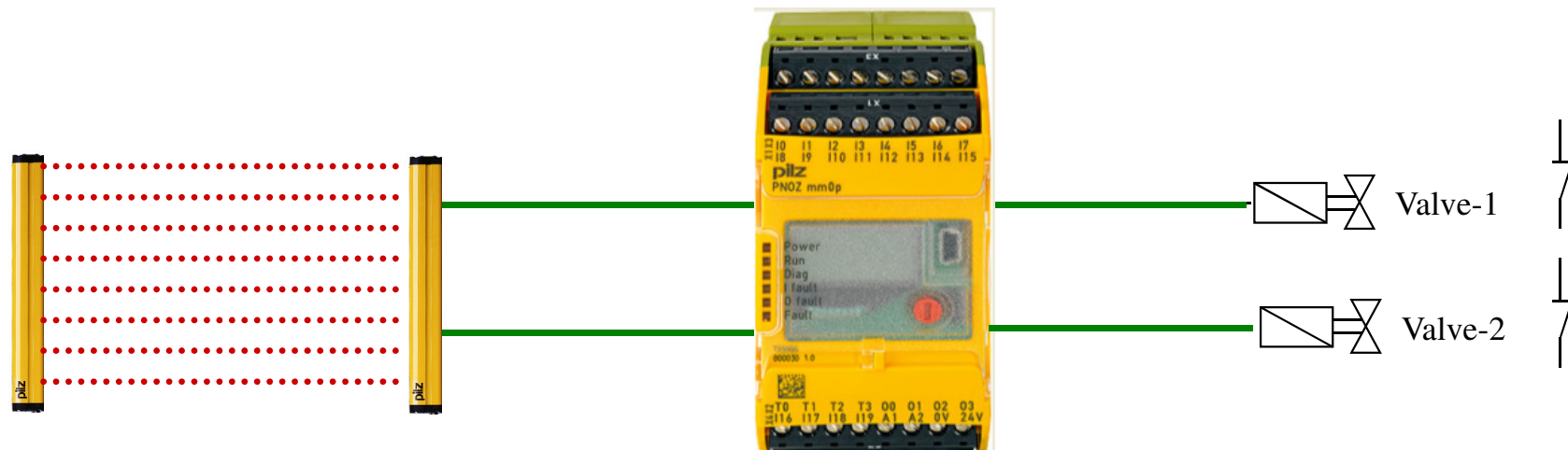
this shall conform to the following requirements:

a) the press shall be fitted with either at least **two single valves** or **a double** bodied solenoid operated valve which

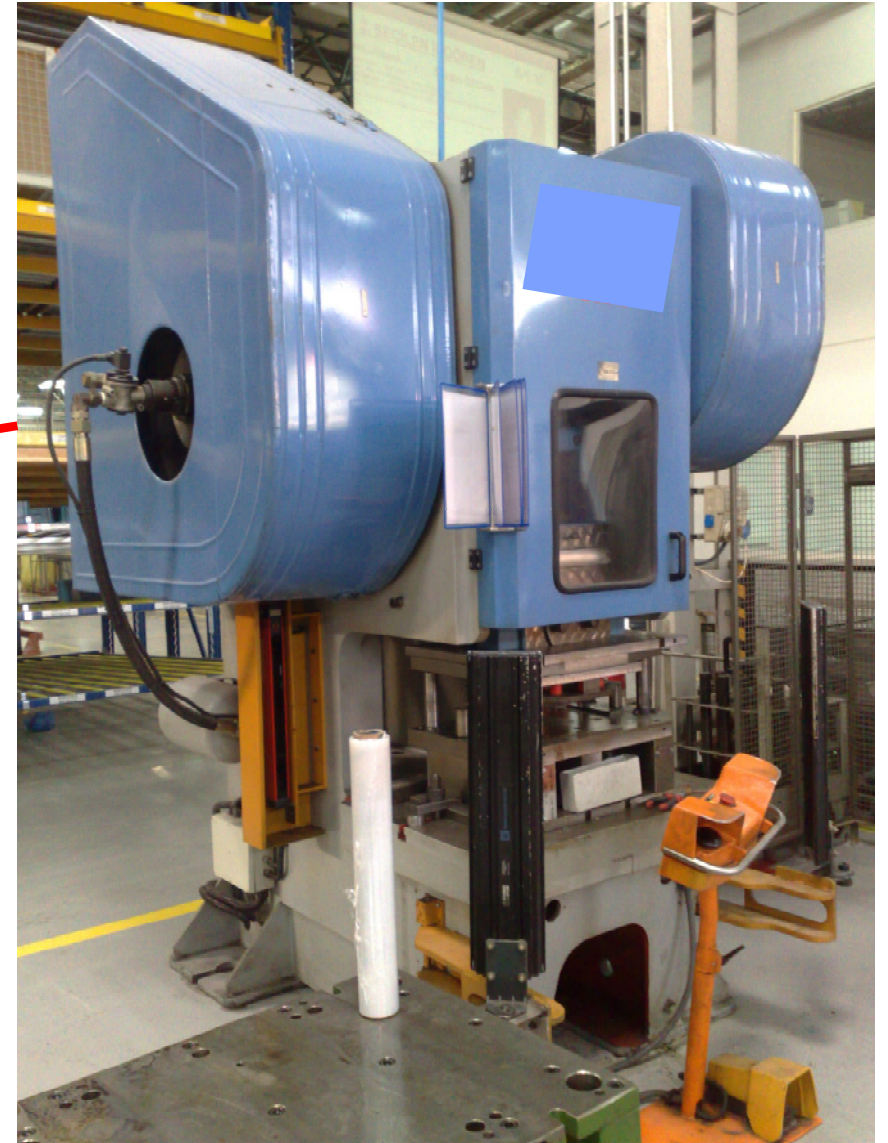
directly control the fluid to the operated clutch and brake, or the equivalent in the case of other forms of drive;

b) the valve solenoids shall be connected

.....



## RA example for Mechanical Presses



# B/S/H/



**Thanks for your listening**

**Necmi Trer**

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