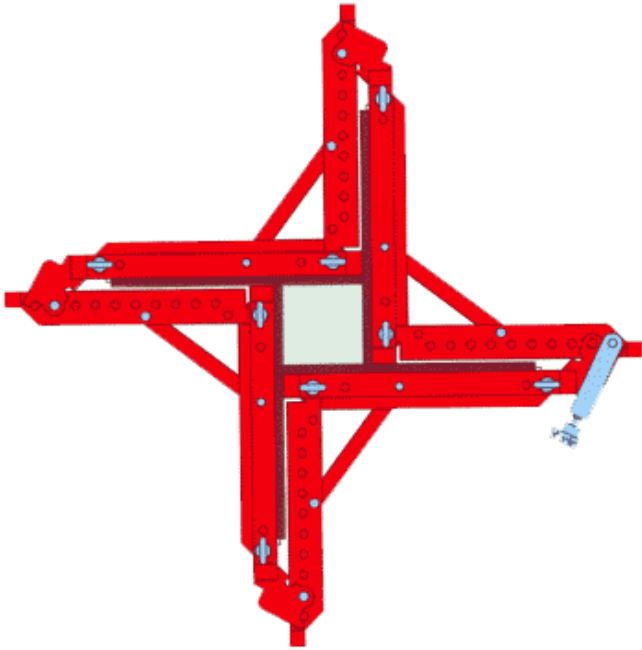


Construction Technology



Formwork and
Falsework

Formwork and Falsework



Formwork

A temporary structure designed to contain fresh liquid concrete, form it into the required shape and dimensions, and provide support to the concrete until it cures sufficient to become self-supporting.

Formwork and Falsework

Falsework

Any temporary structure used to support a permanent structure during its erection and until it becomes self-supporting

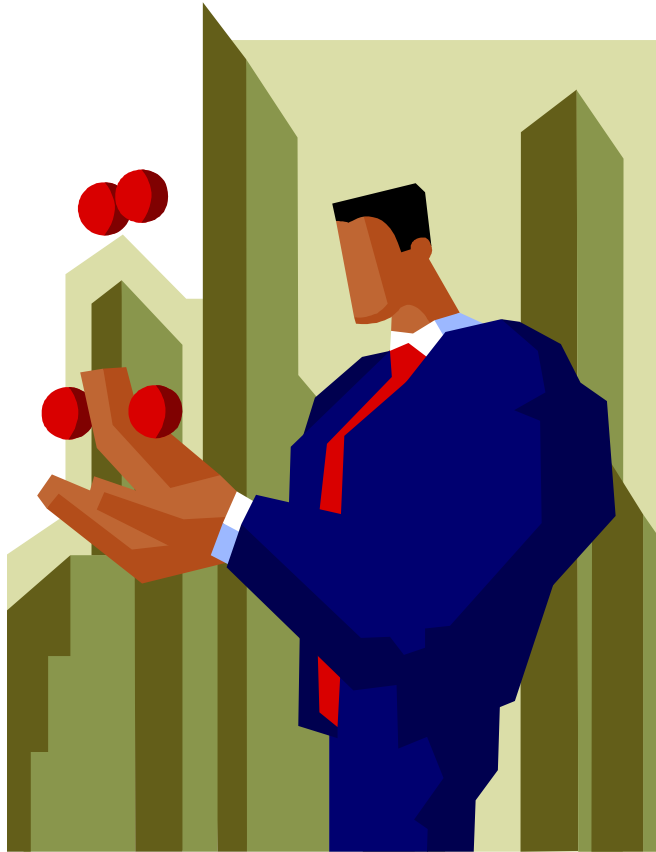


Formwork and Falsework

Item	Material cost (%)	Labour and plant cost (%)	Total cost of structure (%)
Concrete	12	8	20
Reinforcement	19	6	25
Formwork and falsework	8	27	35
Sundries	13	7	20
Total	52	48	100

Source: Concrete Society, Formwork A Guide to Good practice

Permanent Works Designer's Role



Awareness of the inter-relationships between the costs of concrete, reinforcement, formwork and other items appropriate to the design.

Repetitive use of formwork for example, will reduce the unit cost.

Permanent Works Designer's Role

Other factors likely to adversely influence costs:

- Member variations
- Steps and staggers in walls and slabs
- Box-outs
- Inserts
- Corbels
- Special joints
- Inappropriate as-cast finishes
- Restrictions on the use, type and position of ties
- Restrictions on sequence and timing of construction.

Permanent Works Design

“Designers need to understand how the structure can be constructed, cleaned and maintained safely.

This involves ensuring that the overall design takes **full** account of any temporary works, for example falsework, which may be needed, no matter who is to develop these works.”



Role of the Temporary Works Designer

To produce a
functional
temporary works
design



Role of the Temporary Works Designer

Design will need to consider:

- Overall building design
- Specifications
- Time of construction
- Plant capacity
- Key dates
- Local conditions
- Organisational structure
- Restrictions
- Safety
- Others...

Temporary Works Design

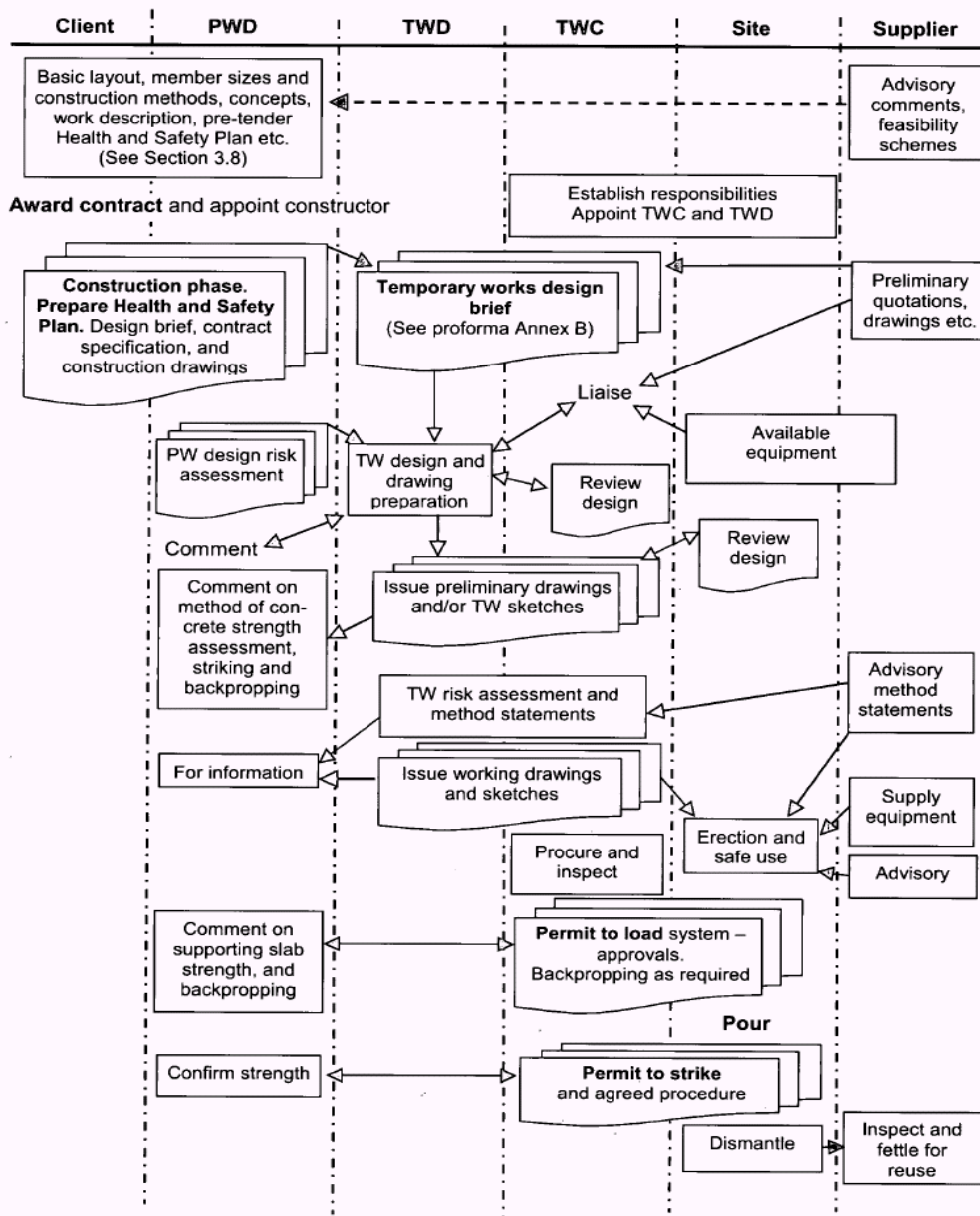


- Position of construction joints
- Pour sizes
- Finishes
- Span
- Cycle time
- Back-propping / re-propping
- Support materials

Management of the Temporary works



A temporary works co-ordinator should be appointed early in the planning process to co-ordinate and manage the design, procurement and operations of the temporary works



Typical temporary works management flow diagram.

Note: The diagram does not illustrate the roles of the various parties, e.g. planning supervisor, under health and safety legislation.

Formwork: design and construction



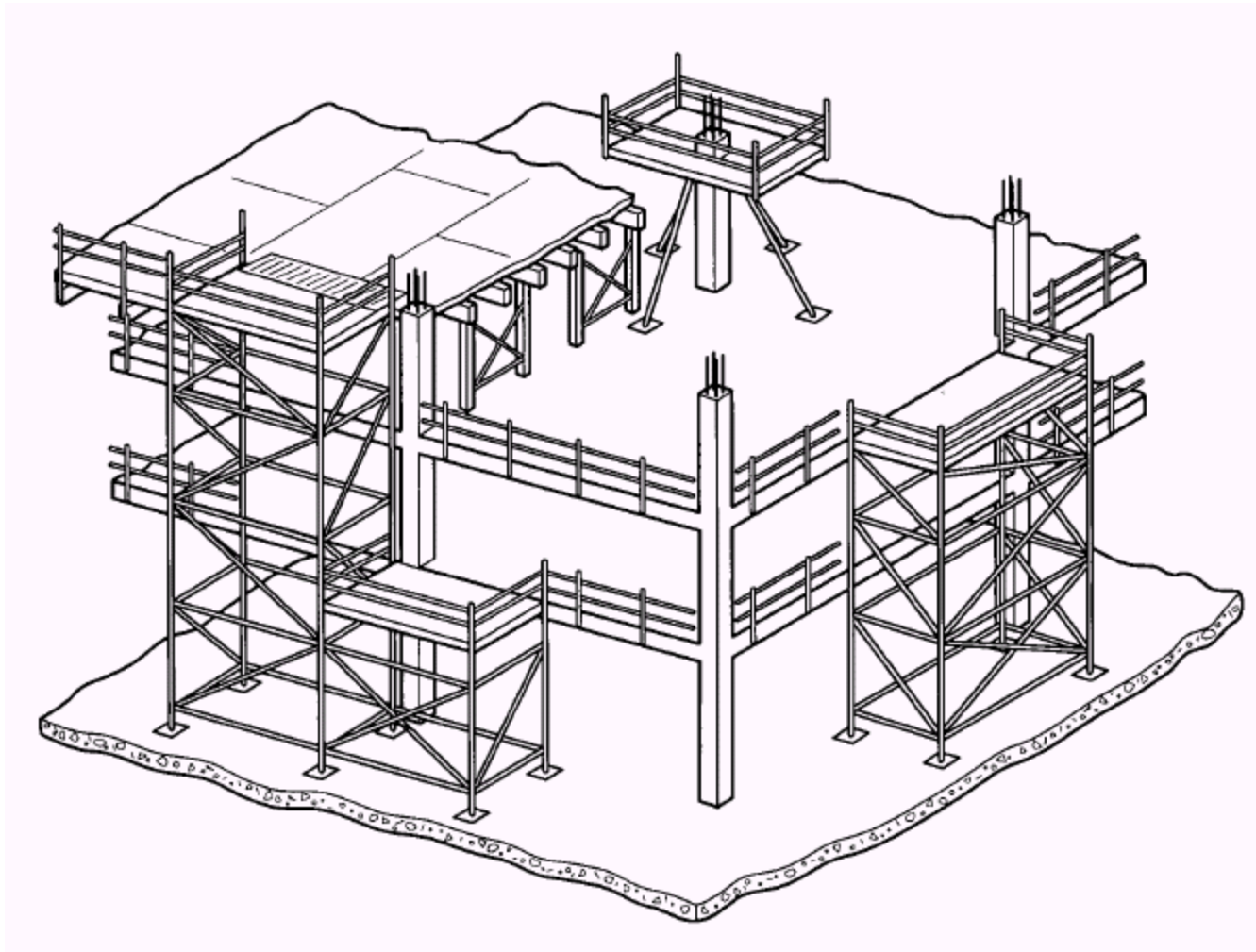
- Rigidity
- Strength
- Accuracy
- Watertight
- Handling
- Striking

Construction Stage



General considerations...

- Communications
- Debris
- Loading-out
 - Properly designed
 - Safe load
 - Imposed load



Loading-out platform

Construction Stage



Column formwork...

- Working platforms
- Stability
- Slab integration

System Column Formwork



- Maximum concrete pressure
- Restraints
- Manoeuvrability
- Adjustability
- Storage
- Disposable forms

Peri



Propriety column forms

Tunnel Form



- Economical for projects with 100+ cellular units
- Sufficient space
- Efficient planning
- Training
- Cost effective
- Repetitive work
- Reduced construction cycle

Construction Stage

Table and flying forms...

- Bracing
- Secured trolleys
- Signal compatibility
- Sling lengths



Table / Flying Form

- Speed
- Fully assembled units
- Surface finish
- Accuracy
- Large bay areas
- Reduced workforce
- Repetitiveness



Construction Stage



Precast units

- Co-ordination
- Accuracy of information
- Infills
- Working platforms

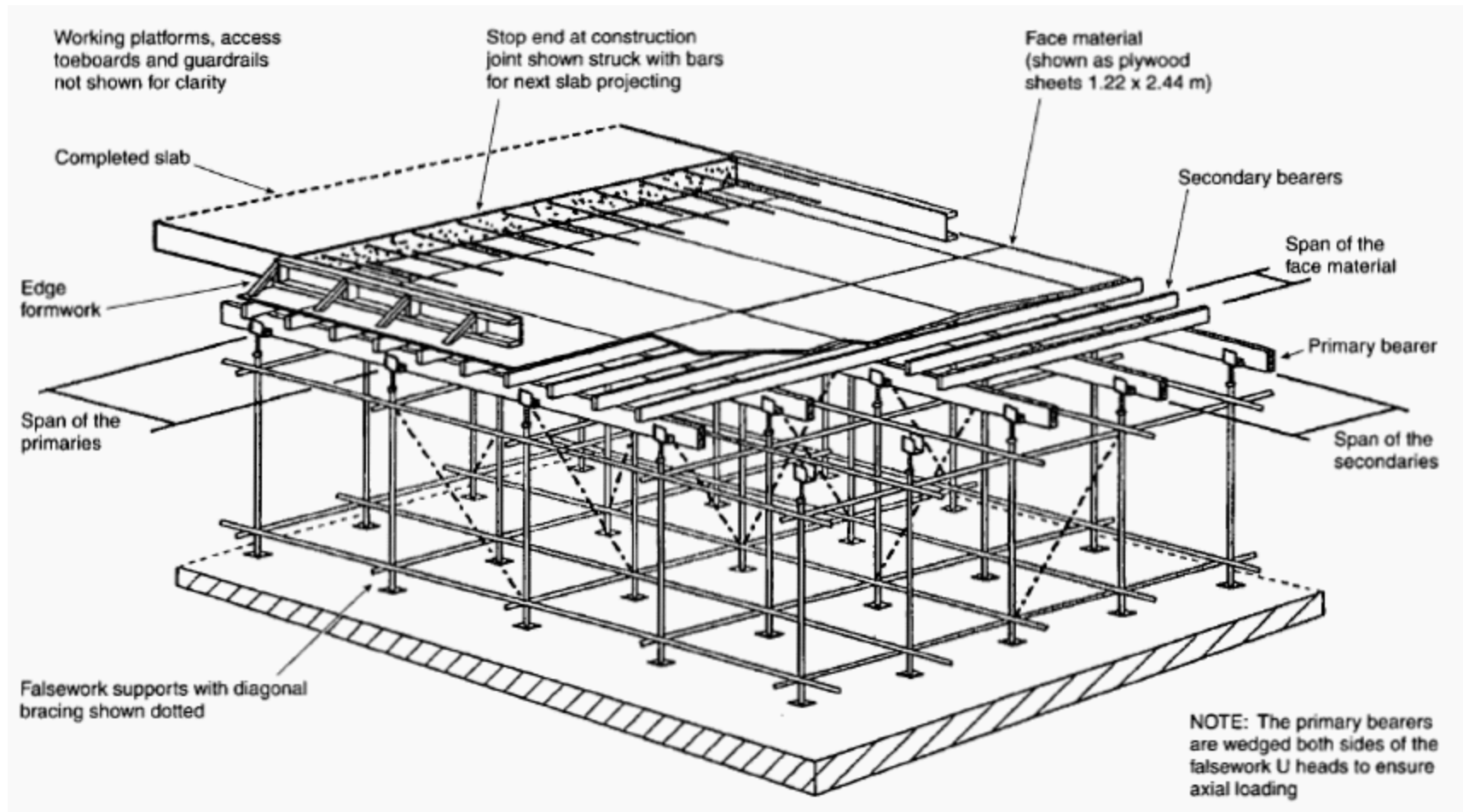
Systems Falsework and Formwork



Peri

- Easibility
- Speed
- Simplicity
- Less labour
- Reduction in back propping
- Accuracy
- Quality
- Space/access limitations

Modular system formwork: High Street



Flat slab arrangement with steel skeletal system

Flying Forms

- Larger areas achievable
- Greater strength and stability
- Need clear space and access



Flying Forms



- Ideal for flat slab and repetitive construction
- Economic if used more than ten times
- Cycle time as little as four days

Slip Form

- Economical for tall buildings
- Little flexibility for change
- Slipformed structure should have significant dimensions
- Setting rate of concrete needs continuous monitoring
- High level of competency required
- Standby plant and equipment required



Jump Forms

- Integral system – formwork and working platform
- Support from previous cast concrete
- Staged process
- Highly productive
- Modular construction



Jump Forms



Swansea Tower



Climbing formwork London, Dorka



Formwork and Falsework Tutorial

The prime purpose of formwork is to form and contain the concrete. Very frequently, formwork materials which perform this function adequately cannot be relied upon to give a satisfactory finish.

Discuss this statement.

