Ishikawa fishbone diagram

Ing.J.Skorkovský,CSc.
Department of Corporate Economy
ESF-MU Czech Republic

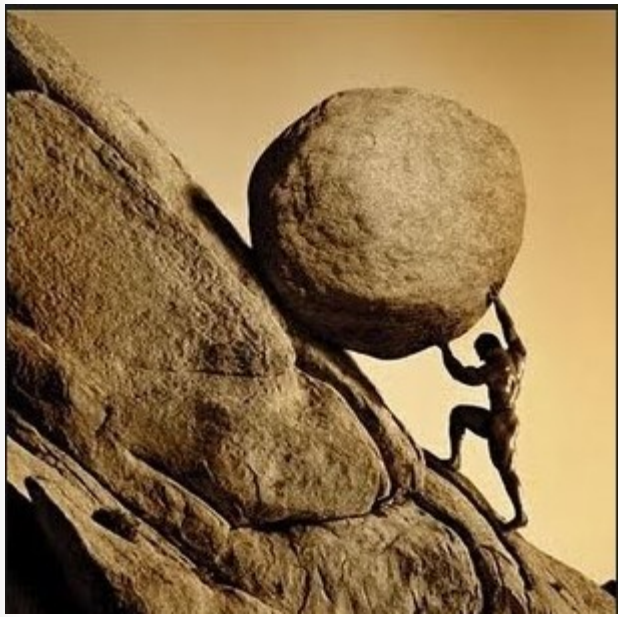
Introduction (FBD= fishbone diagram)

- FDB is a tool to find out relationships:

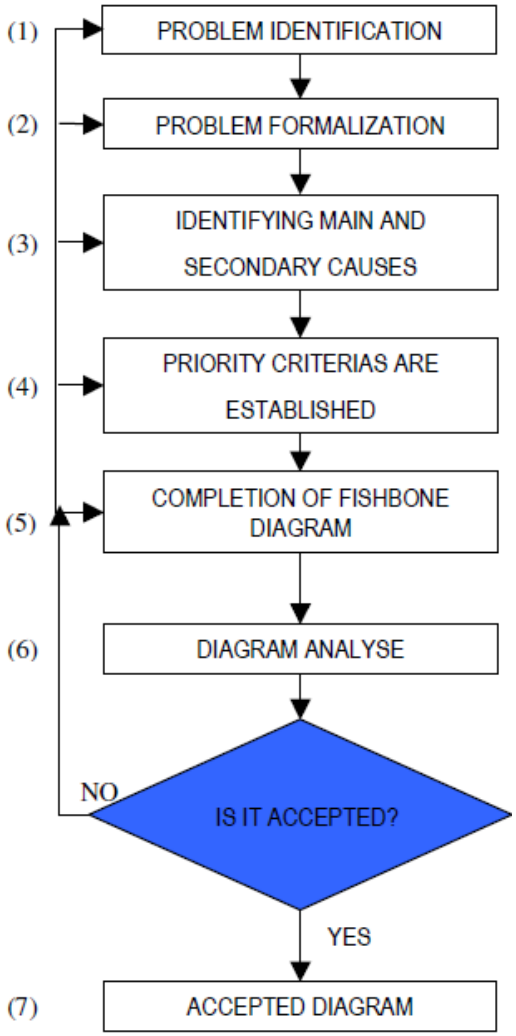
Cause → Effect

- Use in QM especially in automotive industry
- On 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

How to create FBD

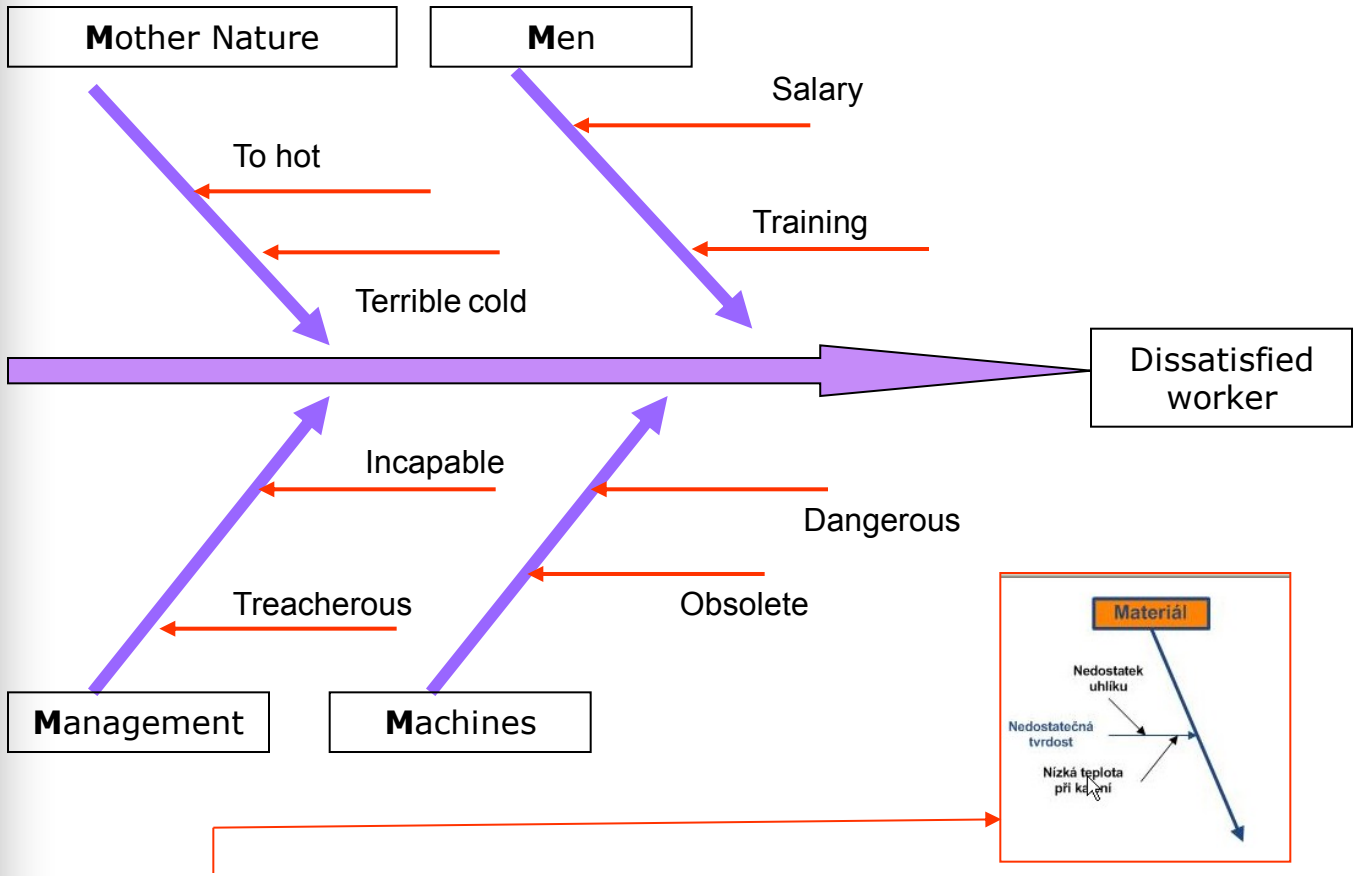


it might not be so easy !!!



Resource :**Ilie G. and. Ciocoiu C.N.**
APPLICATION OF FISHBONE DIAGRAM TO DETERMINE THE RISK OF AN EVENT WITH MULTIPLE CAUSES
MANAGEMENT RESEARCH AND PRACTICE Vol. 2 Issue 1 (2010) p: 1-20

Fishbone diagram



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

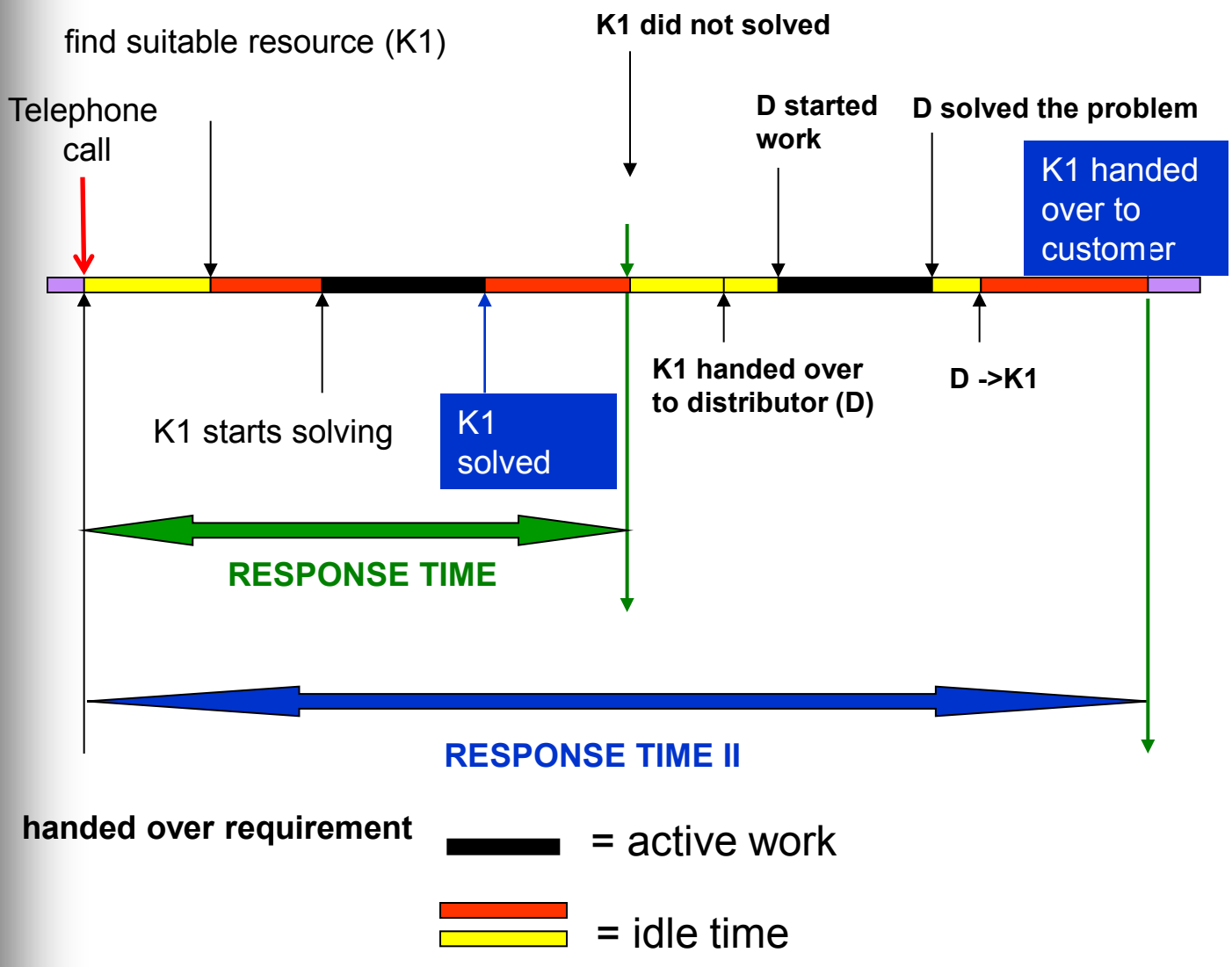
Some chosen problems which could be find out during ERP support process I

- 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

Mother Nature

Men

Good weather

Bad weather

Bad training

HR have a bad recruitment policy

Lower quality of the consultants

Consultant takes holiday

Phlegmatic person reacts later than expected

Consultant is on sick leave

Dissatisfied customer

Incapable

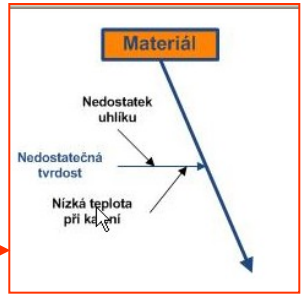
Bad communication

Interest in golf only

Bad SW for support (HELP DESK)

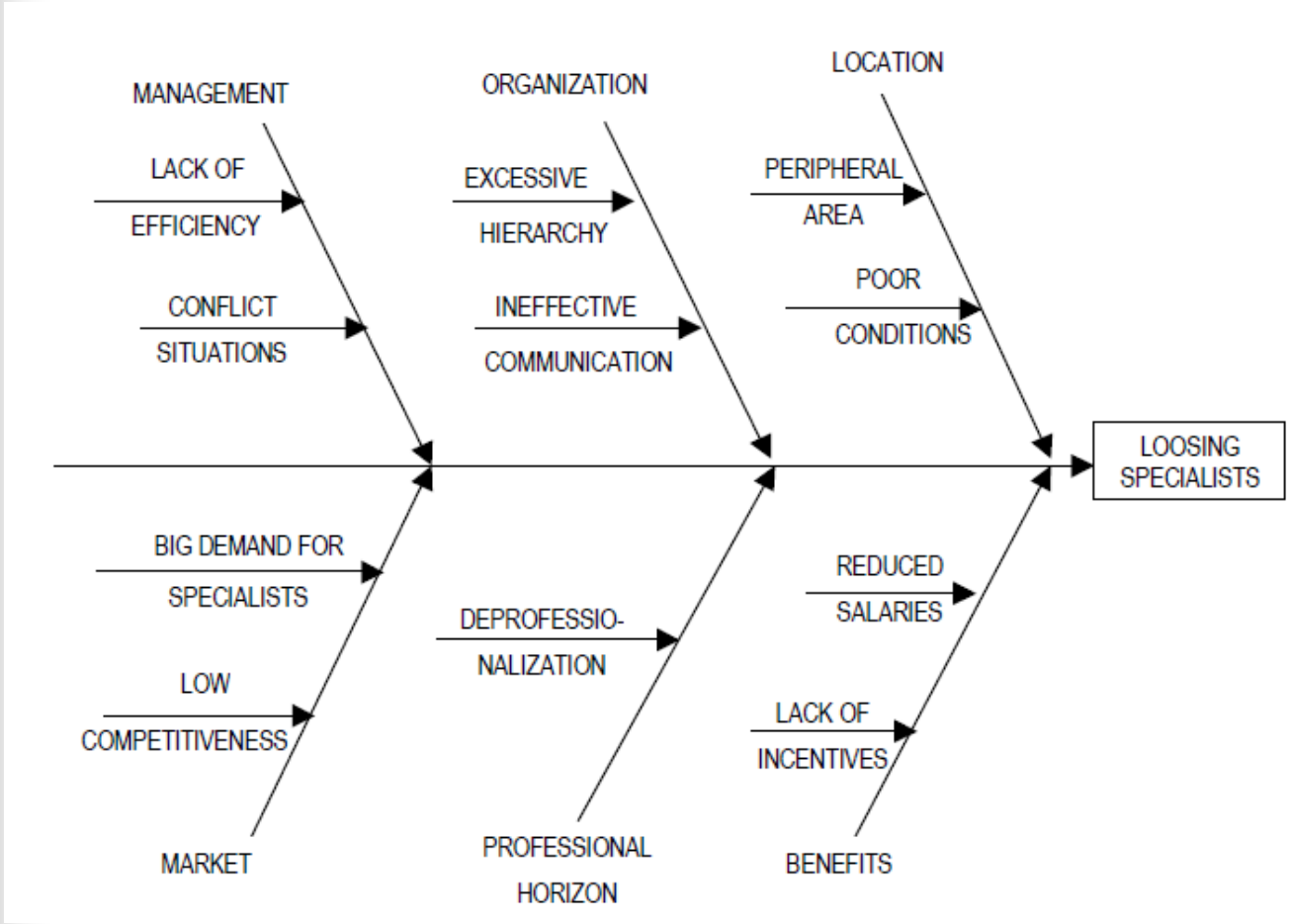
Management

Machines



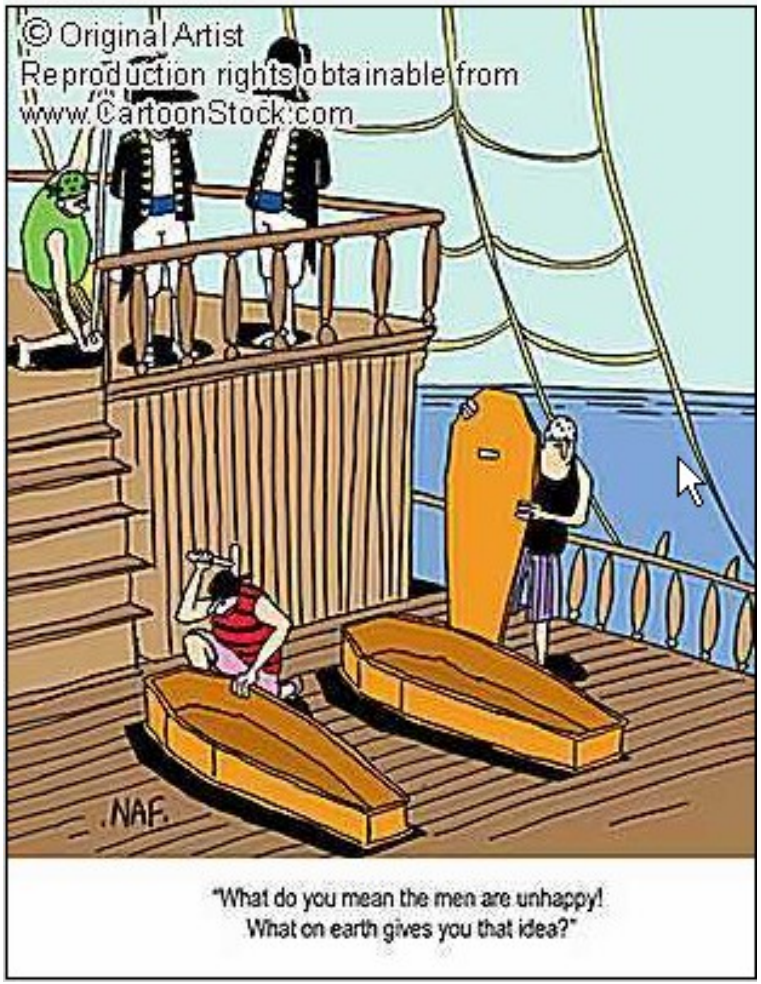
(Methods, **M**aterial, Manpower, Measurement, Machines)

FBD-Loosing Specialists-example



Dissatisfied employee I

Dissatisfied employee II



5WHYs

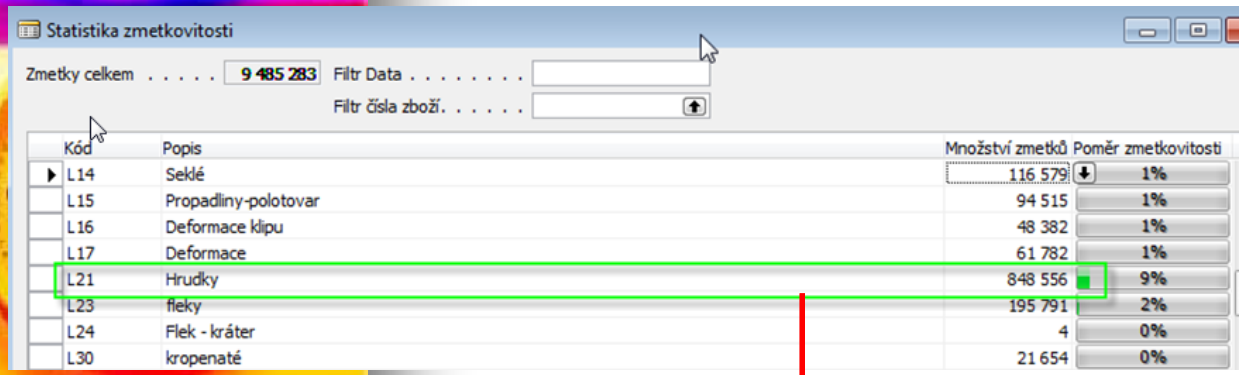
- WHY 1 :Why my car had stopped ?
- No petrol in tank
- WHY 2 :Why i did not have a petrol in my tank ?
- I did not buy in the morning on my way to work
  WHY 3 :Why i did not buy a petrol ?
- No money in my pockets
- WHY 4 : Why no money i my pockets?
- Evening poker
- WHY 5 : Why i did not win a poker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

5WHYs

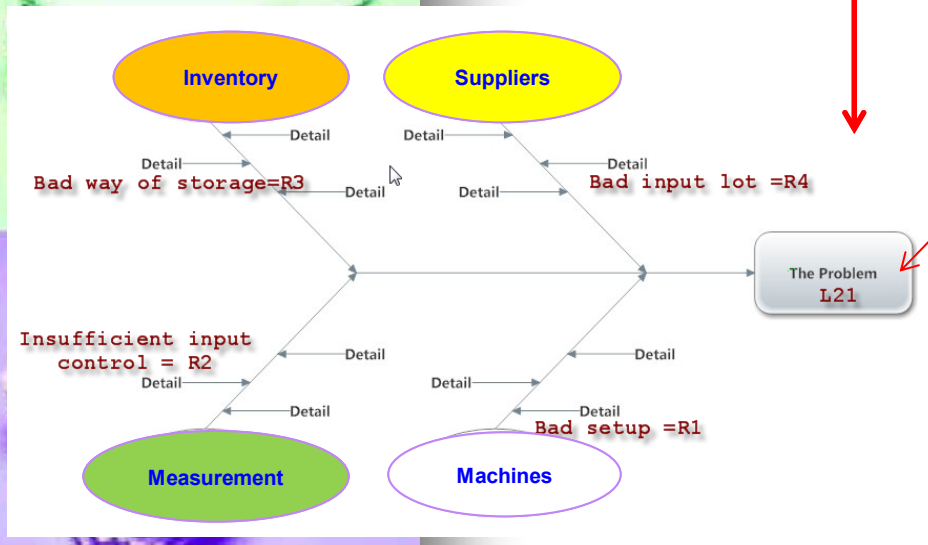
Cause

Effect

TQM and Ishikawa FBD and Pareto



- 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)

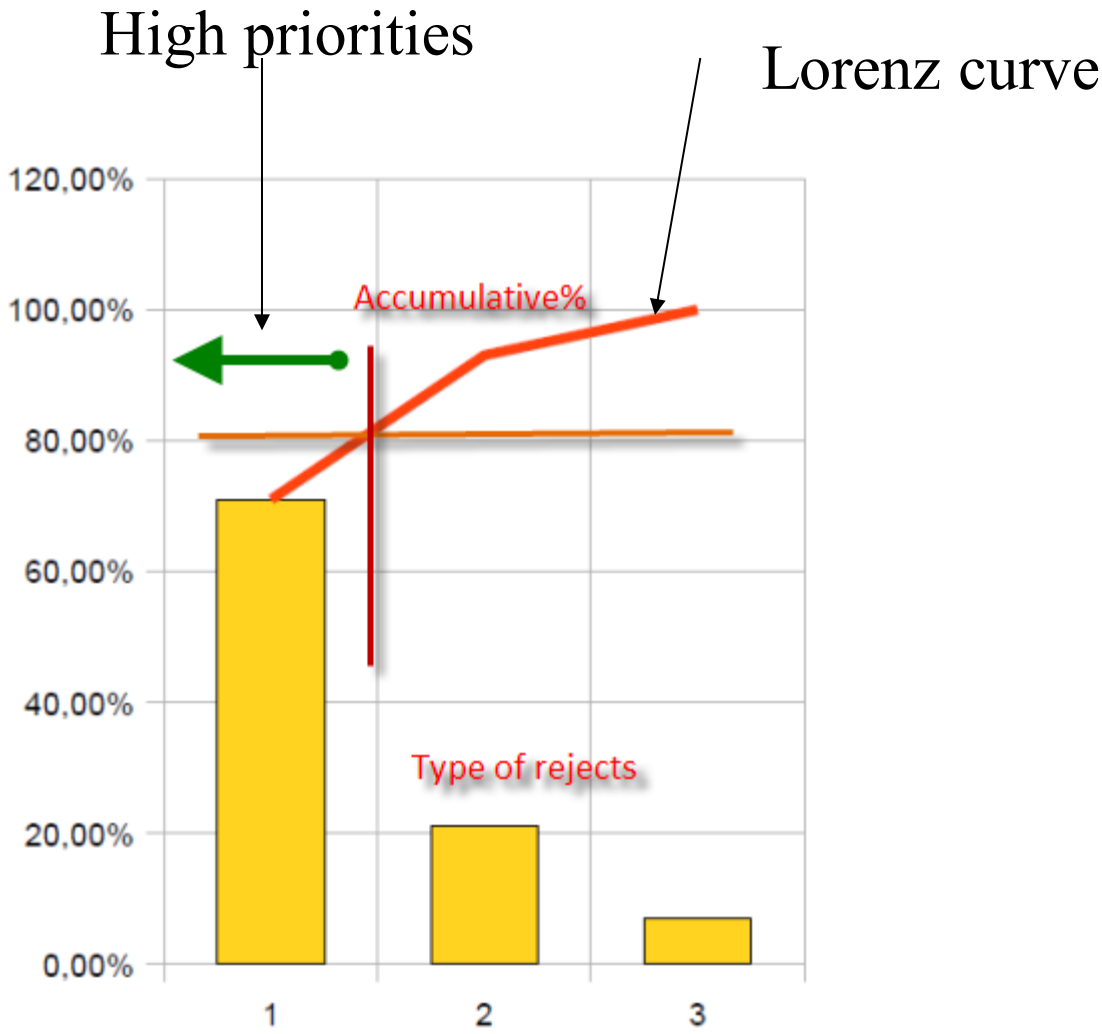
Every reject type ->one Ishikawa diagram (electronic version)

Evaluation of set of rejects

- Every reject is assigned to one Ishikawa tree
- Every tree with empty table is handed over to chosen company of responsible experts
- All tables are collected and evaluated
- See example with two rejects and two experts

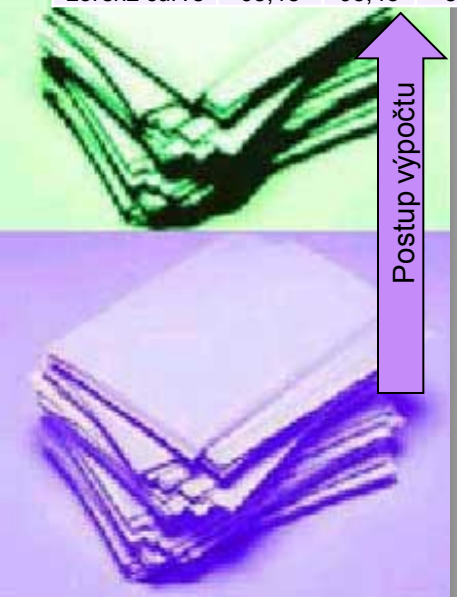
	Domain	Machines	Input control	Setup	Routing	Method	Breakdowns	Workers	Measurment
	Reject code								
	L1	3,5	9	6,5	2	2,5	6	3	1,5
	L2	9,5	2,5	2	5,5	6	8	3,5	2,5
Expert	Reject								
John	L1	3	8	9	3	2	7	2	1
Linda	L1	4	10	4	1	3	5	4	2
Expert	Reject								
John	L2	9	3	3	5	7	8	4	3
Linda	L2	10	2	1	6	5	8	3	2

Pareto chart : possibility to split up reject and setup priorities



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	31,82	9,09	18,18	4,54	36,36	0,00	100
Lorenz curve	68,18	95,45	86,36	100,00	36,36		



Postup výpočtu

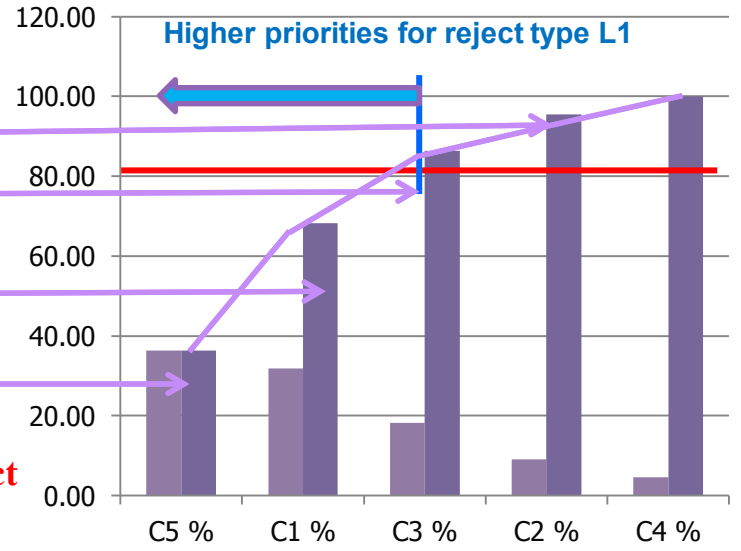
C4: 95,45 + 4,54=100

86,36 + 9,09 =95,45

68,18+18,18 = 86,36

36,36 + 31,82=68,18

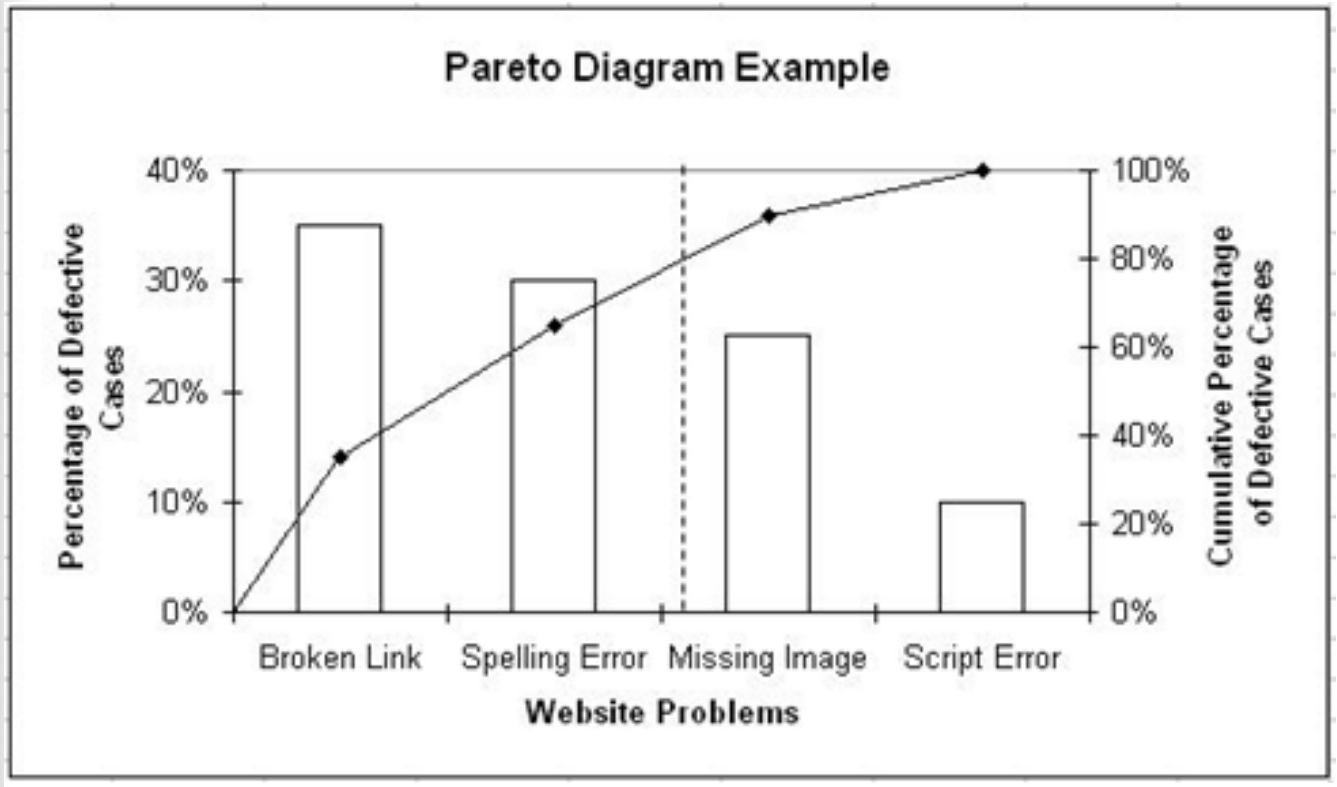
36,36



Firstly, it is necessary to correct causes of C5 a C1 !!!

80 | 20

Pareto analysis II

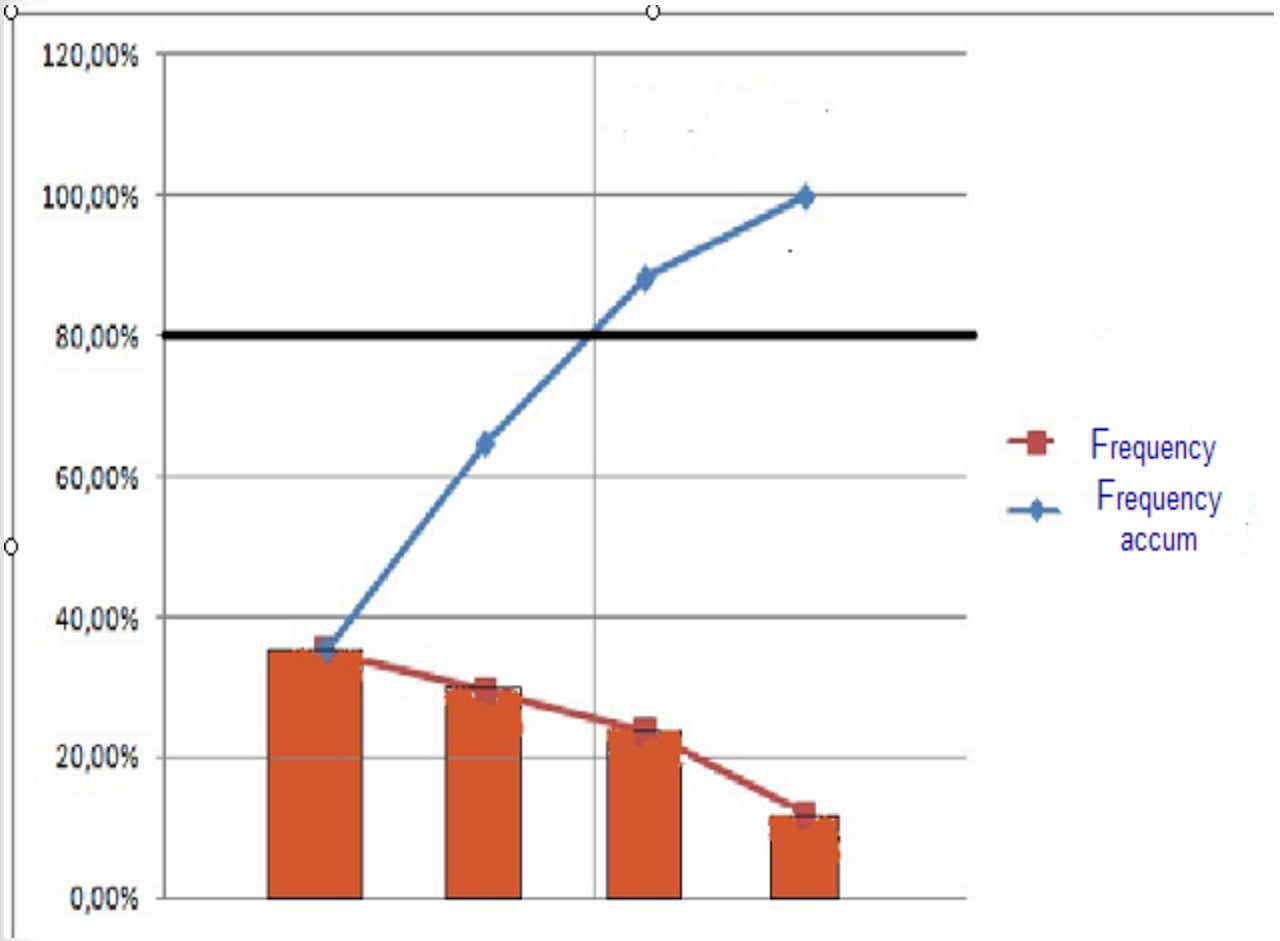


Pareto analysis II - data

- Difficulty
- Resignation
- Underestimation
- Low motivation

Frequency	Freq (%)	Freq accum(%)
6	35,29	35,29
5	29,41	64,71
4	23,53	88,24
2	11,76	100,00

Pareto analysis II



Current Reality Tree and Ishikava (Pareto)

12 Customer is unhappy

11 Project is late and overspend budget

10 Tasks are delayed

9 Bad multitasking

6 Overburdened resources

4 Late assignment of tasks to resources

8 Outdated project management method (SW)

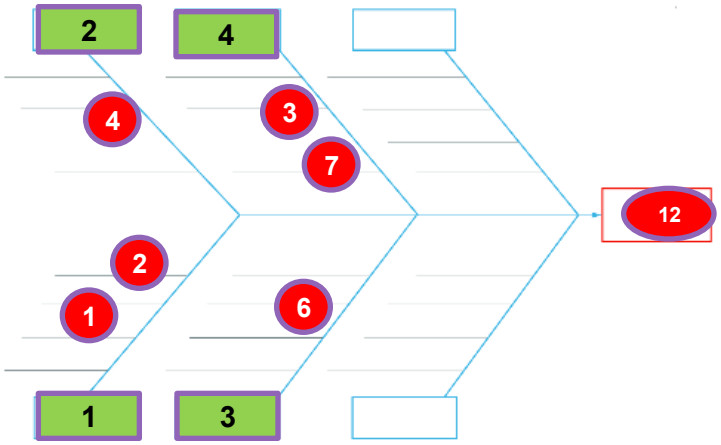
3 Inefficient communication tool (SW)

2 No investment in software

7 No workflow software (method and tool)

1 Cost Worlds Tendency

Root problem



1 = Management

2 = Methodology

3 = Men

4 = Machine (SW)

	1	2	3	4	6	7
John	8	7	4	3	5	6
Caroline	9	5	7	8	5	6
Mean	8,5	6	5,5	5,5	5	6

SW=software

Vilfredo Pareto in person…