

# FOLDER 3

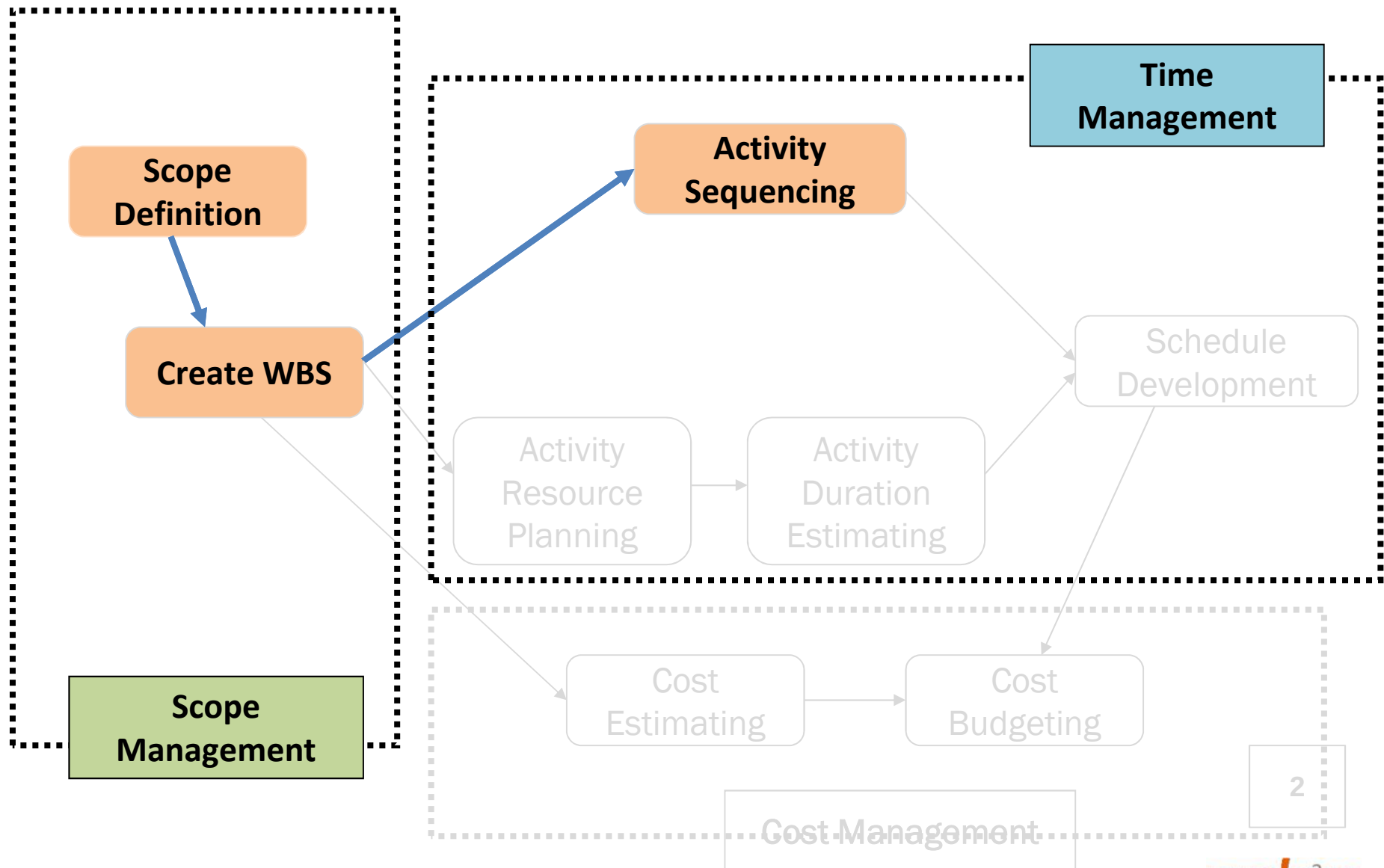
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## PENGURUSAN MASA

- Activity Sequencing



# key planning process for scheduling & estimating..



# Activity Sequencing

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**Menentukan turutan /  
hubungan logik di antara aktiviti/kerja  
projek**



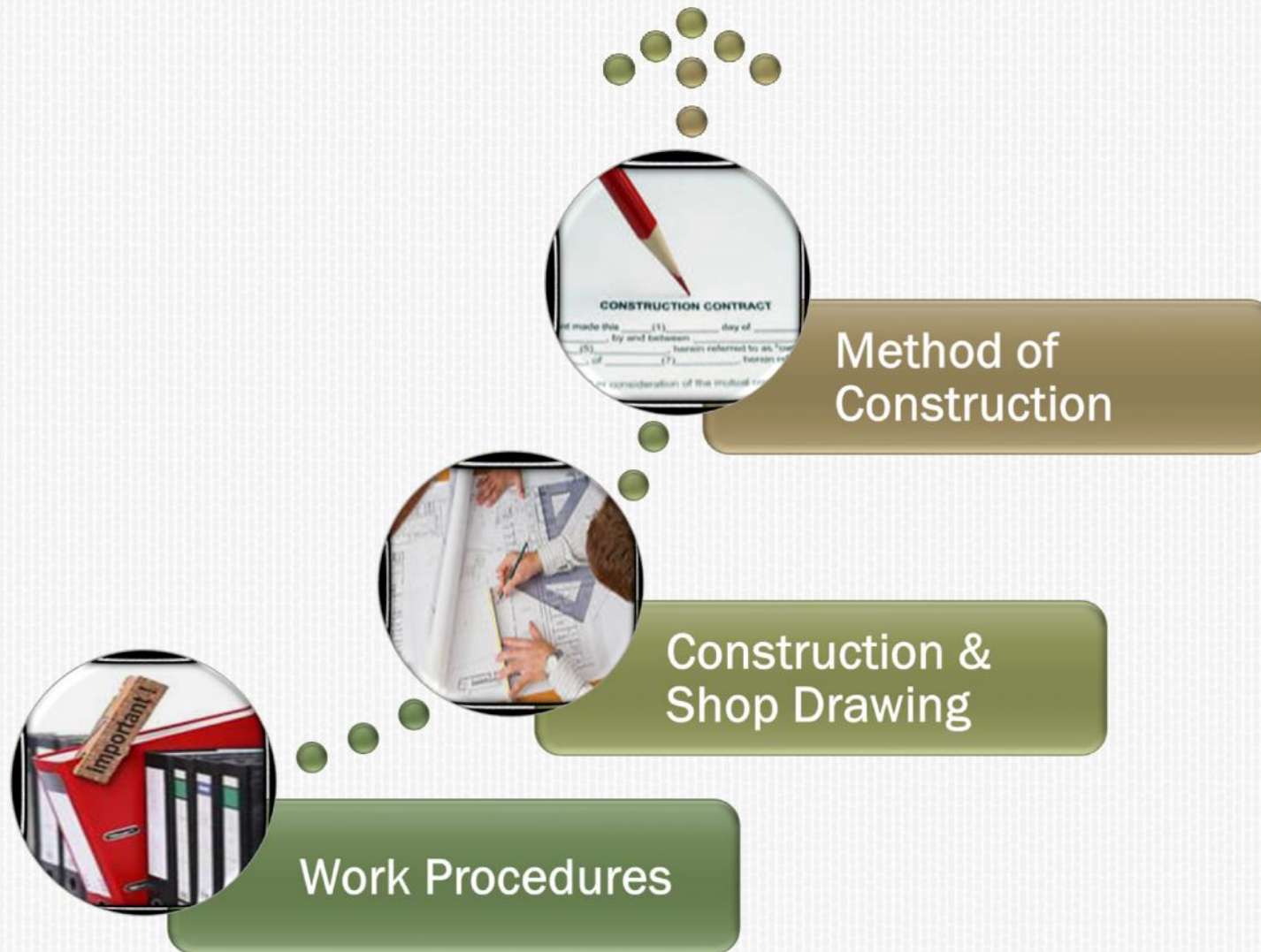
# Bagaimana Menentukan Susunan Cara Kerja??..

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- 1. Method statements**
- 2. Predecessor**
- 3. Successor**
- 4. Link type**
- 5. Lead time**
- 6. Lag time**
- 7. Task constraint**
- 8. Network diagram**



# 1 : METHOD STATEMENT



## 2 & 3 : PREDECESSOR & SUCCESSOR

2

**Predecessor**

- Kerja mesti mula / siap sebelum kerja seterusnya bermula / siap

3

**Successor**

- Kerja di mana bermula / siapnya bergantung kepada mula / siap kerja yang sebelumnya

**Predecessor**

**Akt. A**



**Akt. B**

**Successor**

## 2 & 3 : PREDECESSOR & SUCCESSOR

### CONTOH:



Suc : ujian

Pre : pasang

Suc : guna

Pre : ujian

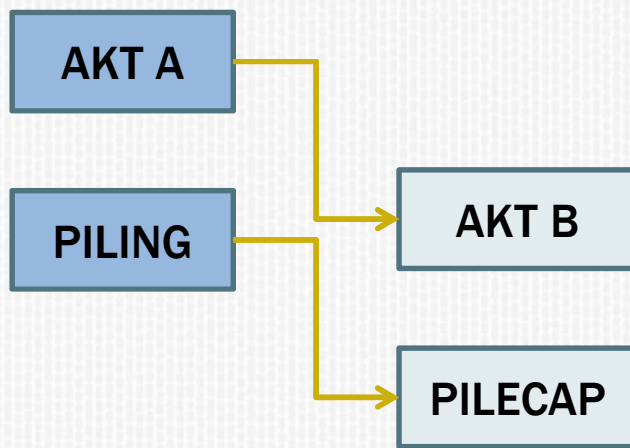


## 4 : LINK (HUBUNGAN)

4.1

**FS** – Finish to Start

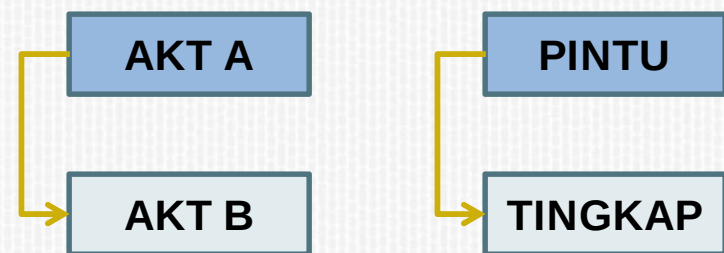
- Akt. B Tidak Boleh Mula Sehingga Akt. A Siap.



4.2

**SS** – Start to Start

- Akt. B tidak boleh mula sehingga Akt. A mula

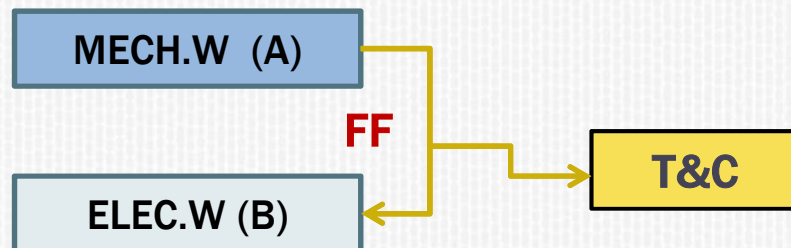


## 4 : LINK (HUBUNGAN)

### 4.3

#### FF – Finish to Finish

- Akt. A & B perlu siap untuk mula Aktiviti seterusnya

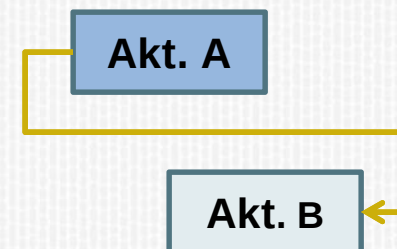


9

### 4.4

#### SF – Start to Finish

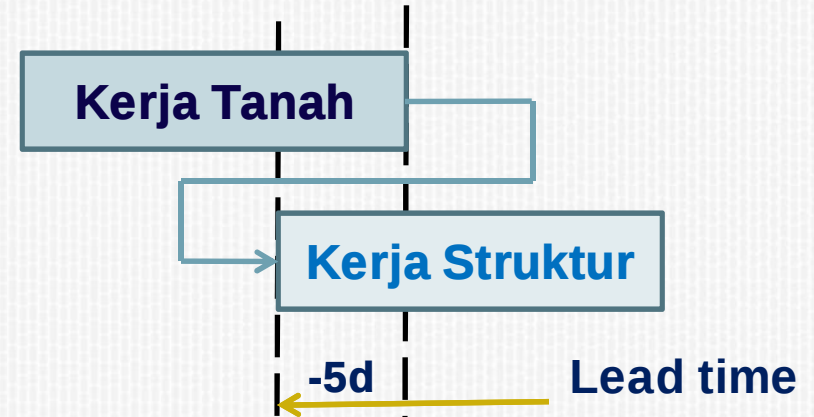
- Akt. B tidak boleh siap sebelum akt. A mula. Akt. B bergantung kepada bila mulanya Akt. A
- Sesuai untuk 4M (bahan, pekerja, mesin, sumber)



## 5 & 6 : LEAD & LAG

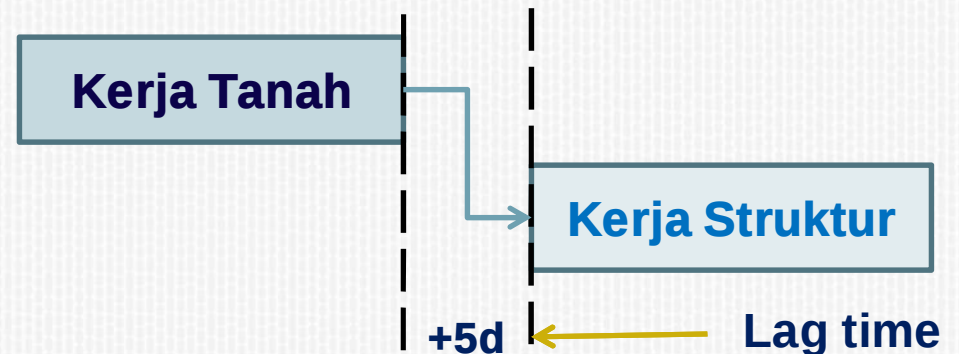
- **Lead Time** – awalkan kerja (cth: kerja struktur awal 5 hari)

**FS – 5d**



- **Lag Time** – lewatkan kerja (cth: kerja struktur lewat 5 hari)

**FS + 5d**



# 7 : TASK CONSTRAINT



- i. **ASAP : A Soon As Possible (Kaedah penjadualan)**  
Schedule method base on Project Start Date  
Pass

Forward

- i. **ALAP : As Late As Possible (Kaedah penjadualan)**  
Schedule method based on Project Finish Date  
Backward Pass

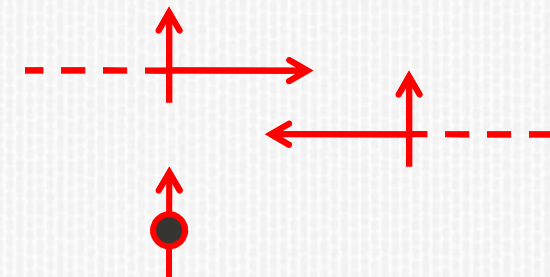
- i. **SNET : Start Not Earlier Than**  
cth: kerja boleh mula pd 24/8 tetapi sebelum  
24/8 tidak boleh buat



- ii. **SNLT : Start Not Late Than**  
cth: kerja boleh mula pd 24/8 tetapi  
selepas 24/8 tidak boleh buat



- iii. **FNET : Finish Not Earlier Than**  
iv. **FNLT : Finish Not Late Than**  
v. **MSO : Must Start On**  
vi. **MFO : Must Finish On**



# 7 : TASK CONSTRAINT

File Task Resource Project View Add-Ins Format

Calibri 10 0% 25% 50% 75% 100% Mark on Track Respect Links Inactivate Manually Schedule Auto Schedule Inspect Move Mode Task Information Properties

View Clipboard Font Schedule Tasks Insert Properties

|    | Task | WBS      | Task Name | Duration | Start | Finish | Predecessors |
|----|------|----------|-----------|----------|-------|--------|--------------|
| 1  |      | 1        |           |          |       |        |              |
| 2  |      | 1.1      |           |          |       |        |              |
| 3  |      | 1.2      |           |          |       |        |              |
| 4  |      | 1.2.1    |           |          |       |        |              |
| 5  |      | 1.2.2    |           |          |       |        |              |
| 6  |      | 1.2.3    |           |          |       |        |              |
| 7  |      | 1.2.4    |           |          |       |        |              |
| 8  |      | 1.2.4.1  |           |          |       |        |              |
| 9  |      | 1.2.4.2  |           |          |       |        |              |
| 10 |      | 1.2.4.3  |           |          |       |        |              |
| 11 |      | 1.2.4.4  |           |          |       |        |              |
| 12 |      | 1.2.4.5  |           |          |       |        |              |
| 13 |      | 1.2.4.6  |           |          |       |        |              |
| 14 |      | 1.2.4.7  |           |          |       |        |              |
| 15 |      | 1.2.4.8  |           |          |       |        |              |
| 16 |      | 1.2.4.9  |           |          |       |        |              |
| 17 |      | 1.2.4.10 |           |          |       |        |              |
| 18 |      | 1.2.4.11 |           |          |       |        |              |
| 19 |      | 1.2.4.12 |           |          |       |        |              |
| 20 |      | 1.2.4.13 |           |          |       |        |              |
| 21 |      | 1.2.4.14 |           |          |       |        |              |
| 22 |      | 1.2.4.15 |           |          |       |        |              |
| 23 |      | 1.2.4.16 |           |          |       |        |              |

Task Information

General Predecessors Resources Advanced Notes Custom Fields

Name: Progress Report 6 Duration: 1 day ☐ Estimated

Constrain task

Deadline: NA

Constraint type: Start No Earlier Than As Late As Possible As Soon As Possible Finish No Earlier Than Finish No Later Than Must Finish On Must Start On Start No Earlier Than Start No Later Than

Constraint date: Tue 10/05/11

Task type: ☐ Effort driven ☐ Scheduling ignores resource calendars

Calendar:

WBS code:

Earned value method

☐ Mark task as milestone

Help OK Cancel

| Task               | Duration | Start        | Finish       |
|--------------------|----------|--------------|--------------|
| Progress Report 11 | 1 day    | Tue 19/07/11 | Tue 19/07/11 |
| Progress Report 12 | 1 day    | Tue 02/08/11 | Tue 02/08/11 |
| Progress Report 13 | 1 day    | Tue 16/08/11 | Tue 16/08/11 |
| Progress Report 14 | 1 day    | Tue 30/08/11 | Tue 30/08/11 |
| Progress Report 15 | 1 day    | Tue 13/09/11 | Tue 13/09/11 |
| Progress Report 16 | 1 day    | Tue 27/09/11 | Tue 27/09/11 |

# 7 : TASK CONSTRAINT

|    |   |                                                                   |                            |         |            |            |
|----|---|-------------------------------------------------------------------|----------------------------|---------|------------|------------|
|    |   | 1.2.3                                                             | Maintenance of Site Office | 50 days | 05 Jan '11 | 30 May '11 |
| 9  | 🔄 | 1.2.4                                                             | [-] Laporan Kemajuan       | 83 days | 25 Jan '11 | 26 May '11 |
| 10 | 📅 | 1.2.4.1                                                           | Laporan Kemajuan 1         | 2 days  | 25 Jan '11 | 26 Jan '11 |
| 11 | 📅 | 1.2.4.2                                                           | Laporan Kemajuan 2         | 2 days  | 27 Feb '11 | 28 Feb '11 |
| 12 | 📅 | 1.2.4.3                                                           | Laporan Kemajuan 3         | 2 days  | 27 Mar '11 | 28 Mar '11 |
| 13 | 📅 | 1.2.4.4                                                           | Laporan Kemajuan 4         | 2 days  | 25 Apr '11 | 26 Apr '11 |
| 14 | 📅 | 1.2.4.5                                                           | Laporan Kemajuan 5         | 2 days  | 25 May '11 | 26 May '11 |
| 15 |   | 1.3                                                               | Land Acquisition           | 0 days  | 01 Jan '11 | 01 Jan '11 |
| 16 |   | 1.4                                                               | Services Relocation        | 0 days  | 01 Jan '11 | 01 Jan '11 |
| 17 |   | 1.5                                                               | [-] Block A                | 95 days | 10 Jan '11 | 30 May '11 |
| 18 | 📅 | 1.5.1                                                             | Kerja Tanah                | 42 days | 10 Jan '11 | 14 Mar '11 |
| 19 | 📅 | This task has a 'Start No Earlier Than' constraint on 10 Jan '11. |                            | 33 days | 23 Feb '11 | 10 Apr '11 |
| 20 | 📅 |                                                                   |                            | 43 days | 29 Jan '11 | 30 May '11 |
| 21 |   | 1.5.4                                                             | Kerja M&E                  | 30 days | 24 Mar '11 | 05 May '11 |
| 22 |   | 1.6                                                               | [-] Block B                | 96 days | 09 Jan '11 | 30 May '11 |
| 23 |   | 1.6.1                                                             | Kerja Tanah                | 55 days | 09 Jan '11 | 30 Mar '11 |

- Kalau ada constraint... tanya kontraktor kenapa
- Akan beri kesan kepada tarikh projek siap

## 8 : NETWORK DIAGRAM

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### Activity On Node (AON)



### 4 Jenis Hubungan

1. Finish to Start (FS)
2. Start to Start (SS)
3. Finish to Finish (FF)
4. Start to Finish (SF)

# MICROSOFT PROJECT



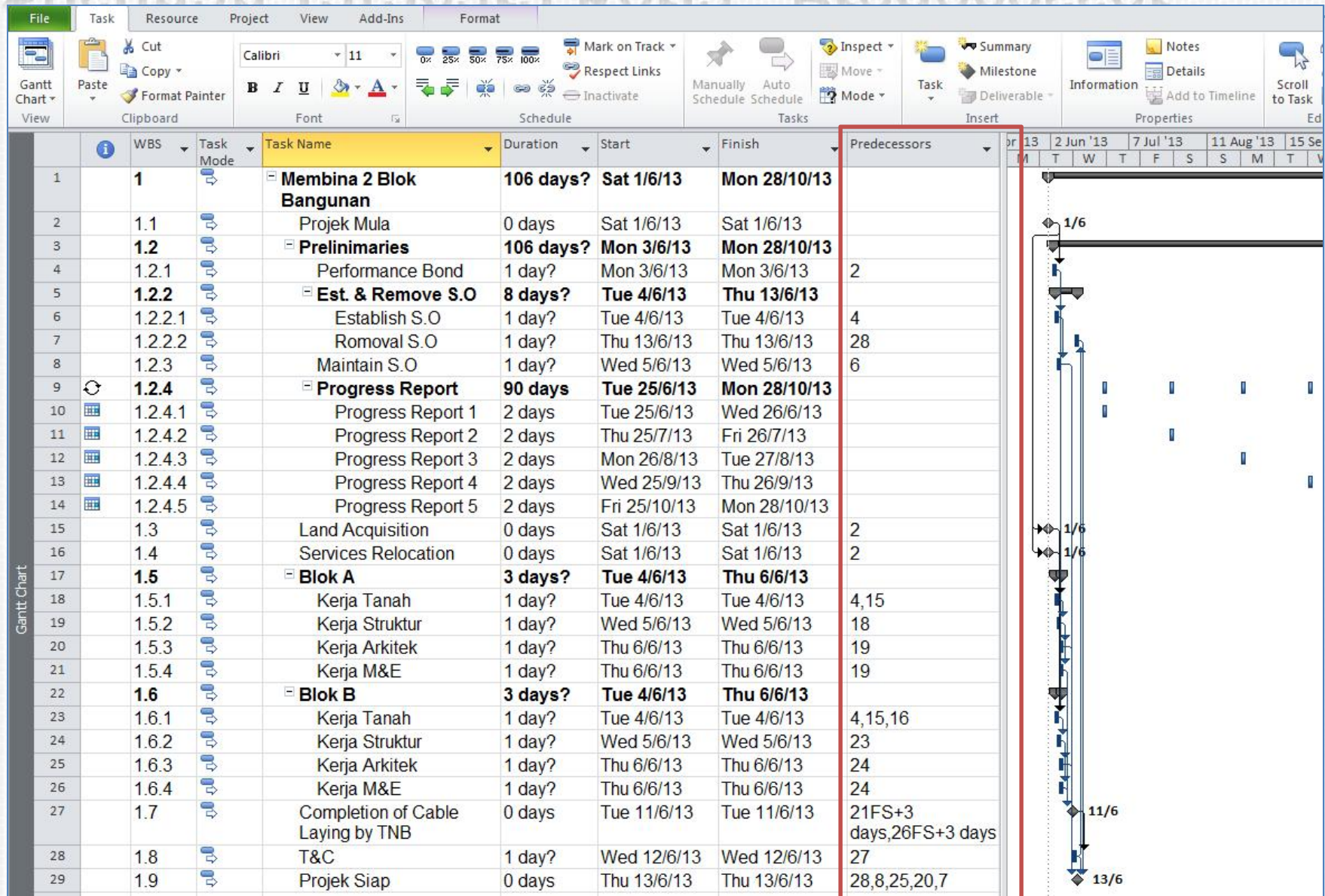
# Menambahbaik 'Link Line'

The screenshot displays the Microsoft Project interface. The 'Format' ribbon is active, showing various task formatting options. A task list is visible on the left, and a Gantt chart is on the right. A 'Layout' dialog box is open, showing the 'Links' section. Red callout boxes are used to highlight key elements:

- 1**: Points to the 'Format' ribbon.
- 2**: Points to the 'Link Line' icon in the 'Format' ribbon.
- 3**: Points to the 'Links' section in the 'Layout' dialog box.
- 4**: Points to the 'OK' button in the 'Layout' dialog box.

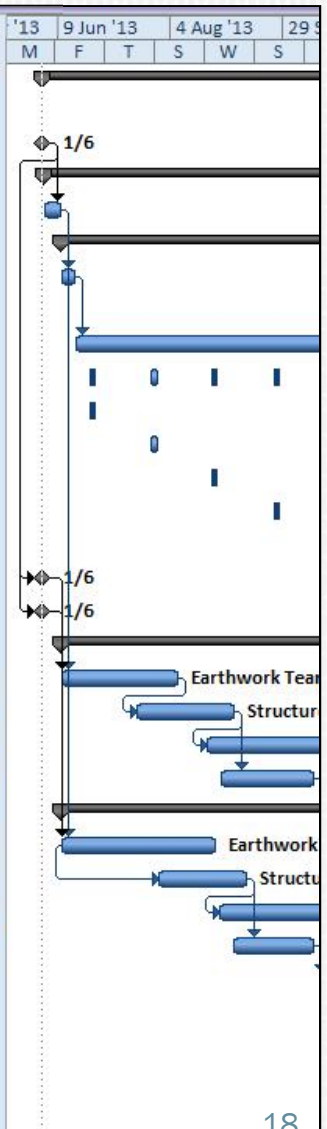
| Task Mode | Task Name                         | Duration | Start        | Finish       | Predecessors             |
|-----------|-----------------------------------|----------|--------------|--------------|--------------------------|
| 1         | Membina 2 Blok Bangunan           | 102 days | Sat 1/6/13   | Wed 30/10/13 |                          |
| 2         | Projek Mula                       | 0 days   | Sat 1/6/13   | Sat 1/6/13   |                          |
| 3         | Preliminaries                     | 102 days | Sun 2/6/13   | Wed 30/10/13 |                          |
| 4         | Performance Bond                  | 5 days   | Sun 2/6/13   | Sun 9/6/13   | 2                        |
| 5         | Est. & Remove S.O                 | 97 days  | Mon 10/6/13  | Wed 30/10/13 |                          |
| 6         | Establish S.O                     | 5 days   | Mon 10/6/13  | Sun 16/6/13  | 4                        |
| 7         | Removal S.O                       | 2 days   | Tue 11/6/13  | Wed 12/6/13  |                          |
| 8         | Maintain S.O                      | 91 days  | Mon 10/6/13  | Wed 30/10/13 |                          |
| 9         | Progress Report                   | 84 days  | Tue 11/6/13  | Wed 30/10/13 |                          |
| 10        | Progress Report 1                 | 2 days   | Tue 11/6/13  | Wed 12/6/13  |                          |
| 11        | Progress Report 2                 | 2 days   | Thu 13/6/13  | Fri 14/6/13  |                          |
| 12        | Progress Report 3                 | 2 days   | Sun 16/6/13  | Mon 17/6/13  |                          |
| 13        | Progress Report 4                 | 2 days   | Wed 19/6/13  | Thu 20/6/13  |                          |
| 14        | Progress Report 5                 | 2 days   | Sun 23/6/13  | Mon 24/6/13  |                          |
| 15        | Land Acquisition                  | 0 days   | Sat 1/6/13   | Sat 1/6/13   |                          |
| 16        | Services Relocation               | 0 days   | Sat 1/6/13   | Sat 1/6/13   |                          |
| 17        | Blok A                            | 93 days  | Mon 10/6/13  | Wed 30/10/13 |                          |
| 18        | Kerja Tanah                       | 42 days  | Mon 10/6/13  | Wed 12/6/13  |                          |
| 19        | Kerja Struktur                    | 33 days  | Thu 13/6/13  | Fri 14/6/13  |                          |
| 20        | Kerja Arkitek                     | 43 days  | Thu 13/6/13  | Wed 30/10/13 |                          |
| 21        | Kerja M&E                         | 32 days  | Thu 13/6/13  | Mon 17/6/13  |                          |
| 22        | Blok B                            | 97 days  | Mon 10/6/13  | Wed 30/10/13 |                          |
| 23        | Kerja Tanah                       | 53 days  | Mon 10/6/13  | Wed 12/6/13  |                          |
| 24        | Kerja Struktur                    | 30 days  | Mon 29/7/13  | Tue 10/9/13  | 23SS+34 days             |
| 25        | Kerja Arkitek                     | 43 days  | Wed 28/8/13  | Wed 30/10/13 | 24FS-10 days             |
| 26        | Kerja M&E                         | 28 days  | Wed 4/9/13   | Mon 14/10/13 | 24FS-5 days              |
| 27        | Completion of Cable Laying by TNB | 0 days   | Mon 21/10/13 | Mon 21/10/13 | 21FS+3 days, 26FS+3 days |
| 28        | T&C                               | 5 days   | Tue 22/10/13 | Mon 28/10/13 | 27                       |
| 29        | Projek Siap                       | 0 days   | Wed 30/10/13 | Wed 30/10/13 | 28,8,25,20,7             |

# Susunan Tatacara Kerja - Predecessor



# Susunan Tatacara Kerja - Successor

| Task Mode | Task Name                         | Duration        | Start              | Finish              | Predecessors            | Successors               |  |
|-----------|-----------------------------------|-----------------|--------------------|---------------------|-------------------------|--------------------------|--|
| 1         | <b>Membina 2 Blok Bangunan</b>    | <b>102 days</b> | <b>Sat 1/6/13</b>  | <b>Wed 30/10/13</b> |                         |                          |  |
| 2         | Projek Mula                       | 0 days          | Sat 1/6/13         | Sat 1/6/13          |                         | 4,15,16                  |  |
| 3         | <b>Preliminaries</b>              | <b>102 days</b> | <b>Sun 2/6/13</b>  | <b>Wed 30/10/13</b> |                         |                          |  |
| 4         | Performance Bond                  | 5 days          | Sun 2/6/13         | Sun 9/6/13          | 2                       | 6,18,23                  |  |
| 5         | <b>Est. &amp; Remove S.O</b>      | <b>97 days</b>  | <b>Mon 10/6/13</b> | <b>Wed 30/10/13</b> |                         |                          |  |
| 6         | Establish S.O                     | 5 days          | Mon 10/6/13        | Sun 16/6/13         | 4                       | 8                        |  |
| 7         | Removal S.O                       | 2 days          | Tue 29/10/13       | Wed 30/10/13        | 28                      | 29                       |  |
| 8         | Maintain S.O                      | 91 days         | Mon 17/6/13        | Tue 29/10/13        | 6                       | 29                       |  |
| 9         | <b>Progress Report</b>            | <b>84 days</b>  | <b>Tue 25/6/13</b> | <b>Mon 28/10/13</b> |                         |                          |  |
| 10        | Progress Report 1                 | 2 days          | Tue 25/6/13        | Wed 26/6/13         |                         |                          |  |
| 11        | Progress Report 2                 | 2 days          | Thu 25/7/13        | Sun 28/7/13         |                         |                          |  |
| 12        | Progress Report 3                 | 2 days          | Sun 25/8/13        | Mon 26/8/13         |                         |                          |  |
| 13        | Progress Report 4                 | 2 days          | Wed 25/9/13        | Thu 26/9/13         |                         |                          |  |
| 14        | Progress Report 5                 | 2 days          | Sun 27/10/13       | Mon 28/10/13        |                         |                          |  |
| 15        | Land Acquisition                  | 0 days          | Sat 1/6/13         | Sat 1/6/13          | 2                       | 18,23                    |  |
| 16        | Services Relocation               | 0 days          | Sat 1/6/13         | Sat 1/6/13          | 2                       | 23                       |  |
| 17        | <b>Blok A</b>                     | <b>93 days</b>  | <b>Mon 10/6/13</b> | <b>Thu 24/10/13</b> |                         |                          |  |
| 18        | Kerja Tanah                       | 42 days         | Mon 10/6/13        | Wed 7/8/13          | 4,15                    | 19FS-15 days             |  |
| 19        | Kerja Struktur                    | 33 days         | Thu 18/7/13        | Wed 4/9/13          | 18FS-15 days            | 20FS-10 days,21FS-5 days |  |
| 20        | Kerja Arkitek                     | 43 days         | Thu 22/8/13        | Thu 24/10/13        | 19FS-10 days            | 29                       |  |
| 21        | Kerja M&E                         | 32 days         | Thu 29/8/13        | Mon 14/10/13        | 19FS-5 days             | 27FS+3 days              |  |
| 22        | <b>Blok B</b>                     | <b>97 days</b>  | <b>Mon 10/6/13</b> | <b>Wed 30/10/13</b> |                         |                          |  |
| 23        | Kerja Tanah                       | 53 days         | Mon 10/6/13        | Mon 26/8/13         | 4,15,16                 | 24SS+34 days             |  |
| 24        | Kerja Struktur                    | 30 days         | Mon 29/7/13        | Tue 10/9/13         | 23SS+34 days            | 25FS-10 days,26FS-5 days |  |
| 25        | Kerja Arkitek                     | 43 days         | Wed 28/8/13        | Wed 30/10/13        | 24FS-10 days            | 29                       |  |
| 26        | Kerja M&E                         | 28 days         | Wed 4/9/13         | Mon 14/10/13        | 24FS-5 days             | 27FS+3 days              |  |
| 27        | Completion of Cable Laying by TNB | 0 days          | Mon 21/10/13       | Mon 21/10/13        | 21FS+3 days,26FS+3 days | 28                       |  |
| 28        | T&C                               | 5 days          | Tue 22/10/13       | Mon 28/10/13        | 27                      | 7,29                     |  |
| 29        | Projek Siap                       | 0 days          | Wed 30/10/13       | Wed 30/10/13        | 28,8,25,20,7            |                          |  |



# Network Diagram

Untuk pastikan semua predecesor dan sucessor dimasukkan ke dalam setiap aktiviti

- kecuali recuring task, start (tiada predecessor) dan finish (tiada sucessor).

The screenshot shows the Microsoft Project interface with the 'Gantt Chart Tools' ribbon active. The 'Built-In' dropdown menu is open, highlighting 'Network Diagram' (labeled 3). The task list table is as follows:

| Task Mode | Task Name                      | Duration         | Start              | Finish              | Predecessors |
|-----------|--------------------------------|------------------|--------------------|---------------------|--------------|
|           | <b>Membina 2 Blok Bangunan</b> | <b>106 days?</b> | <b>Sat 1/6/13</b>  | <b>Mon 28/10/13</b> |              |
|           | Projek Mula                    | 0 days           | Sat 1/6/13         | Sat 1/6/13          |              |
|           | <b>Preliminaries</b>           | <b>106 days?</b> | <b>Mon 3/6/13</b>  | <b>Mon 28/10/13</b> |              |
|           | Performance Bond               | 1 day?           | Mon 3/6/13         | Mon 3/6/13          | 2            |
|           | <b>Est. &amp; Remove S.O</b>   | <b>8 days?</b>   | <b>Tue 4/6/13</b>  | <b>Thu 13/6/13</b>  |              |
| 1         | Establish S.O                  | 1 day?           | Tue 4/6/13         | Tue 4/6/13          | 4            |
| 2         | Romoval S.O                    | 1 day?           | Thu 13/6/13        | Thu 13/6/13         | 28           |
|           | Maintain S.O                   | 1 day?           | Wed 5/6/13         | Wed 5/6/13          | 6            |
|           | <b>Progress Report</b>         | <b>90 days</b>   | <b>Tue 25/6/13</b> | <b>Mon 28/10/13</b> |              |
| 1         | Progress Report 1              | 2 days           | Tue 25/6/13        | Wed 26/6/13         |              |
| 2         | Progress Report 2              | 2 days           | Thu 25/7/13        | Fri 26/7/13         |              |
| 3         | Progress Report 3              | 2 days           | Mon 26/8/13        | Tue 27/8/13         |              |
| 4         | Progress Report 4              | 2 days           | Wed 25/9/13        | Thu 26/9/13         |              |
| 5         | Progress Report 5              | 2 days           | Fri 25/10/13       | Mon 28/10/13        |              |
|           | Land Acquisition               | 0 days           | Sat 1/6/13         | Sat 1/6/13          | 2            |

The network diagram on the right shows task dependencies with arrows and labels like '1/6'.

# Network Diagram

