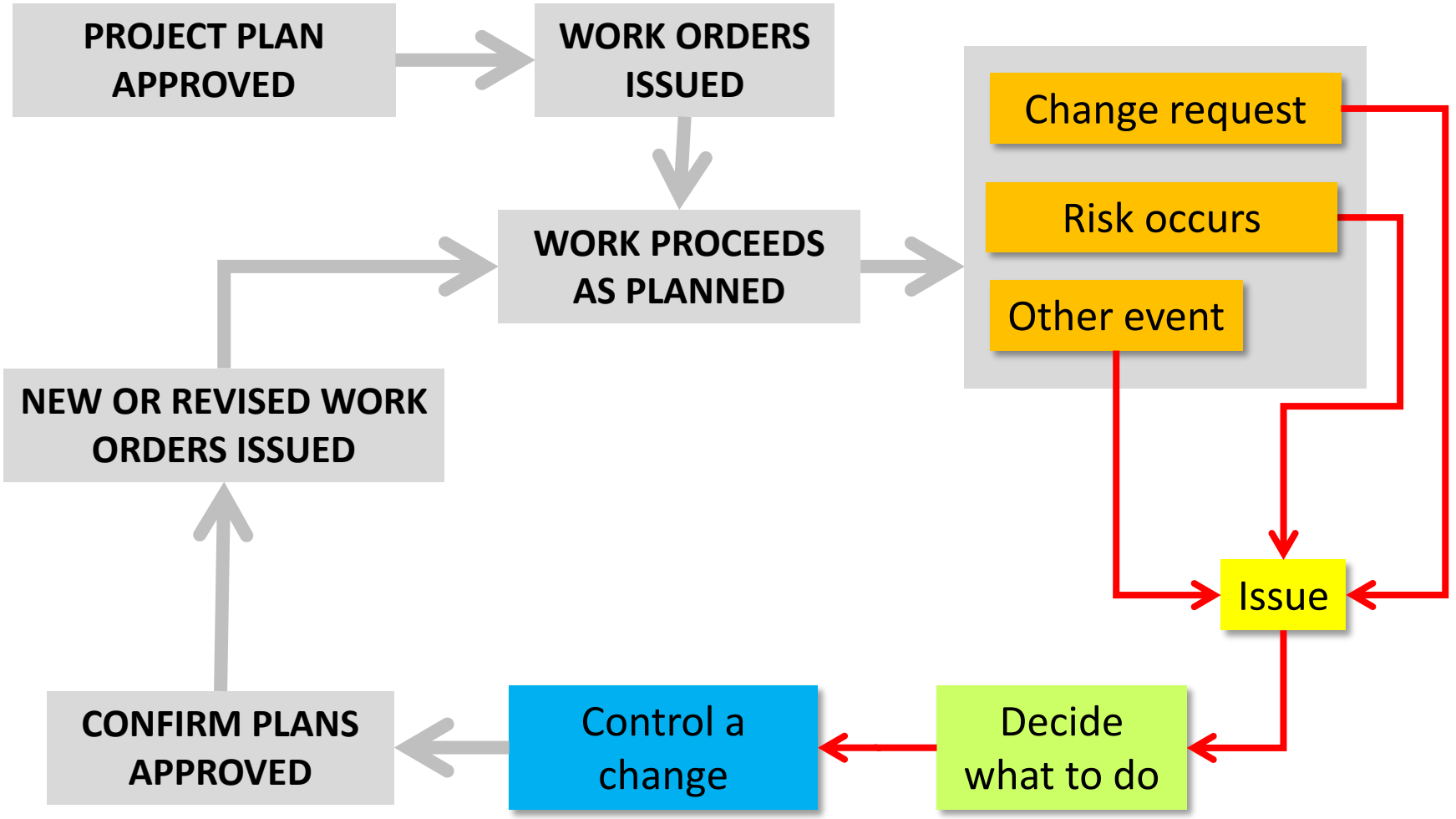
PM101: Lecture 19

Handling issues and changes

Fancy a change?



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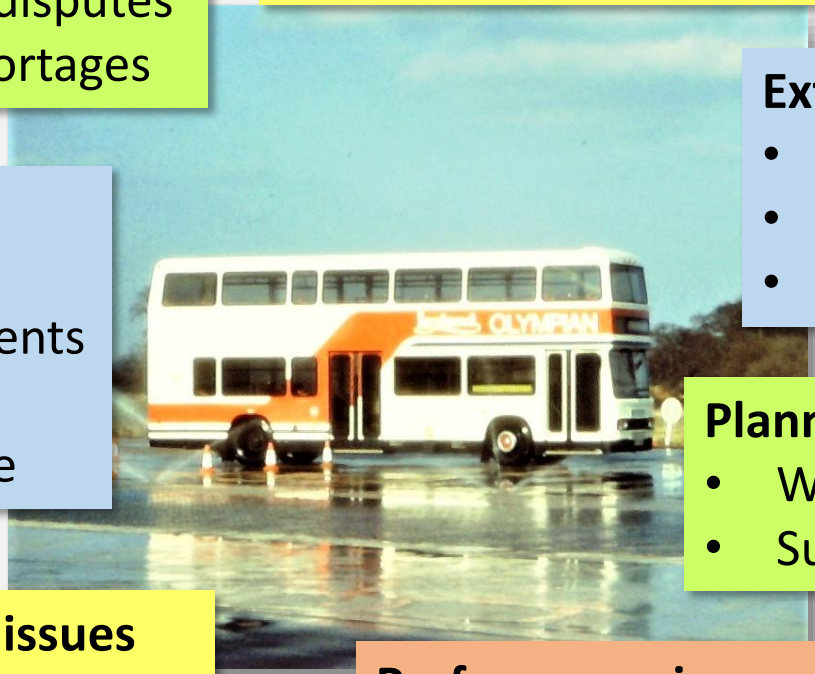
Making an issue of it

Project team issues
- Mistakes
- Illness
- Labour disputes
- Staff shortages

Quality issues
- Breach of standards
- Faults and breakages
- Test failures

The Risk Register may have predicted some of these



External issues
- Weather events
- New laws
- Customs delays

Client issues
- New requirements
- Changed requirements
- Budget cut
- Shortened deadline

Planning issues
- Wrong estimates
- Supplier failure

Stakeholder issues
- Occupation of site
- Legal challenge

Performance issues
- Time overrun
- Cost overrun

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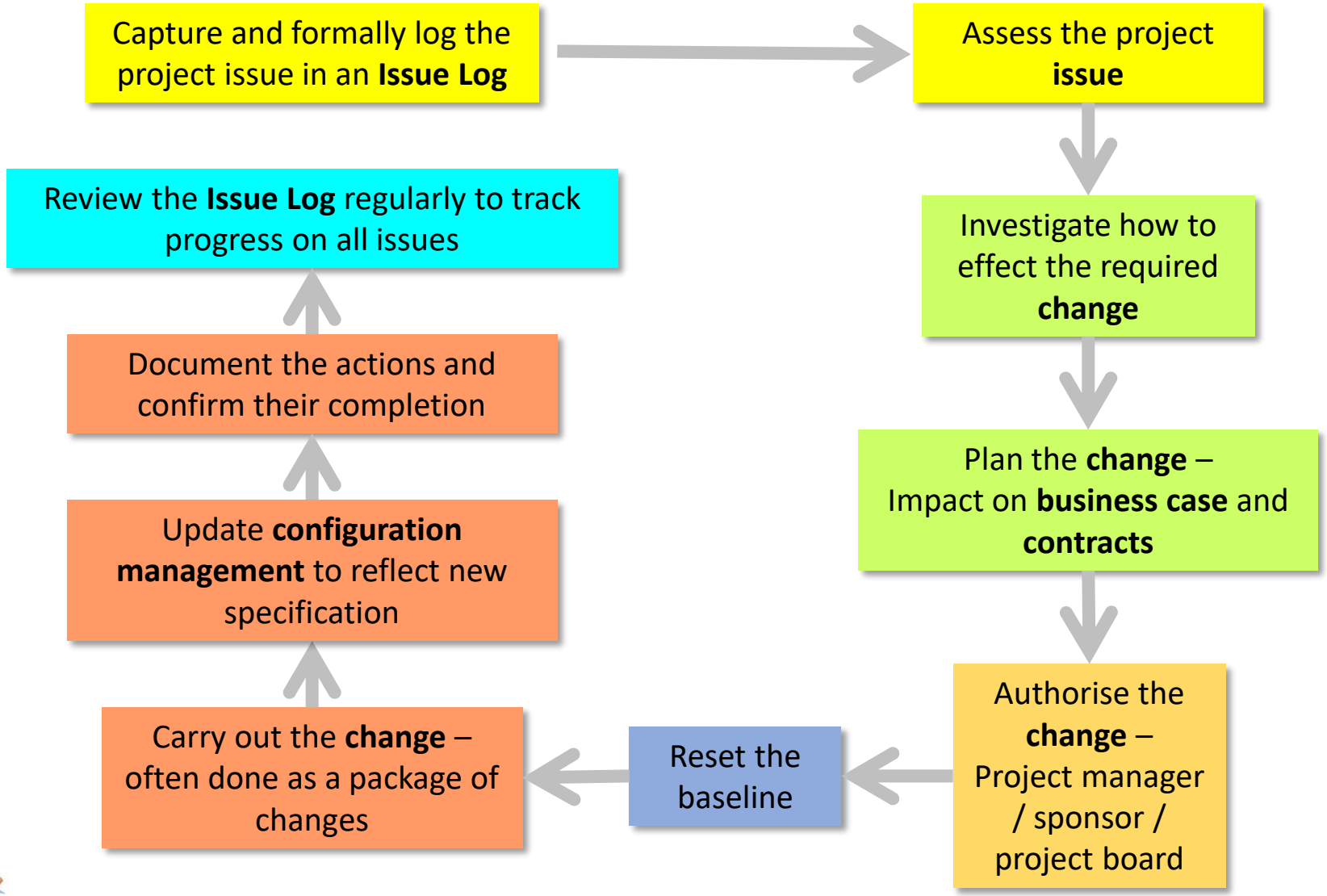
Change control process



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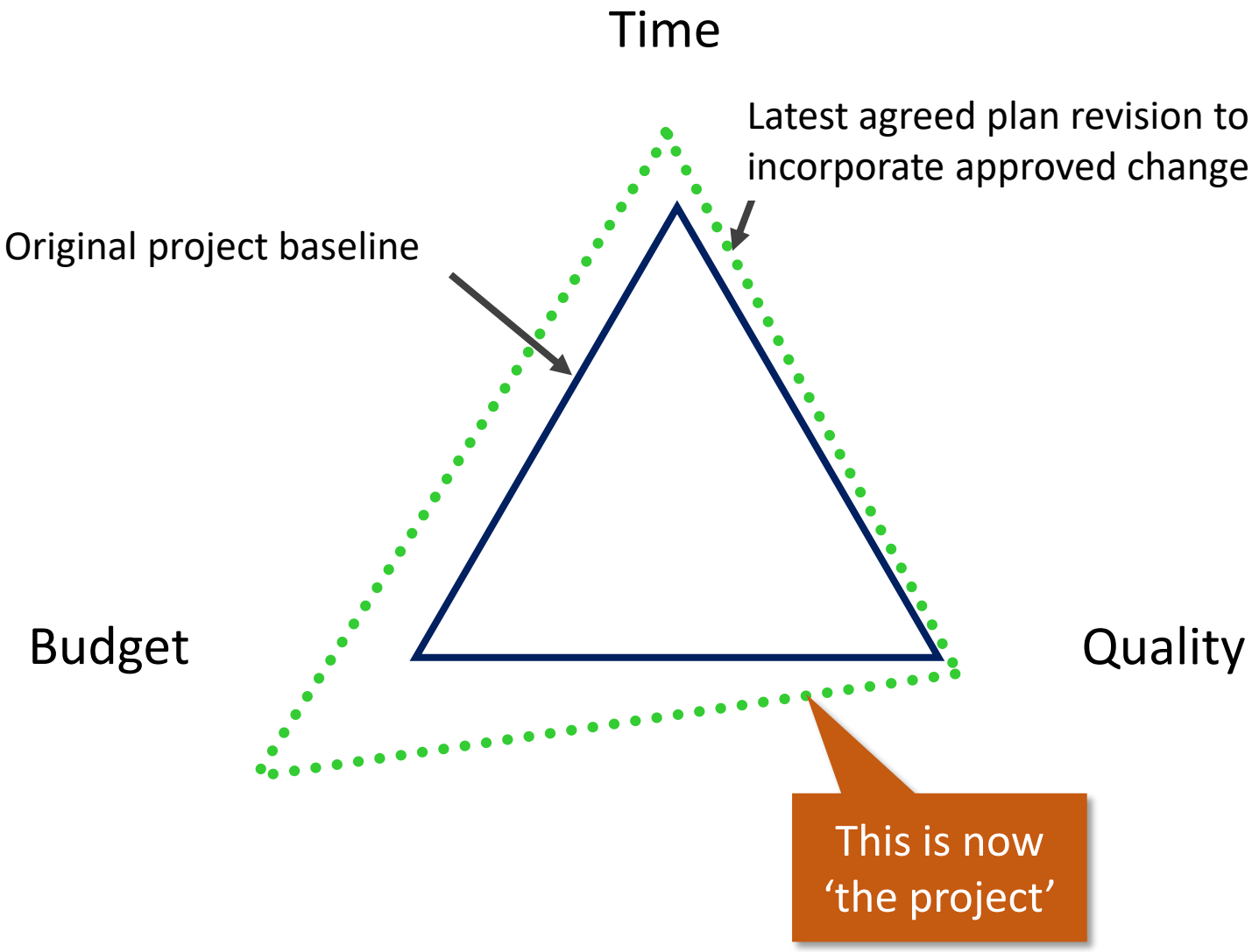
A change means resetting the baseline



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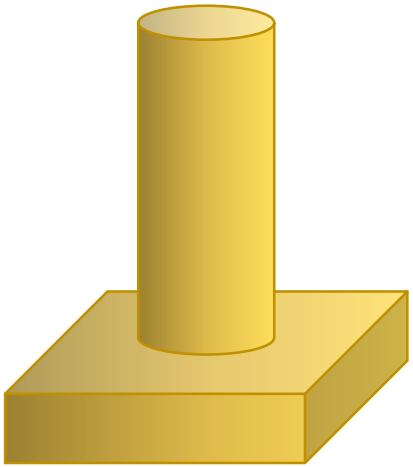
Configuration management



A hall is being designed with a roof held up by a central column mounted in a stone base block.

The original output specification calls for a 450mm diameter column slotting into 455mm diameter slot in the base.

Column – Version 1.0 (from supplier A)
Base – Version 1.0 (from supplier B)

Tests show that the column is not strong enough to support the roof. The specification needs to change to a 550mm diameter column. This is defined as **Column – Version 2.0**

But **the Version 1.0 base will not accept the Version 2.0 column**. So we need to change the specification of the base to create version 2.0 that will accept the column.

Configuration management ensures that both suppliers have the right up to date specifications and make only Version 2.0 components that will fit together when the assembly takes place on site.

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Crashing the project

Crashing the project does not mean destroying it!

Crashing is taking actions to finish the project sooner than would be the case if it was allowed to carry on under the current plan.

In other words, crashing is about **accelerating the project**.

Photo: Snapfish from Pexels

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Reasons for crashing

- **The initial schedule was too optimistic.** Everything is now running late, so the original deadline cannot be met with the current plan.
- **Market pressure means we need to finish sooner.** Unless the project is finished sooner, market share will be lost.
- **We have slipped behind schedule.** Technical difficulties or poor productivity mean we are running seriously late.
- **Contract pressures intensify.** It becomes clear than being late will incur serious financial penalties.
- **External factors intervene.** Bad weather, labour unrest and similar occurrences impose delays.

The fundamental question: Should we crash the project or cancel it? Run any proposals for change through the business case.

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The challenges of crashing

It is very **hard to increase productivity** in the middle of a project:

- Quality standards and processes are fixed
- Equipment cannot be used faster
- New systems and equipment cannot work without training

Extra work hours do not automatically help:

- Productivity falls when people work long hours
- Overtime is not used effectively
- Extra people gets in each others' way

Crashing is never easy, and is usually painful and expensive.

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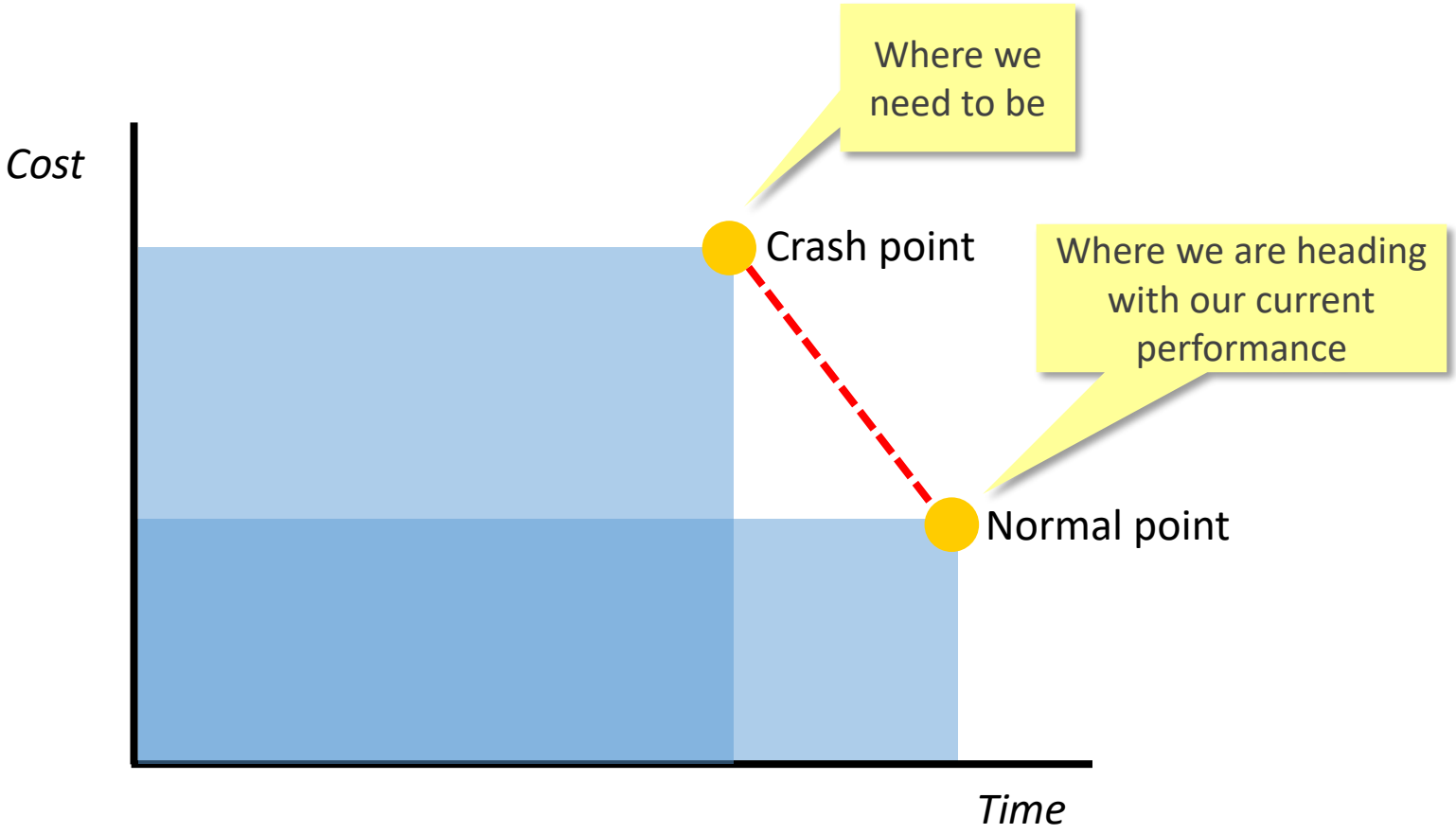
The crashing trade-offs



$$\text{Slope} = \frac{\text{Crash cost} - \text{Normal cost}}{\text{Normal time} - \text{Crash time}}$$

Meredith, J. & Mantel, S. (2012), *Project management – a managerial approach*, Hoboken, NJ, John Wiley, p386.

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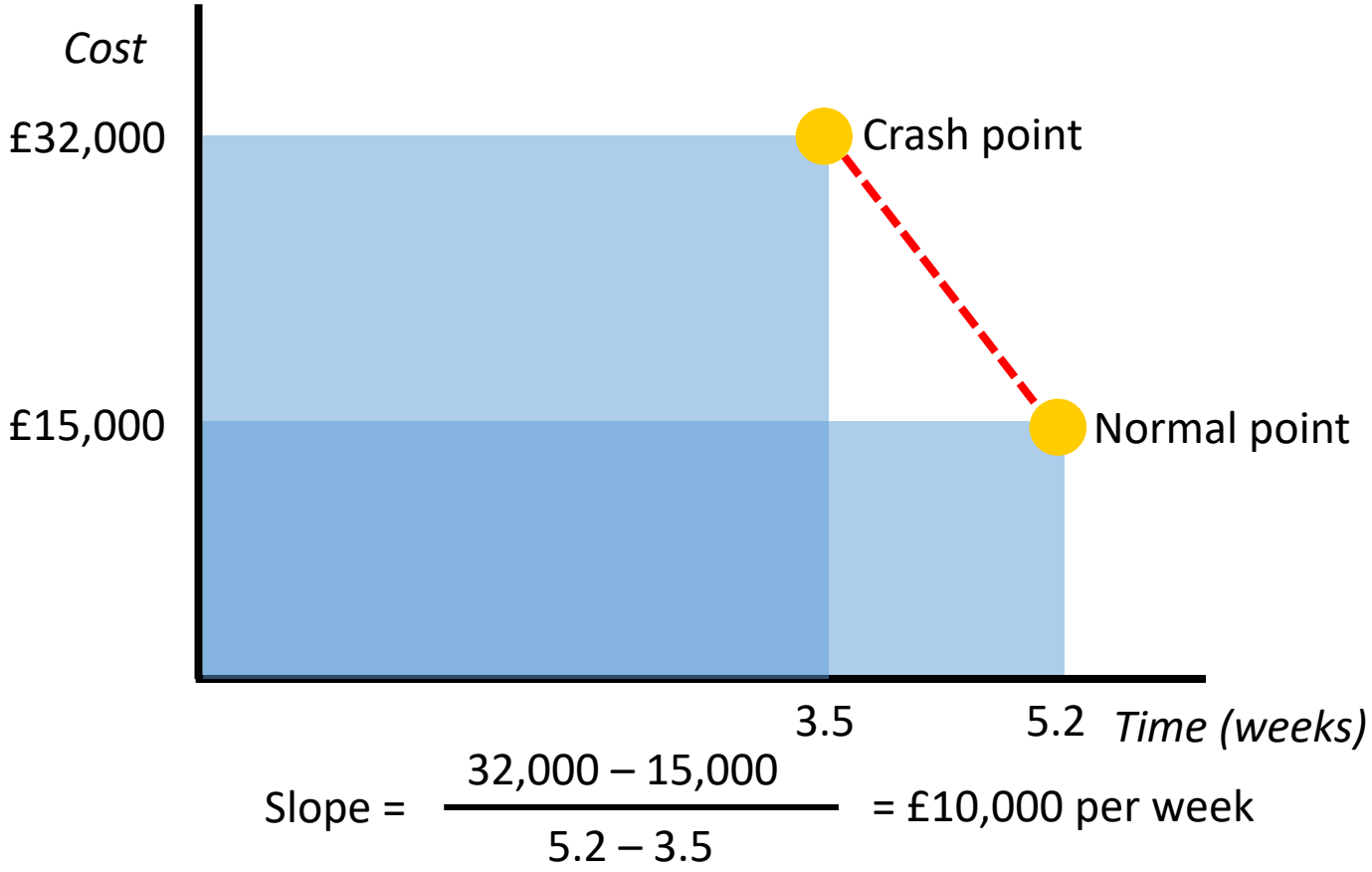
The cost of crashing



$$\text{Slope} = \frac{32{,}000 - 15{,}000}{5.2 - 3.5} = £10{,}000 \text{ per week}$$

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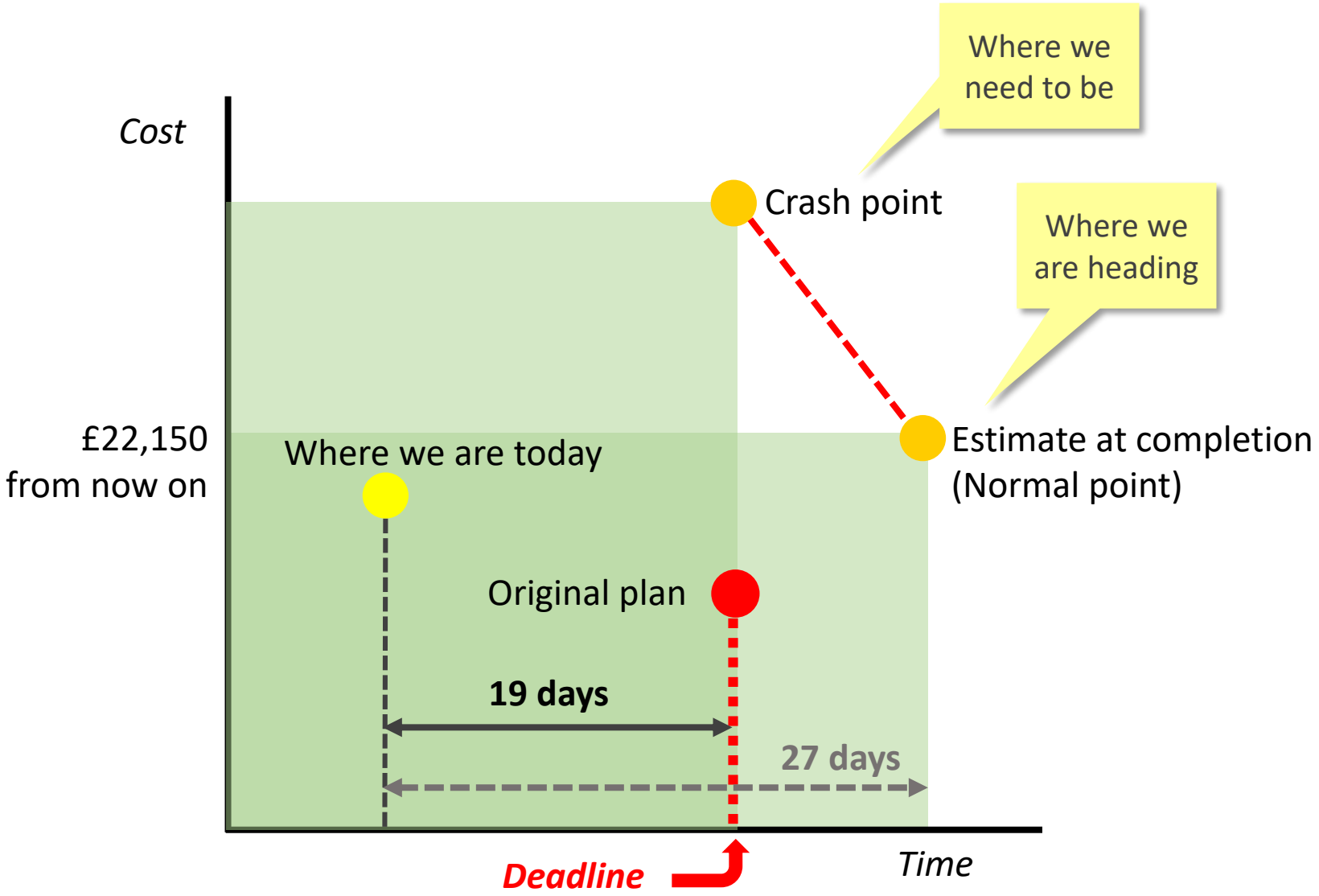
The crashing trade-offs



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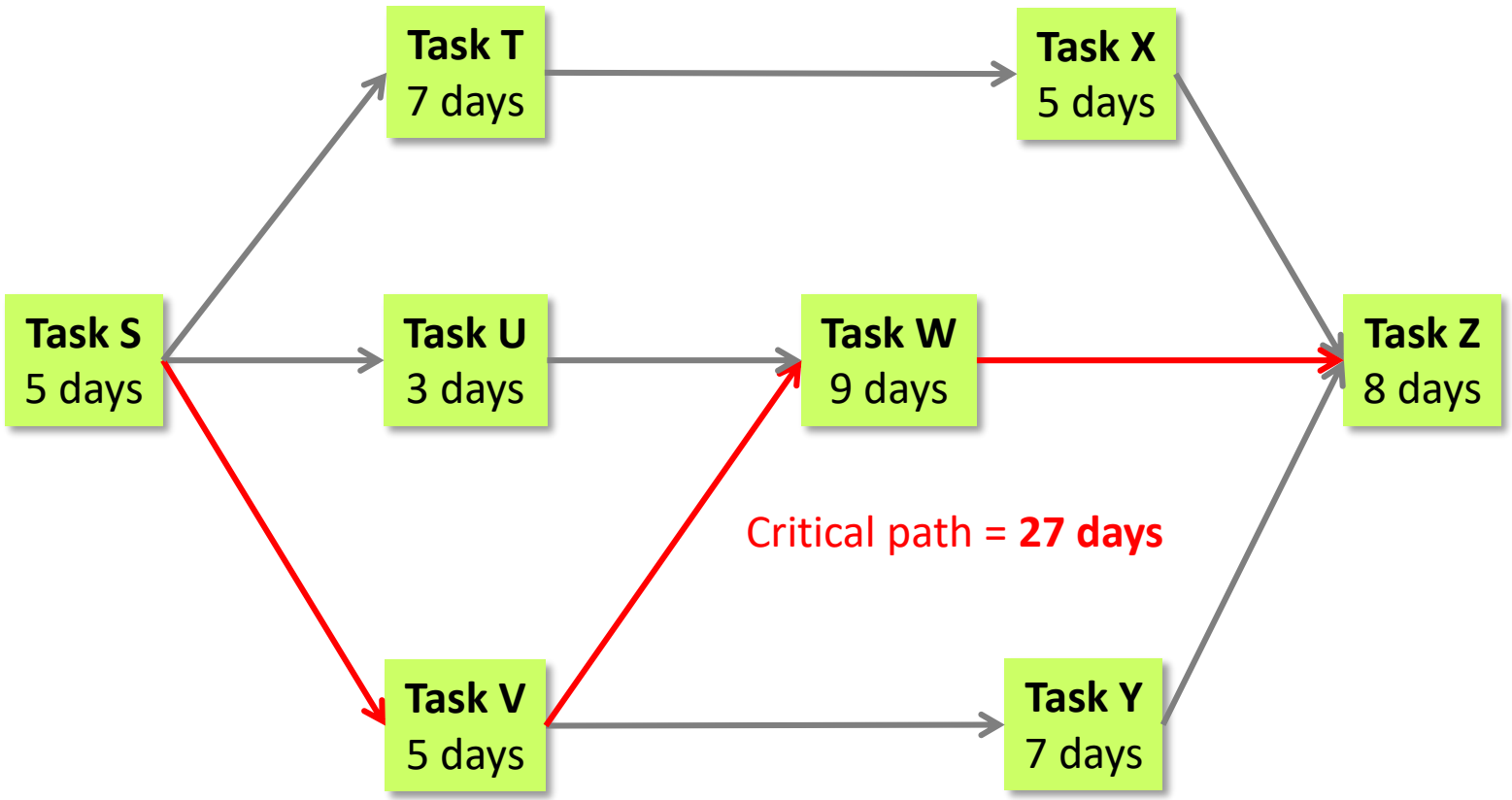
The normal point project task network



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Project activities and costs

	Normal	
Task	Duration (days)	Cost £
S	5	1,000
T	7	700
U	3	2,500
V	5	1,500
W	9	3,750
X	5	1,600
Y	7	2,100
Z	8	9,000
Total		**£22,150**

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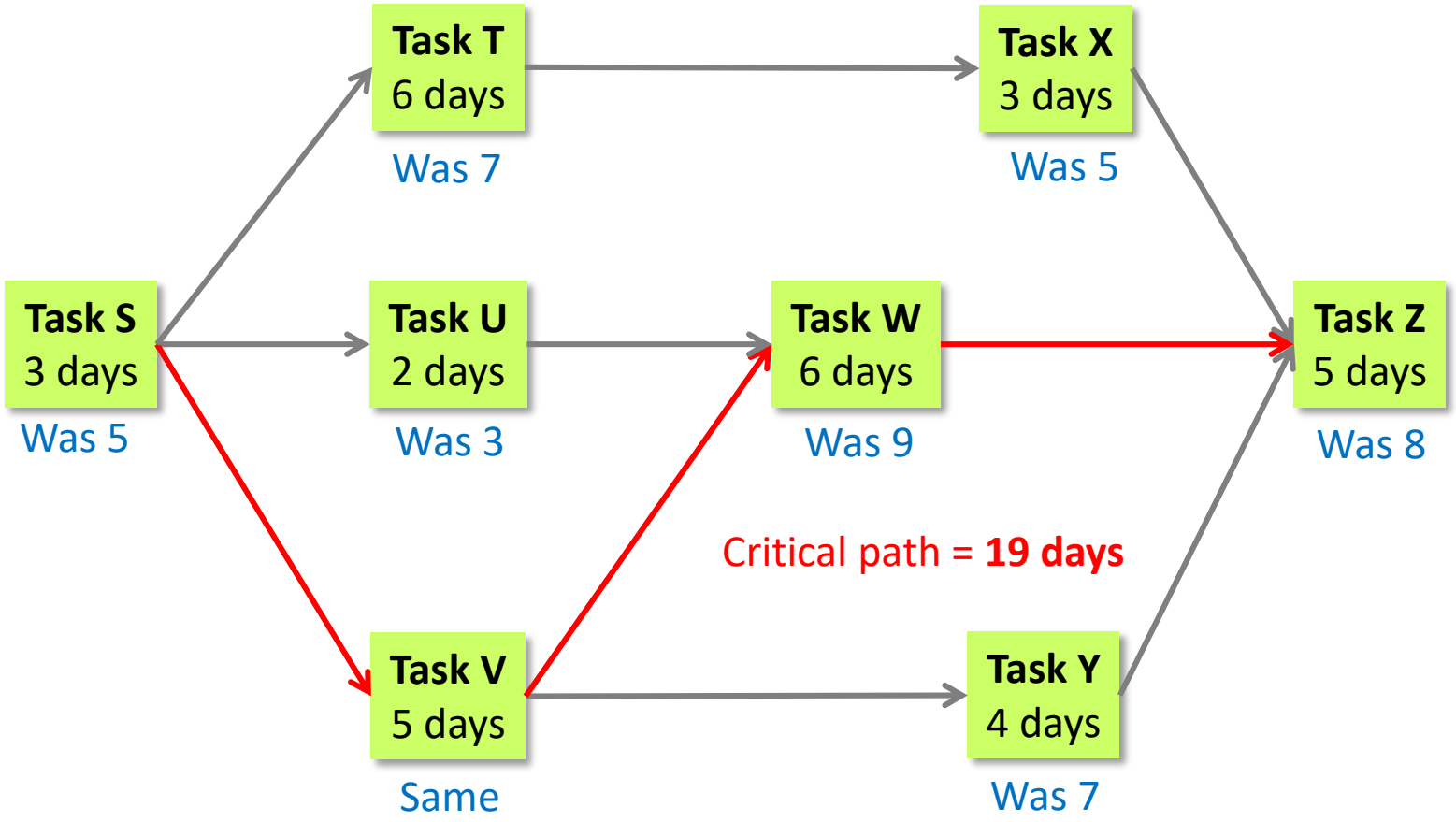
The fully crashed project task network



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Project activities and costs

	Normal		Crashed (pass1)		
Task	Duration (days)	Cost £	Duration (days)	Cost £	Cost per day
S	5	1,000	3	1,500	250
T	7	700	6	1,000	300
U	3	2,500	2	4,000	1,500
V	5	1,500	5	1,500	-
W	9	3,750	6	9,000	1,750
X	5	1,600	3	2,500	450
Y	7	2,100	4	3,000	300
Z	8	9,000	5	15,000	2,000
Total		**£22,150**		**£37,500**	

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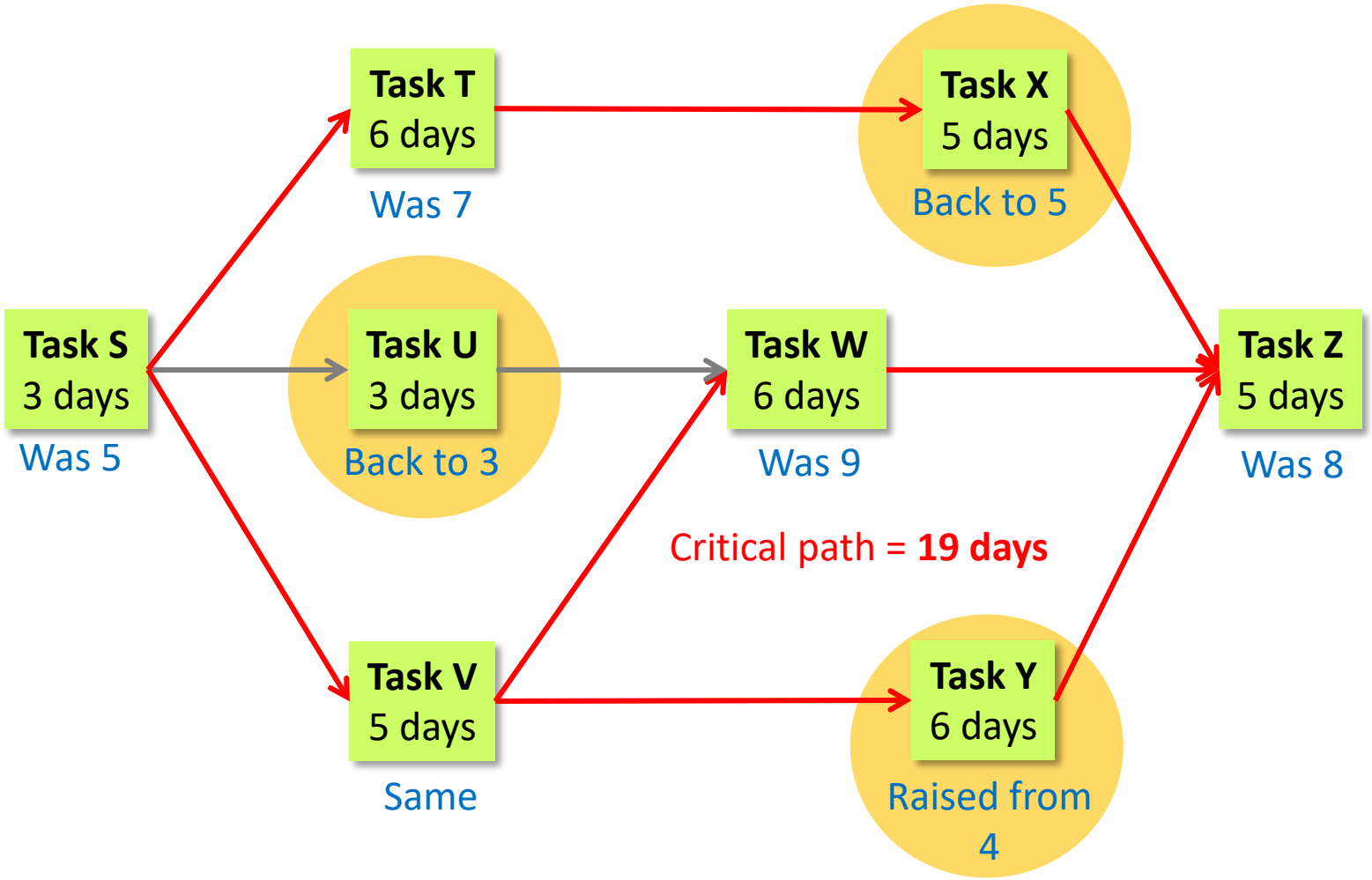
The optimally crashed project task network



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Project activities and costs

	Normal		Crashed (pass 2)		
Activity	Duration (days)	Cost £	Duration (days)	Cost £	Cost per day
S	5	1,000	3	1,500	250
T	7	700	6	1,000	300
U	3	2,500	3	2,500	-
V	5	1,500	5	1,500	-
W	9	3,750	6	9,000	1,750
X	5	1,600	5	1,600	-
Y	7	2,100	6	2,400	300
Z	8	9,000	5	15,000	2,000
Total		**£22,150**		**£34,500**	

Was £37,500

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Rules for crashing

- **Understand exactly why the project has to be crashed.** How critical is the new deadline; can even a small period of time be added?
- **Work out the costs of accelerating each remaining task.** Sometimes costs do not follow a simple cost per day pattern.
- **Look to crash tasks with lowest crash costs first.** See if deadline can be reached by avoiding tasks with high crashing costs.
- **Remember that the critical path may change.** Multiple critical paths are possible as everything is compressed. Tricky to manage.
- **Day to day schedule and cost management will be intensive.** More than ever, time and cost must be closely controlled to minimise overspend.

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Issues and changes: core ideas

A issue in the project can be prompted by changes requested by the client, risks occurring or unanticipated events.

The response is to go through a structured process that determines how best to deal with the issue, including checking its effects on the business plan and contracts, and revising the project plan.

Once approved the new project plan becomes the revised baseline for the project, against which it will be judged.

Configuration management ensures changes to output specifications are properly tracked.

If the deadline is immovable the project manager may have to crash the project, spending extra money to finish on time.

Accelerating the project is difficult; it is very hard to push up productivity quickly.

Crashing analysis looks for the least costly way to modify the task network to achieve the desired completion date.

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