CONTROL IN CONSTRUCTION MANAGEMENT

BUTE – Faculty of Architecture
Department of construction technology and management

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CM4
Controlling of construction technology

2014.04.28
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CONTROLLED ACTIVITIES

Overall control

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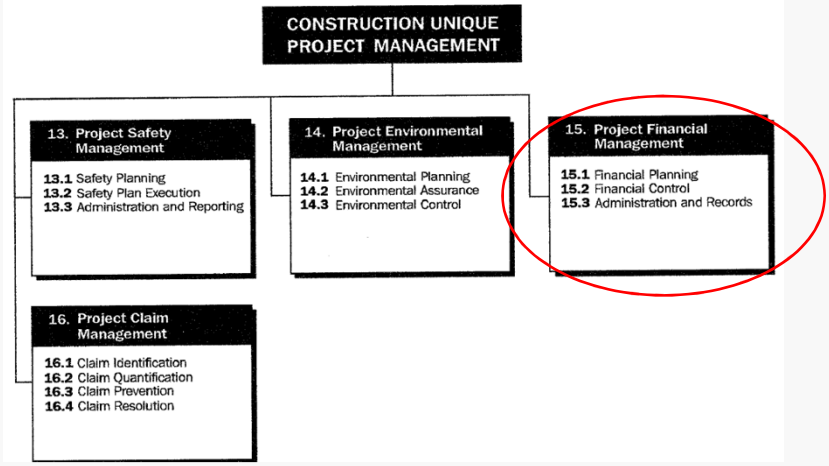
CONTROLLED ACTIVITIES

Overall control



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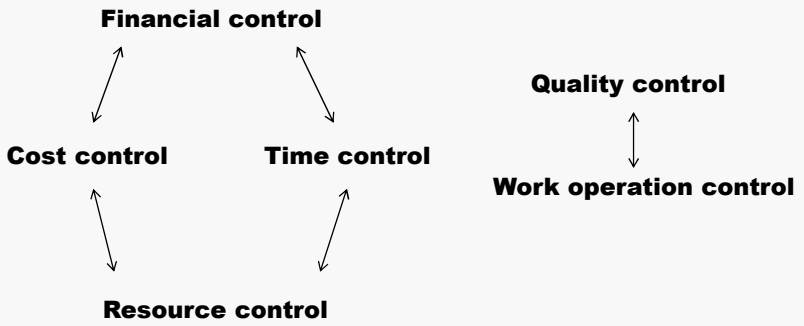
CONTROLLED ACTIVITIES

Overall control



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SCHEDULE CONTROL

Time monitoring

Inputs	Tools & Techniques	Outputs
.1 Project schedule .2 Performance reports .3 Change requests .4 Schedule management plan ***.5 Progress monitoring curves***	.1 Schedule change control system .2 Performance measurement .3 Additional planning .4 Project management software	.1 Schedule updates .2 Corrective action .3 Lessons learned ***.4 Progress curves updates***

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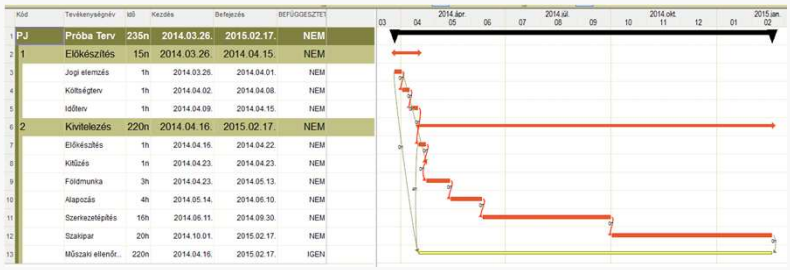
Time monitoring

TIME CONTROL

scheduleing + **daily controlling of the scehule**



Kód	Tevékenységnév	Idő	Kezdés	Befejezés	BEFÜGGŐSZTET
PJ	Próba Terv	235n	2014.03.26.	2015.02.17.	NEM
1	Előkészítés	15n	2014.03.26.	2014.04.15.	NEM
	Jogi elemzés	1h	2014.03.26.	2014.04.01.	NEM
	Költségterv	1h	2014.04.02.	2014.04.08.	NEM
	Időterv	1h	2014.04.09.	2014.04.15.	NEM
2	Kivitelezés	220n	2014.04.16.	2015.02.17.	NEM
	Előkészítés	1h	2014.04.16.	2014.04.22.	NEM
	Kitűzés	1n	2014.04.23.	2014.04.23.	NEM
	Földmunka	3h	2014.04.23.	2014.05.13.	NEM
	Alapozás	4h	2014.05.14.	2014.06.10.	NEM
	Szerkezetépítés	16h	2014.06.11.	2014.09.30.	NEM
	Szakipar	20h	2014.10.01.	2015.02.17.	NEM
	Műszaki ellenőr...	220n	2014.04.16.	2015.02.17.	IGEN

delays / early finshes ⟶ **schedule change**

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possible consequences – management tasks

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Time monitoring

TIME INFLUENCING FACTORS

material
grade
applied technology
technical circumstances

work capacity

norm

duartion of the construction activity

possible work hours / day

possible work days / week

3

Resource control

POSSIBLE ACTIONS IN CASE OF DELAY

- **increasing work capacity**
- **increasing working hours /day or week**
- **changing technology / material**
- **(?reducing grade?)**

3

Resource control

TIME-COST RELATIONS

calculation method

inputs

- **specific performance indicators of the construction works – (currancy unit / time unit / working unit)**

  e.g. 15 € / hour / worker

- **specific cost or cost proportions of the work activities / groups of activities (%)**

  e.g. cost of loadbearing walls = 4-5% of the total construction cost

3

Resource control

TIME-COST RELATIONS

Examples – specific performance indicators

groups of activities	*specific indicator*
bricklayer work	180-210 € /day/ worker
motorized work	400-480 € /day/ worker
wall and floor tiling	220-280 € /day/ worker
metal sheet worker	300-360 € /day/ worker
Painter works	280-320 € /day/ worker
building installation	360-440 € /day/ worker
assembly works	400-480 € /day/ worker
other	200-240 € /day/ worker

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Resource control

TIME-COST RELATIONS

Examples – specific cost proportions of the work activities

groups of activities	*approx. % of total construcion cost*
earthwork	3-5%
foundation	8-10%
loadbearing walls	10-14%
partition walls	10-12%
slabs	12-15%
roof structure and surface	14-16%
built-in furniture	5-8%
building installation	18-21%
extranal establishments	6-10%

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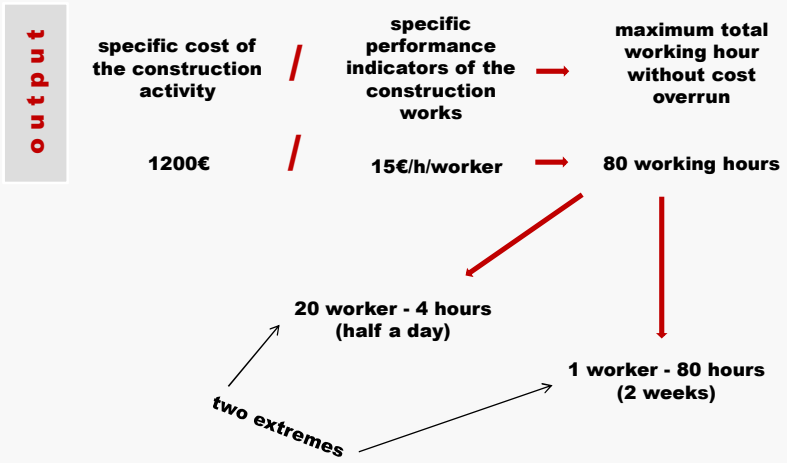
Resource control

TIME-COST RELATIONS

calculation method



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Cost monitoring

CONSEQUENCES OF TREATING DELAYS

- **extra cost of changing technology**
- **extra cost of increasing capacity**
  - **cost of the extra human resource**

    (extra working hours or workers)
  - **cost of the extra eqiupment**

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calculation required

cost monitoring – resource monitoring

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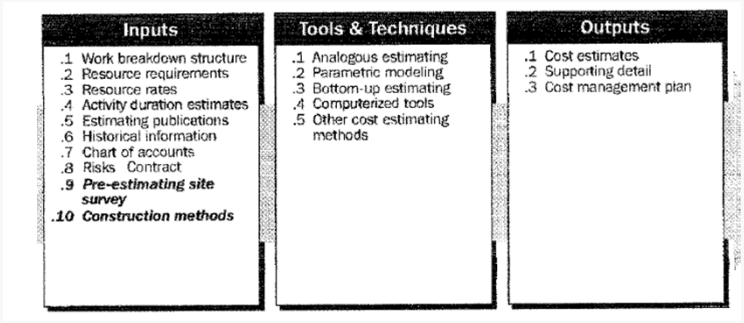
Cost monitoring

COST CONTROL IN GENERAL



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Cost monitoring

COST CONTROL

COST AND COMPARISON TO ESTIMATE REPORT

		Recorded Costs		Open Commitments	Cumulative Total	Continued Below
Acct.	Description	Period	Cumulative to date			
201	Concrete work	10,500	210,500	6,500	217,000	
301	Mechanical contract	300,000	5,400,000	80,000	5,480,000	
401	Electrical	110,000	2,300,000	120,000	2,420,000	

		Estimate to Complete	Estimate at Completion				Over (under)
Acct.	Description		Current	Previous	Incr.(Decr.)	Budget	Budget
201	Concrete work	51,000	268,000	250,000	18,000	260,000	8,000
301	Mechanical contract	120,000	5,600,000	5,600,000	0	5,600,000	0
401	Electrical	60,000	2,480,000	2,450,000	30,000	2,500,000	-20,000

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Cost monitoring

FINANCIAL PLANNING

Inputs	Tools & Techniques	Outputs
.1 Sources of funds .2 Contract requirements .3 Economic environment .4 Estimated construction cost .5 Project Duration .6 Tax benefits .7 Risk factors .8 Financial advisor	.1 Feasibility study .2 Financial advisor .3 Sensitivity analysis .4 Provision for added financing .5 Test the financial plan	.1 Project financial plan .2 Legal entity .3 Expenditure authority

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Cost monitoring

FINANCIAL CONTROL

Inputs	Tools & Techniques	Outputs
.1 Contract requirements .2 Project financial plan .3 Cost and revenue benefits .4 Change requests	.1 Project accounting systems .2 Internal and external audits .3 Cash flow analysis .4 Financial reports	.1 Corrective action

3

Cost monitoring

FINANCIAL CONTROL

actulized cash-flow plan

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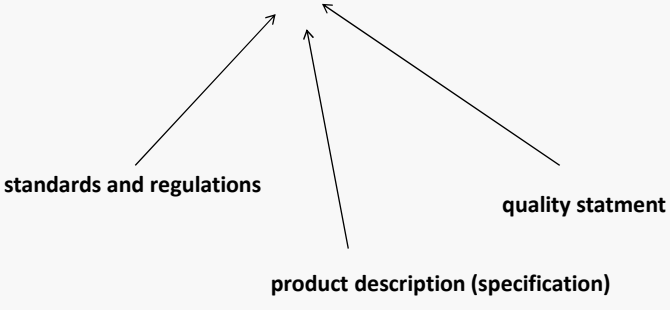
Quality control

QUALITY ASSURANCE DURING THE CONSTRUCTION

Aim:

to ensure to safisfy the needs of the project, for witch it was undertken



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QUALITY ASSURANCE DURING THE CONSTRUCTION

Quality control

Quality and Grade

low quality – oparation faileurs, functional problems

low grade – selection of less durable, less noble surfaces, materils

low grade – high quality ☺

high grade - low quality ☹

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QUALITY ASSURANCE

Quality control

participant	*contolling process*	*contolling aspect*	
client	quality surveyor	every aspect	INNER CONTROLLING
designers	architectural supervision	aesthetical quality/ accordance with the plan	
contractor	daily controlling routine	every aspect	
authority	before construction,after hand over	accordance with the plan	OUTER CONTROLLING
state	during the construction	every legal aspect	

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QUALITY ASSURANCE AND CONTROL

Quality control

Who does it? Who is responsible?

- **forman**
- **general forman**
- **site manager**

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QUALITY ASSURANCE AND CONTROL

Quality control

applied standard ⟷ **executed work**

work-operation control ✚ **inspection of the executed work**

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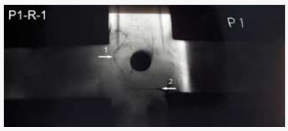
Quality control

WAYS OF QUALITY CONTROL

Tools for inspection:

- **performance control**
- **sampling (statistical sampling)**
- **non-destructive testing (e.g. Ultra sonic or X-ray tests)**
- **trend analyses**



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Quality control

PERFORMANCE CONTROL

e.g. - masonry wall

- **measurents**
- **plumb / level**
- **alignement**
- **right angles**

4

Quality control

PERFORMANCE CONTROL

e.g. – tiled surface

- **plumb / level**
- **aligment**
- **joints**

4

Quality control

PERFORMANCE CONTROL

e.g. – carpentry structure / joinery work

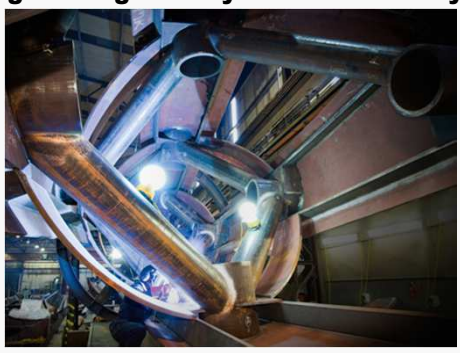
- **measurents**
- **joints**
- **alignements**

5

Work opration control

OPERATION CONTROL

Engineering activity for the assembly



- **in case of complicated spacial structures**
- **3D computer model**
- **laser beam control for the assembly**

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Sources

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