

A stack of white papers with blue lines, slightly blurred, set against a light blue background.A blurred, circular clock face with numbers, set against a pink and purple background.

Ishikawa fishbone diagram

A stack of white papers with blue lines, slightly blurred, set against a light green background.A yellow analog clock with black numbers and hands, set against a yellow and orange background.

Skorkovský ESF MU KPH

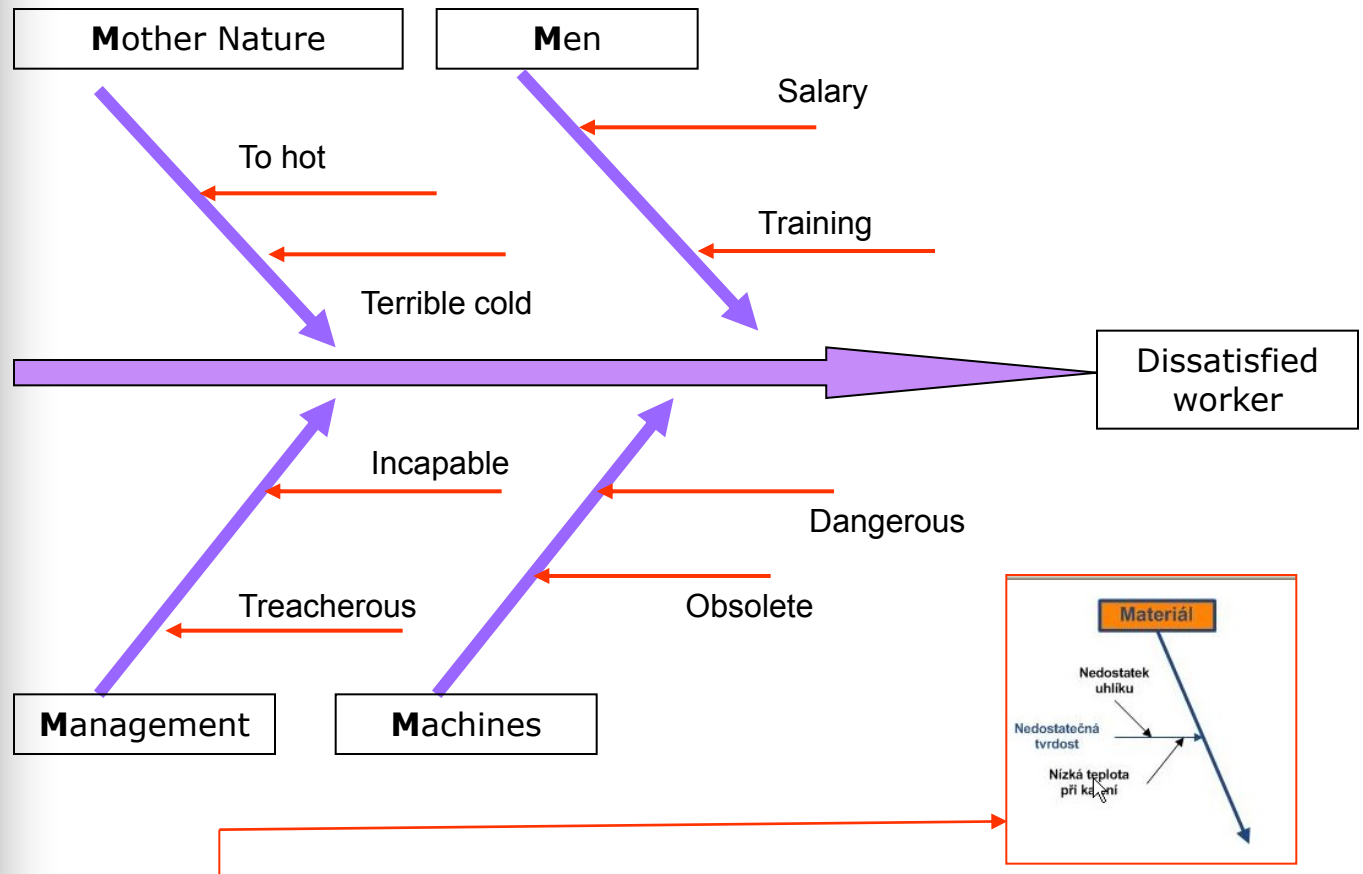
Introduction (FBD= fishbone diagram)

- FBD is a tool to find out relationships:

Cause → Effect

- Use in QM especially in automotive industry
- One of the tool set used to create so called 8D report (8 disciplines=FBD+5WHYs+PA+QM)
- Another tool : 5 WHYs - will be cleared later
- Another tool : PARETO=PA analysis will be shown later

Fishbone diagram



(Methods, **Material**, Manpower, Measurement, Machines, Mother Nature, Management)

Some chosen problems which could be find out during ERP support process I

- long response time to requirements
 - requirement is directed to unsuitable consultant
 - bad documentation about service action (poor log)
 - people ask repeatedly same questions at different moments and different consultants are asked
 - solution of disputes :complaint- standard service
 - payment asked for supplied services
1. how much (to whom, type of task, type of the error- see diagram
 2. starting time for invoiced services, response time
 1. requirement is handed over till the problem is solved
 2. time of starting solving -solved
 3. start of implementaion of the bad object till end of testing
 4. training

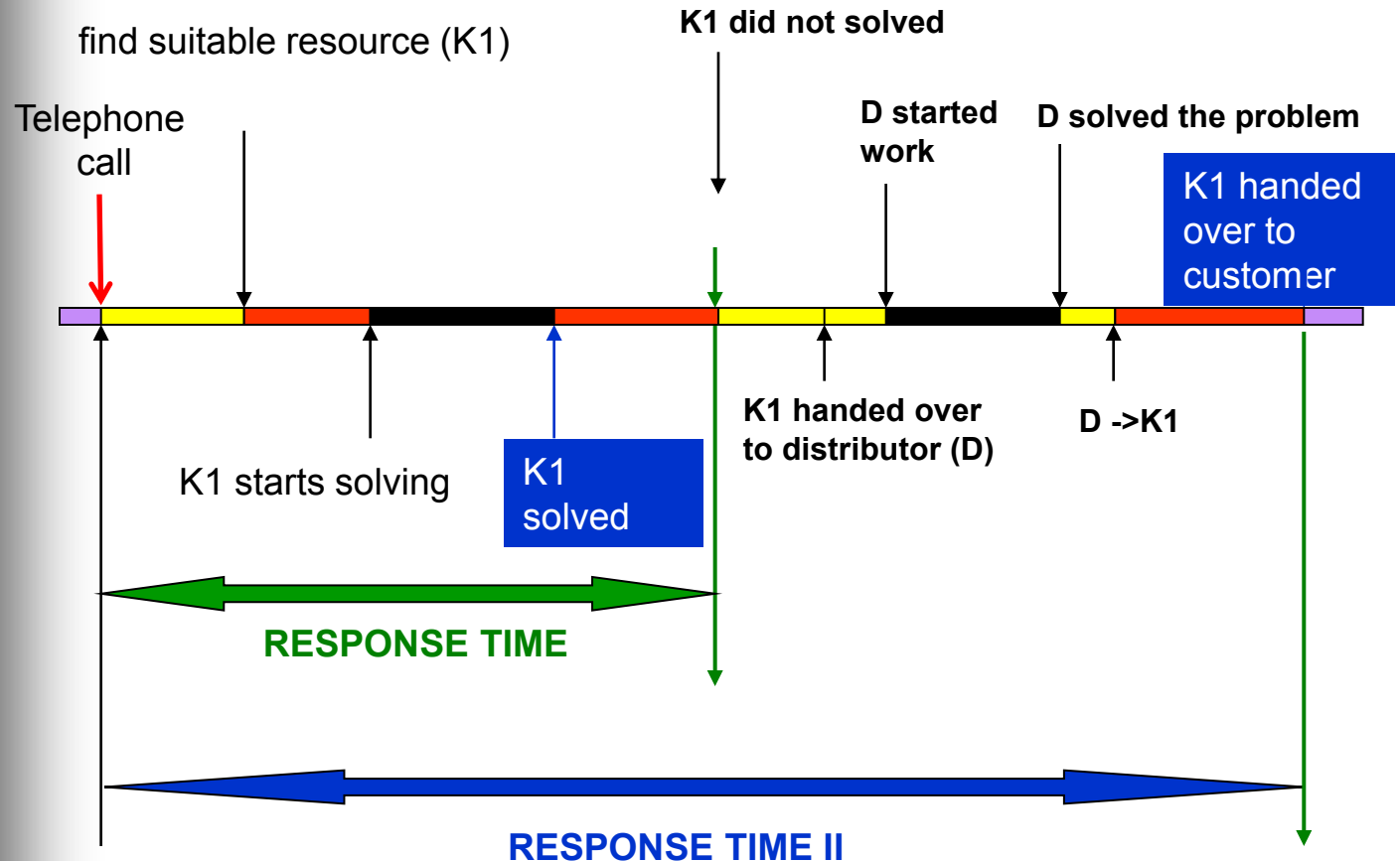


Some chosen problems which could be find out during ERP support process II

- bad training methodology
- bad consultants
- bad communication protocol
 1. telephone
 2. e-mail
 3. SKYPE
- lack of interest of the management of both parties
- right specification of reaction time
- specification to the error types and related response times
- response time of the distributor (ERP integrator ERP)



Diagram – response time



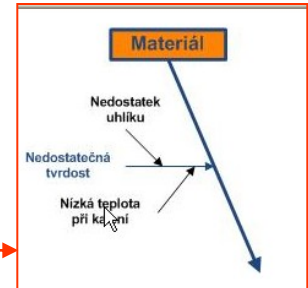
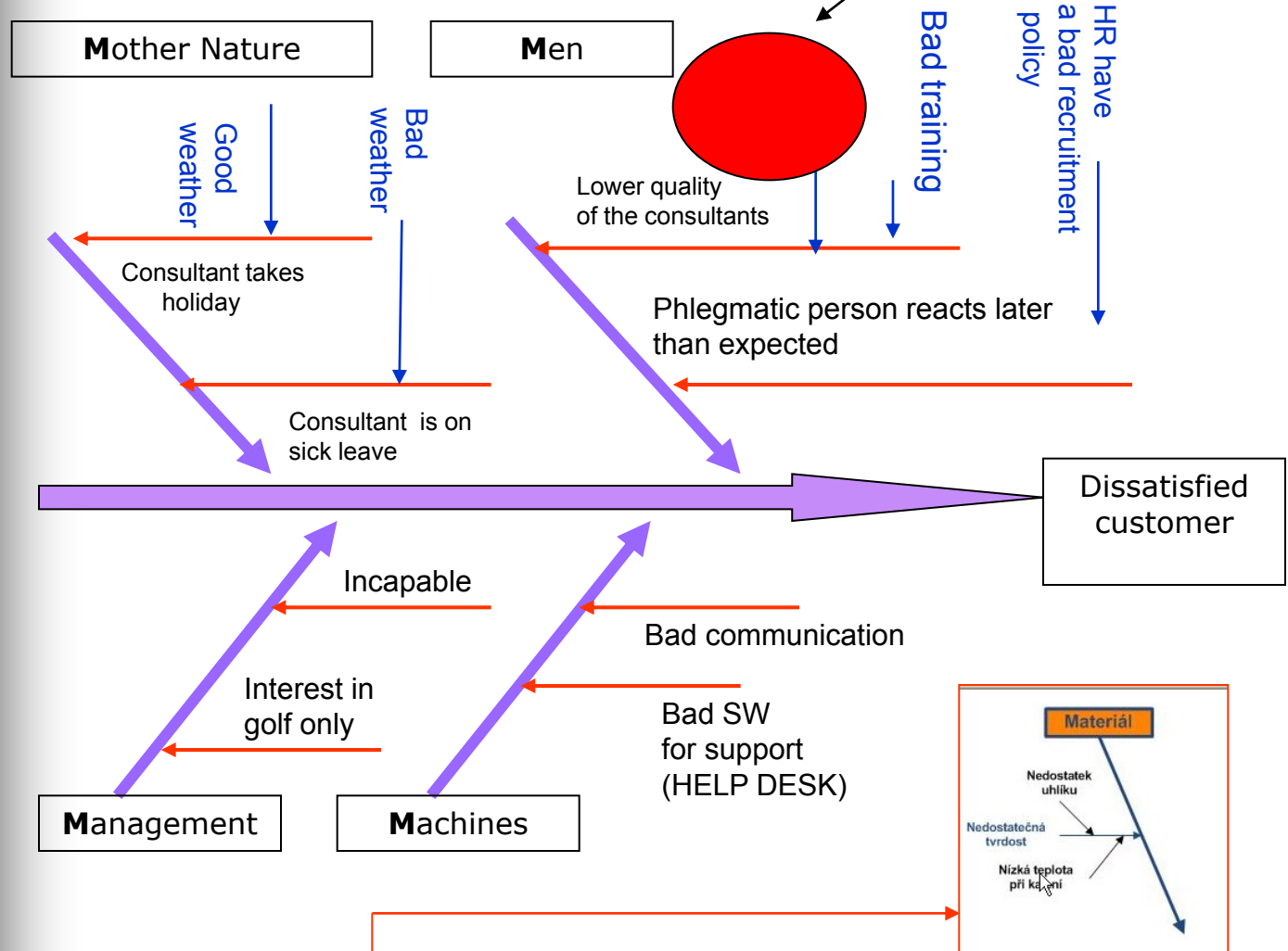
handed over requirement

— = active work

— = idle time

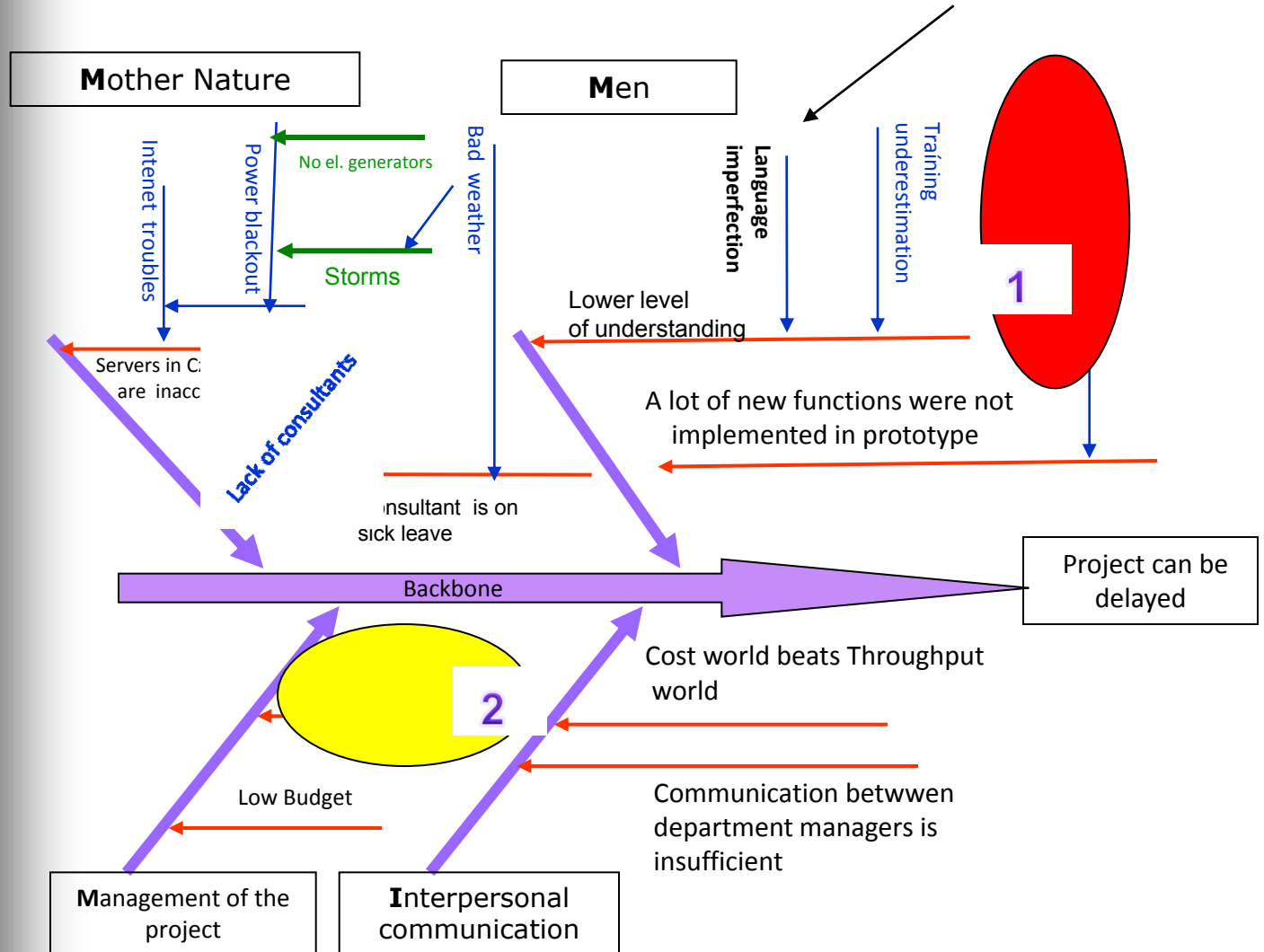
Fishbone diagram-support

heart of the problem



(Methods, **Material**, Manpower, Measurement, Machines)

Fishbone diagram-SA Project



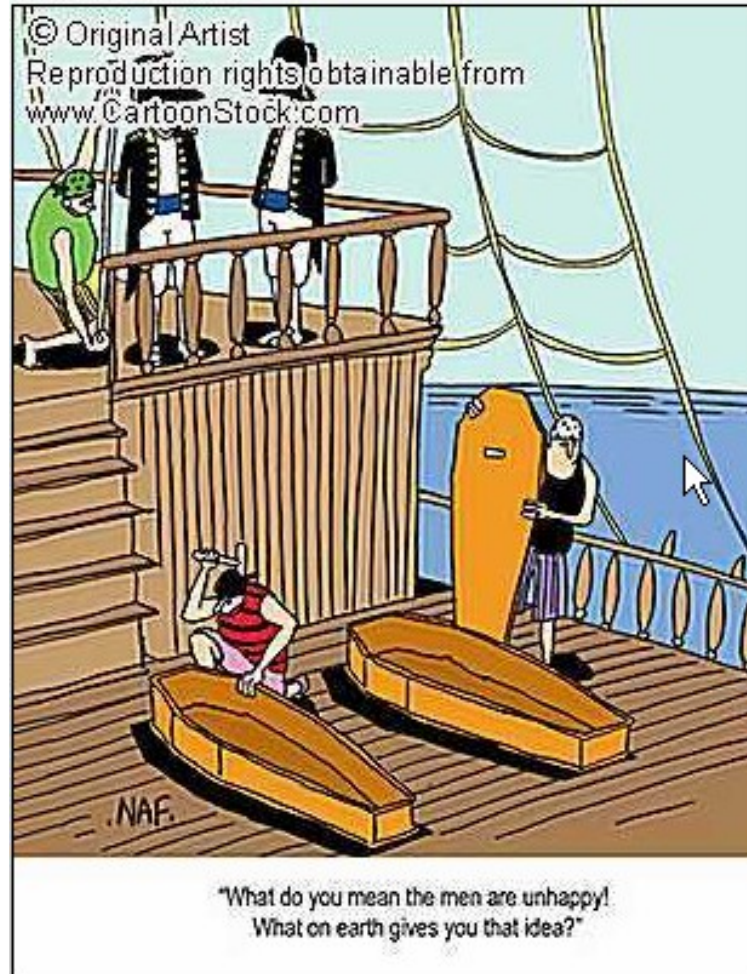
(Methods, **Material**, Manpower, Measurement, Machines)

Dissatisfied employee I



"EVERYTHING OKAY, PHILLIPS?"

Dissatisfied employee II



5WHYs

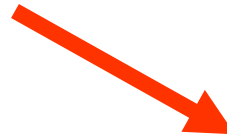
- WHY 1 :Why my car had stopped ?
- No petrol in tank
- WHY 2 :Why i did not have a petrol in my tank ?
- I did not buy in the morning on my way to work
- WHY 3 :Why i did not buy a petrol ?
- No money in my pockets
- WHY 4 : Why no money i my pockets?
- Evening poker
- WHY 5 : Why i did not win a poker game?
- I do not know how to bluff!



5WHYs



Cause



Effect



TQM and Ishikawa FBD and Pareto

Statistika zmetkovosti **Reject statistics**

Zmetky celkem **9 485 283** Filtr Data **Filter date**
Rejects Total Filtr čísla zboží. **Filter Item**

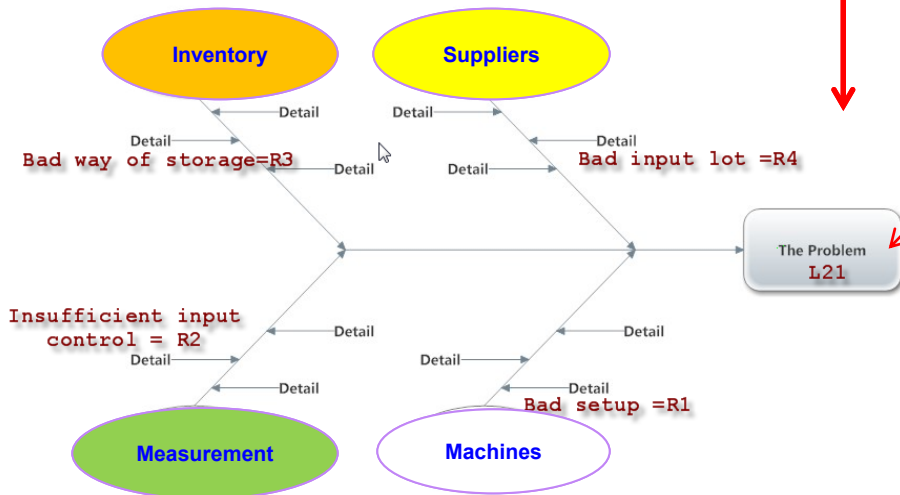
| Kód | Popis | Množství zmetků | Poměr zmetkovosti |
|-----|-----------------------|-----------------|-------------------|
| L14 | Seké | 116 579 | 1% |
| L15 | Propadliny-polotovary | 94 515 | 1% |
| L16 | Deformace klipu | 48 382 | 1% |
| L17 | Deformace | 61 782 | 1% |
| L21 | Hrudky | 848 556 | 9% |
| L23 | řleky | 195 791 | 2% |
| L24 | Flek - kráter | 4 | 0% |
| L30 | kropenatě | 21 654 | 0% |

Bad size, rusty, overflow, bad colour,...

- Reject statistics
- Final product /Rejects
- MachineCenters/Rejects
- Rejects in time
- Final products/Rejects in time
- Machine centers/Rejects in time

| Reject type (effects); | Reason 1 (cause) | Reason 2 (cause) | Reason 3 (cause) | Reason 4 (cause) |
|------------------------|------------------|------------------|------------------|------------------|
| L19 | 8 | 9 | 2 | 4 |
| L20 | 0 | 1 | 4 | 6 |
| L21 | 7 | 2 | 3 | 5 |

Score



Manual for urgent reject cause elimination



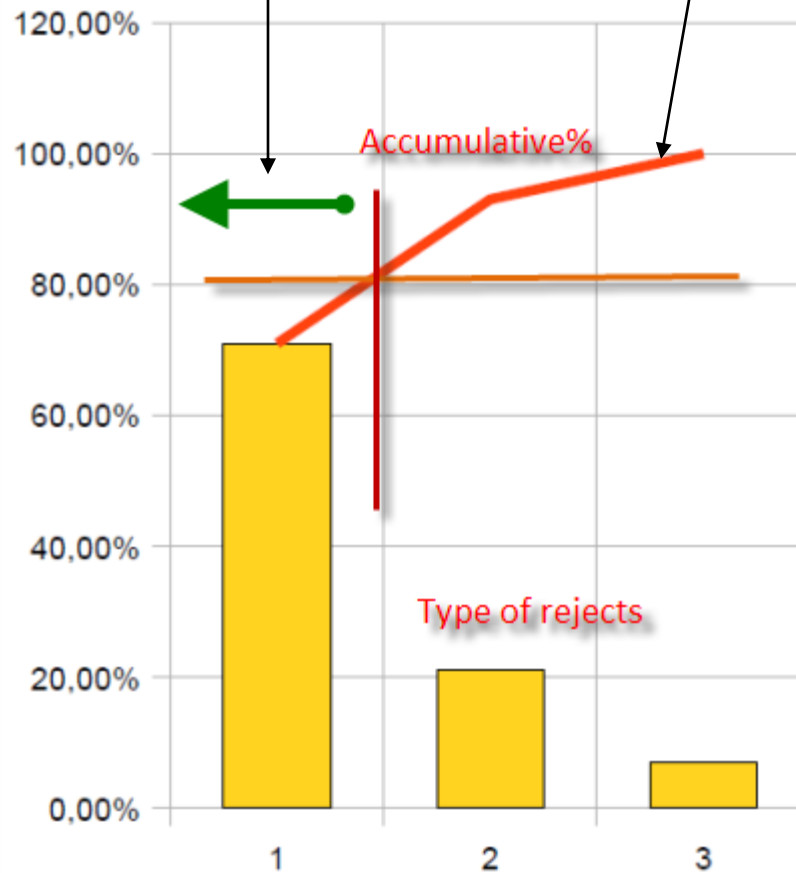
(to establish correct priority of remedy actions)

Every reject type -> one Ishikawa diagram (electronic version)

Pareto chart : possibility to split up reject and setup priorities

High priorities

Lorenz curve



Pareto analysis per every type of reject – next

step -> practical example of Pareto use in ERP MS Dynamics NAV

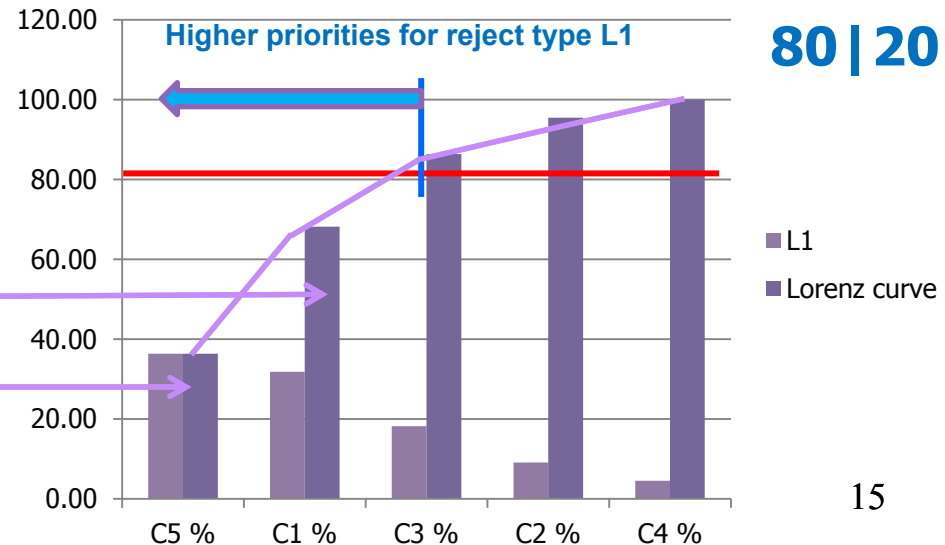
| Type of reject | Cause 1 | Cause 2 | Cause 3 | Cause 4 | Cause 5 | Cause 6 | Total |
|----------------|---------|---------|---------|---------|---------|---------|-------|
| L1 | 7 | 2 | 4 | 1 | 8 | 0 | 22 |
| L2 | 2 | 4 | 6 | 8 | 0 | 9 | 29 |
| L3 | 4 | 0 | 0 | 5 | 6 | 7 | 22 |
| L4 | 5 | 7 | 2 | 0 | 1 | 3 | 18 |
| L5 | 0 | 2 | 7 | 3 | 0 | 1 | 13 |
| L6 | 9 | 7 | 5 | 2 | 3 | 6 | 32 |
| L7 | 0 | 7 | 0 | 2 | 3 | 4 | 16 |
| L8 | 1 | 8 | 6 | 2 | 4 | 0 | 21 |
| L9 | 2 | 0 | 5 | 7 | 1 | 4 | 19 |
| L10 | 7 | 2 | 8 | 9 | 7 | 5 | 38 |
| C | C5 % | C1 % | C3 % | C2 % | C4 % | C6 % | |
| L1 | 36,36 | 31,82 | 18,18 | 9,09 | 4,55 | 0,00 | 100 |
| Lorenz curve | 36,36 | 68,18 | 86,36 | 95,45 | 100,00 | | |



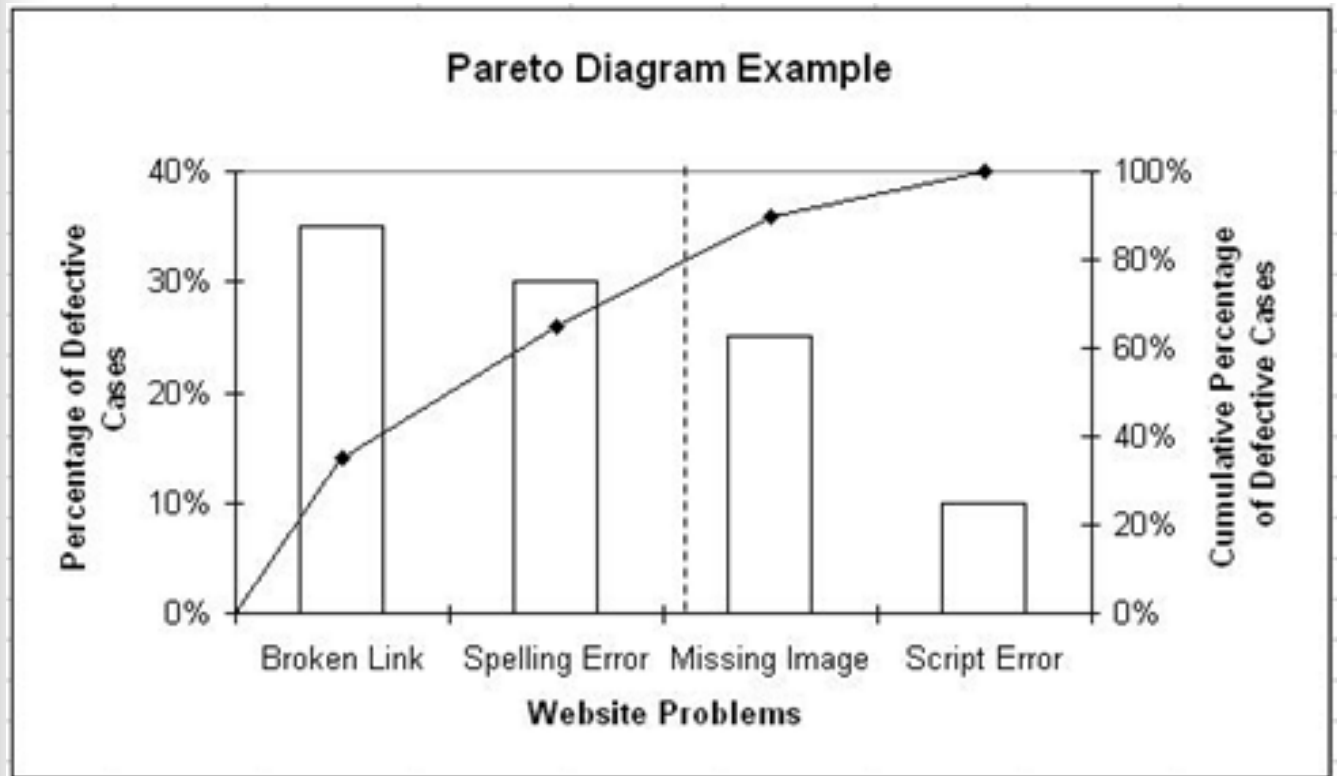
We need to improve (remedy) firstly causes C5 a C1 !!!

36,36 + 31,82

36,36



Pareto analysis II

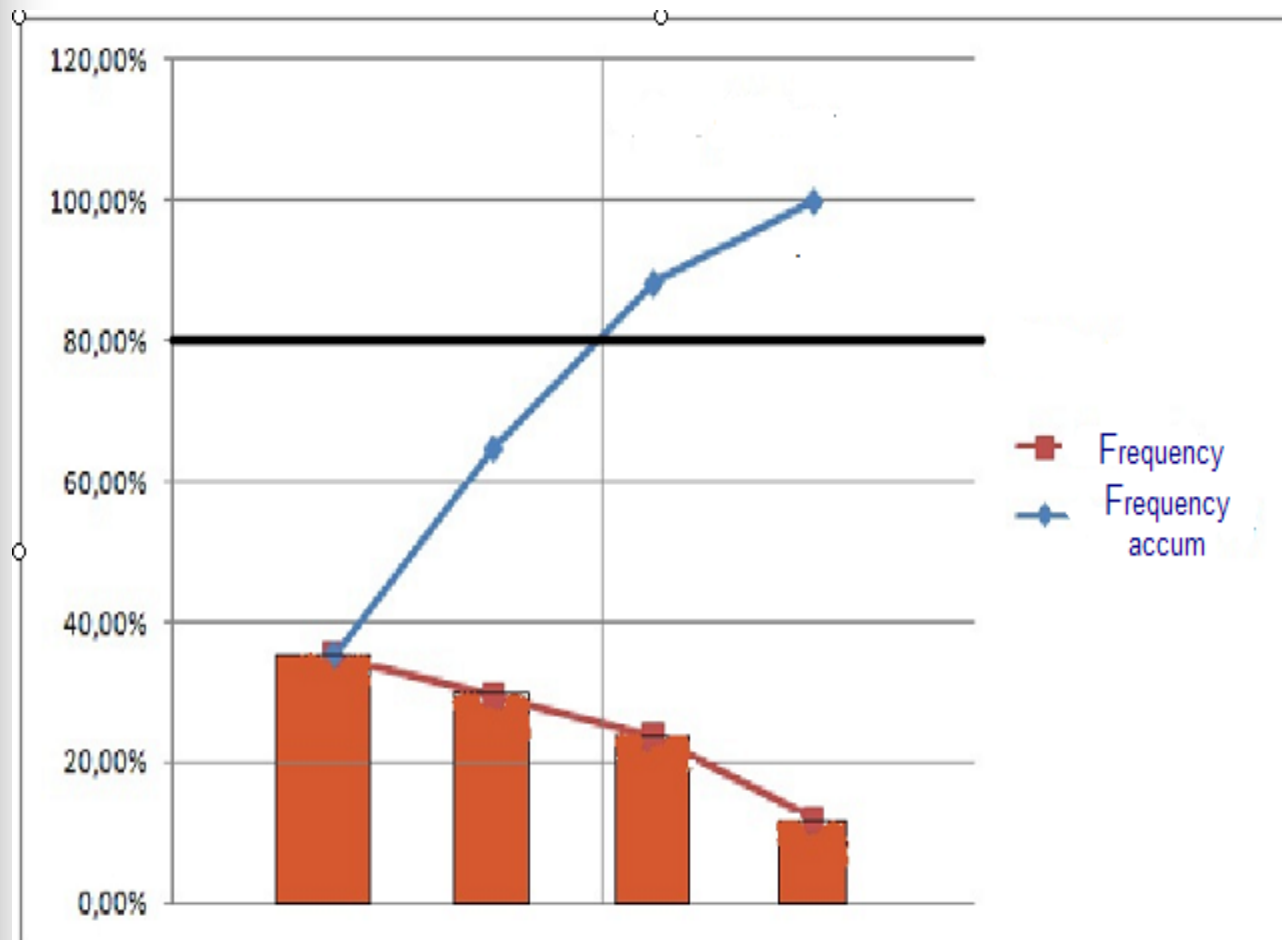


Pareto analysis II - data

| | Frequency | Freq (%) | Freq accum(%) |
|-------------------|-----------|----------|---------------|
| ■ Difficulty | 6 | (35,29) | (35,29) |
| ■ Resignation | 5 | (29,41) | (64,71) |
| ■ Underestimation | 4 | (23,53) | (88,24) |
| ■ Low motivation | 2 | (11,76) | (100,00) |



Pareto analysis II





Vilfredo Pareto in person...



Akira Ishikawa in person...