Scheduling Network exercise

Composing an MPM network

• Placing the shields
  Loadbearing structures
  Building installations
  Finishing works
Composing an MPM network

• Visualising technological conditions

I. Loadbearing structures
II. Building installations
III. Finishing works

Composing an MPM network

• Visualising organisational conditions

I. Loadbearing structures
II. Building installations
III. Finishing works
Composing an MPM network

• Checking network

I. Loadbearing structures
II. Building installations
III. Finishing works
End

• Adding durations

I. Loadbearing structures
II. Building installations
III. Finishing works
End
Time analysis

• Calculating forwards - starting

I. Loadbearing structures
   0 • 4 • FS0
   4 • FS0

II. Building installations
   4 • FS0
   4 • FS0
   CR3 • CR3

III. Finishing works
   6 •
   7 •
   8 •

End

Time analysis

• Calculating forwards – in the direction of the arrows

I. Loadbearing structures
   0 • 4 • FS0
   4 • FS0

II. Building installations
   4 • FS0
   4 • FS0
   CR3 • CR3

III. Finishing works
   6 •
   7 •
   8 •

End
Time analysis

• Calculating forwards – in the direction of the arrows

I.

0 4 4
FS0

II.

4 3 7
FS0

III.

5
FS0

Loadbearing structures

Building installations

Finishing works

End
Time analysis

- Calculating forwards – in the direction of the arrows

I. II. III.

Loadbearing structures

Building installations

Finishing works

End
Time analysis

- Calculating forwards – in the direction of the arrows

I. Loadbearing structures
II. Building installations
III. Finishing works

End
Time analysis

- Calculating forwards – CR3

I. Loadbearing structures

II. Building installations

III. Finishing works

End

Time analysis

- Calculating forwards – CR3 → SS3

I. Loadbearing structures

II. Building installations

III. Finishing works

End
Time analysis

- Calculating forwards – CR3 \(\rightarrow\) SS3

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1. Loadbearing structures
2. Building installations
3. Finishing works
4. End

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Time analysis

- Calculating forwards – CR3 \(\rightarrow\) SS3

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1. Loadbearing structures
2. Building installations
3. Finishing works
4. End
Time analysis

• Calculating forwards – choosing the maximum

I. Loadbearing structures

II. Building installations

III. Finishing works

End

Calculating forwards

• Early dates
• Appointed starting date
• Proceeding in the direction of the arrows
• Maximal values

Calculating backwards

• Late dates
• Appointed finishing date
• Proceeding against the arrows
• Minimal values

SAME ORDER OF STEPS!
Time analysis

• Calculating backwards – appointing finishing date

I. FS0
II. FS0
III. FS0

Loadbearing structures
Building installations
Finishing works
End

Time analysis

• Calculating backwards – against the arrows

I. FS0
II. FS0
III. FS0

Loadbearing structures
Building installations
Finishing works
End
Time analysis

- Calculating backwards – against the arrows

I. Loadbearing structures
   0 4 4
   FSO
   4 3 7
   FSO
   7 5 12

II. Building installations
   4 4 8
   FSO
   8 4 12
   FSO
   12 4 16
   CR3 (SS3)
   11 7 18
   CR3 (SS3)
   15 8 23
   CR3 (SS3)

III. Finishing works
   7 6 13
   11 16 23
   15 15 23

End
   23 0 23
   23 23

Time analysis

- Calculating backwards – against the arrows

I. Loadbearing structures
   0 4 4
   FSO
   4 3 7
   FSO
   7 5 12

II. Building installations
   4 4 8
   FSO
   8 4 12
   FSO
   12 4 16
   CR3 (SS3)
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   CR3 (SS3)
   15 8 23
   CR3 (SS3)

III. Finishing works
   7 6 13
   11 17 23
   15 15 23

End
   23 0 23
   23 23
Time analysis

• Calculating backwards – against the arrows

I. Loadbearing structures

II. Building installations

CR3 (SS3)

III. Finishing works

End

Time analysis

• Calculating backwards – against the arrows

I. Loadbearing structures

II. Building installations

CR3 (SS3)

III. Finishing works

End
Time analysis

• Calculating backwards – choosing the minimum

I. Loadbearing structures
   0 4 4 FS0
   4 4 8 FS0
   7 6 13 CR3 (SS3)
   23 End

II. Building installations
   4 3 7 FS0
   8 4 12 FS0
   11 7 18 CR3 (SS3)
   23 End

III. Finishing works
   4 FS0
   8 CR3 (SS3)
   15 CR3 (SS3)
   23 End
Time analysis

• Calculating backwards – choosing the minimum

I. Loadbearing structures
II. Building installations
III. Finishing works

End

I. Loadbearing structures
II. Building installations
III. Finishing works

End
Time analysis

• Calculating backwards – choosing the minimum

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<thead>
<tr>
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<td>Finishing works</td>
<td>CR3 (SS3)</td>
<td>11 18</td>
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<tr>
<td>End</td>
<td>23 23</td>
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Time analysis

• Checking the network

• Getting back 0 as the starting date

• Late date ≥ early date
Analysing the network

• Float – total float

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<td>0 4 4</td>
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<td>FSO</td>
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<tr>
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<td>8 0 12</td>
<td>12 4 16</td>
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<td>7 6 13</td>
<td>11 7 18</td>
<td>15 8 23</td>
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<tr>
<td>Works</td>
<td>17 10 23</td>
<td>15 23</td>
<td>15 0 23</td>
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Analysing the network

• Critical nodes

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Analysing the network

• Critical edges

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Analysing the network

• Critical path

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Analysing the network

• Modifying the network
  • When?
    • During the planning phase
    • During the construction – according to actual data
  • Why?
    • To reduce the total duration
    • Delay in the preceding activities → keeping end deadline
  • How?
    • Changing activity durations in the critical path
    • Changing relations in the critical path
      • Allowing greater overlapping
      • Using more resources (e.g. labour) → eliminating relations

Modifying the network

• Changing activity duration

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<td>12 4 16</td>
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<tr>
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Modifying the network

• Changing activity duration

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Modifying the network

• Changing activity duration in the critical path

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Modifying the network

• Changing activity duration in the critical path

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Modifying the network

- Changing activity duration in the critical path

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MPM network ➔ bar chart