Organisation

The range of topics discussed in this section are listed below:

A Definition of terms
- 1.0 Building design
- 2.0 Building construction

B Duties and outputs for construction management
- 1.0 Construction planning
- 1.1 Definition of duties and outputs/contents
- 1.2 Aims/risks of construction planning
- 1.3 Means and tools for construction management
  - * Construction drawings
  - * Sectional drawings (component drawings, junction drawings)
  - * Special drawings
  - * Specifications
  - * Area/room/component schedules, specifications, bills of quantities
- 2.0 Tender action and letting of contracts
- 2.1 Definition of duties and outputs/contents
- 2.2 Aims/risks of tender action and letting of contracts
- 2.3 Means and tools of tender action and letting of contracts
  - * Contract laws and regulations
  - * Contract conditions and articles of agreement
  - * Technical conditions and preambles
  - * Standard specifications, manufacturers' specifications and performance specifications
- 3.0 Construction supervision
- 3.1 Definition of duties and outputs/contents
- 3.2 Aims/risks of construction supervision
- 3.3 Means and tools of construction supervision
  - * Standard procedures
  - * Techniques of project management/time management

A Definition of terms

Definition of duties describing the necessary architectural services and the relevant fees are contained in the respective guidelines for each country or professional body, e.g. the RIBA Architects' Plan of Work in the UK, or the HOAI [Honorarordnung für Architekten und Ingenieure] in Germany.

1.0 Building design

The briefing and design stages (A–D in RIBA Plan of Work, 1–4 in HOAI) include inception/feasibility (3%), outline proposals (7%), scheme design (11%) and approvals planning (6%). Design services typically represent 27% of the total fee.

2.0 Building construction

The production drawings and information stages (E–H in RIBA Plan of Work, 5–9 in HOAI) include detail design, production information, bill of quantities (if applicable) (25%), preparing tender documents (10%), tender action (4%), site supervision (31%), project administration and documentation (3%). Construction management duties typically represent 73% of the total fee.

B Duties and outputs for construction management

1.0 Construction planning

1.1 Definition of duties and outputs/contents

Basic services

* Working through the results of stages 2 and 4 (stage by stage processing information and presenting solutions) – taking into account the urban context, design parameters, and functional, technical, structural, economic, energy (e.g. rational energy use) biological, and economical requirements – and co-operating with other building professionals, to bring the design to the stage where it can be constructed
* Presenting the design in a full set of drawings with all the necessary documentation including detail and construction drawings, 1:50 to 1:1, and accompanying specifications in text
* In schemes which include interior fittings and design, preparing detailed drawings of the rooms and fittings to scales 1:25 to 1:1, together with the necessary specifications of materials and workmanship
* Coordination of the input of the other members of the design team and integrating their information to produce a viable solution
* Preparation and co-ordination of the production drawings during the building stage

Additional services

These additional services can be included as basic services if they are specifically listed in a schedule of services. This will negate some of the limitations in the standard list of basic services.

* Setting up a detailed area-by-area specification in the form of a room schedule to serve as a basis for a description of materials, areas and volumes, duties and programme of works
* Setting up a detailed specification in the form of a bill of quantities to serve as a basis for a description of materials, duties and programme of works
* Inspection of the contractors' and sub-contractors' specialist design input developed on the basis of the specification and programme of works, to check that it accords with the overall design planning
* Production of scale models of details and prototypes
* Inspection and approval of design drawings produced by organisations outside the design team, testing that they accord with the overall design planning (e.g., fabrication drawings from specialist manufacturers and contractors, setting-up and foundation drawings from machine manufacturers), insomuch as their contracts do not form a part of the main contract sum (upon which the professional fees have been calculated)

1.2 Aims/risks of construction planning

Construction planning aims to ensure a trouble- and fault-free execution of the works. This requires a complete and detailed establishment of the formal and technical requirements, and their compliance with formal, legal, technical and economic matters.

* *Legal basis:* planning and building regulations, and other regulations such as safety guidelines, e.g. for places of assembly
* *Technical basis:* established standards and techniques of construction and materials, e.g. building standards, consultation/agreement with specialists and specialist contractors
* *Economic basis:* cost control techniques, e.g. cost estimates/calculations, and consultation/agreement with specialists in this field

Insufficient construction planning results in – among other things – wastage of materials (correction of errors, breakages and decay), waste of productive time (time wasting, duplicated work),and persistent loss of value (planning mistakes/construction faults).

1.3 Means and tools for construction management

Construction drawings contain all the necessary information and dimensions for construction purposes; normal scale is 1:50.

Sectional drawings (component drawings, junction drawings), expand on the construction drawings with additional information on parts of the building works; normal scale is 1:20 , 1:10 , 1:5 or 1:1.

Special drawings are tailored to the specific requirements of elements of the work (e.g. reinforced concrete work, steelwork or timber structural work) and show only the essential aspects of the other building features which relate to that particular specific element of work; normal scale is 1:50, depending on the particular needs. National standards and conventions govern the

drawing modes which, ideally, should be compatible with CAD (computer aided design) and the standard methods of specification and measurement of quantities and pricing. Suitable software packages are available.

Area/room/component schedules, specifications, bills of quantities, contain full information – in the form of lists and tables – about the sizes (e.g. length, width, height, area and volume), the materials (e.g. wall coverings and floor finishes), and equipment (e.g. heating, ventilation, sanitary, electrics, windows and doors) of which make up the building, building elements, rooms or other areas. They serve as a basis for a full specification of materials and workmanship. Bills of quantities are commonly used in the UK and for large contracts in other countries.

2.0 Tender action and letting of contracts i.e. the preparation/co-operation during tender action and letting of contracts

2.1 Definition of duties and outputs/contents i.e. stages G + H in RIBA Plan of Work, and 6 + 7 in HOAI

Basic services

* Production and collation of quantities as a basis for setting up specifications, using information from other members of the design team
* Preparation of specifications with schedules according to trades
* Co-ordination and harmonisation of specifications prepared by other members of the design team
* Compiling the preambles of the specifications for all the trades
* Issuing the tender documents and receiving tenders
* Inspection and evaluation of the tenders, including preparation of a cost breakdown by element, in co-operation with the rest of the design team engaged in these stages
* Harmonisation and collation of the services of the design team engaged in tender action
* Negotiation with tenderers
* Setting up of cost predictions, including the fixed price and variable price elements of the tenders
* Co-operation during the granting of contracts

Additional services

* Setting up specifications and bills on the basis of area schedules and building schedules
* Setting up alternative specifications for additional or specific works
* Compiling comparative cost estimates for the evaluation and/or appraisal of the contributions of other members of the design team
* Inspection and evaluation of the tenders based on specifications of materials and workmanship, including a cost breakdown
* Setting up, inspecting and valuing cost breakdowns according to special conditions

2.2 Aims/risks of tender action and letting of contracts

The tender action aims to formulate contract documents which will enable the construction work of a project to be carried out within the civil legal framework, thus affording the relevant structure of regulation and guarantees. Tenders can be sought when all the relevant information is available for costing. Tender documents consist of: schedule of conditions (e.g. specifications and contractual obligations) plus clauses with descriptions (e.g. possibilities for inspecting the details of the conditions / location, date of the project commencement and completion / limits to time and additional costs).

Tender documents that include the price of the work and signature of the contractor (or his rightful representative) become an *offer*, which can be negotiated or accepted unchanged, resulting in the formulation of a contract, governing everything necessary for the carrying out of the works (e.g. type and extent of the work, amount and manner of payment, timetable and deadlines, and responsibilities).

To prevent, from the outset, differences of understanding and opinion between the members of the contract – and to make clear their mutual responsibilities – contract documents (and hence also the tender documents) must be comprehensive and complete.

Unclear, incomplete tender documents lead to poor building contracts, which provoke conflict, time overruns, defects, loss of value and additional costs.

2.3 Means and tools of tender action and letting of contracts

Contract laws and regulations depend on the country and local situation, and regulate, through the building contract, the legal relationship between the client and the contractor. They generally determine what constitutes a valid contract, how long the liabilities of the contract are valid, recourse to damages, dispute settlement, professional responsibilities and liabilities, and other aspects with regard to contractual relationships.

Contract conditions and articles of agreement are specific to the particular form of contract being used. Because there are many types of standard contract document, it is important that a suitable contract type is chosen to meet the needs of the particular project. Typical headings of clauses of a contract for larger works are listed here:

* Identification of the different members mentioned in the contract, and a description of their role and duties, e.g. employer, contractor, sub-contractors or architect
* Interpretation, definitions, etc.
* Contractor's obligations
* The contract sum, additions or deductions, adjustments and interim certificates for partial completion of work
* Architect's instructions, form and timing of instructions during the contract
* Contract and other documents, and issues of certificates for completions
* Statutory obligations, notices, fees and charges
* Levels and setting out of the works
* Materials, goods and workmanship to conform to description, testing and inspection
* Royalties and patent rights
* Identification of the person in charge of the works
* Access for architect to the works
* Clerk of works or client's representative on site
* Details and procedure in the event of variations and provisional sums
* Definition of the contract sum
* Value added tax (VAT) and other taxes
* Materials and goods unfixed off or on site, ownership, responsibilities incurred
* Practical completion of the contract and liability in the case of defects
* Partial possession by employer
* Assignment of sub-contracts and fair wages
* Insurance against injury to persons and property, and employer's indemnity
* Insurance of the works against perils
* Date of possession, completion and postponement
* Damages for non-completion
* Extension of time
* Loss and expenses cause by matters materially affecting regular progress of the works
* Determination (pulling out of contract) by contractor or employer
* Works by employer or persons employed or engaged by employer, part of, or not part of, the contract
* Measurement of work and certificates for completed work and payment

* Tax obligations
* Unusual eventualities, e.g. outbreak of hostilities, war damage, discovery of antiquities
* Fluctuations in labour and material costs and taxes, and the use of price adjustment formulae

Technical conditions and preambles relate directly to the work to be undertaken and are formulated as general specifications, schedules of duties, general quality of workmanship, programmes of work, etc. and are often divided into the various trades. Typical headings under this section are listed below:

* Scope of work and supply of goods, e.g. includes provision of all necessary tools, purchase, delivery, unloading, storage and installation of all goods
* Quality of goods and components, national or international standards which must be adhered to
* Quality of workmanship, national or international standards of workmanship which must be achieved
* Additional and special duties, specification of the types and range of additional works included within the price, and those special duties which are to be charged in addition
* Method of calculating the amount to be paid to the contractor, and determination of the means of measurement of the work done, e.g. quantitative units, boundaries between different sections of work, measuring techniques, and types of pay calculations (on a time basis, piece work, fixed rates, fluctuating rates, etc.)
* Preambles, more specific and general items of agreement not covered in detail in the main contract conditions can be classed under three headings: *necessary items* are prescriptive (e.g. methods of handover), *recommended items* are advisory (e.g. sequence of work and programming) and *possible items* are suggested (e.g. feedback protocols, meetings, etc.) – taking care that there is no conflict between the preambles and the main contract

Specifications, manufacturers' specifications, performance specifications are detailed descriptions for every part of the work which needs to be carried out. The extent and sophistication of these specifications vary, depending on the size and complexity of the project: for small, simple projects, drawings and specifications will suffice; larger projects need, in addition, schedules (e.g. door and window ironmongery) and bills of quantities (listing the extent of the various elements of the work and giving a basis for the pricing of the work) together with a variety of additional specialist drawings, specifications and schedules (e.g. reinforced concrete work, steelwork, mechanical and electrical equipment, etc.).

To help in the production of specifications and bills of quantities, various systems of standardised texts, split into units or paragraphs, can be included or omitted as required. The suitability and acceptability of the various systems depends on the regulations of each country and profession (e.g. National Building Specification and Standard Measurement of Works in the UK, and the Standardleistungsbuch and LV-Muster in Germany).

Manufacturer's information in relation to materials and equipment, offers additional, useful information in application and installation techniques, constructional details and necessary safety precautions.

In general, in relation to tender action, the use of suitable computer software which links CAD drawings with specifications and bills of quantities is recommended.

3.0 Construction supervision (inspection and supervision of the building works and necessary documentation)

3.1 Definition of duties and outputs/contents i.e. stages J–L in RIBA Plan of Work, and 8 + 9 in HOAI

Basic services will vary according to the conditions of appointment agreed by the architect with the client, and the type of contract agreed between the employer and contractor. The list of basic services will also vary from country to country, depending on the local professional norms. Typical services are listed below.

* Inspection during the progress of the building works to check compliance with the planning approval, the contract drawings and the specifications, as well as with generally accepted qualities of workmanship and adherence to safety regulations and other relevant standards
* Inspection and correction of details of prefabricated components
* Setting up and supervision of a time plan (bar chart)
* Writing of a contract diary
* Combined measuring up of work with the building contractor
* Measuring up and calculating the value of completed work with the co-operation of other members of the design and supervision team while establishing defects and shortcomings, and issuing of certificates
* Inspection of invoices
* Establishing final cost estimates according to the local or regulated method of calculation
* Application to the authorities for grants or subventions according to local and specific circumstances
* Handing over of the building, together with compiling and issuing the necessary documents, e.g. equipment instruction manuals
* Testing protocol
* Listing the guarantee periods
* Supervising the making good of defects listed at handing over
* Ongoing cost control
* Inspection of the project for defects before the end of the guarantee periods of the various sub-contractors and contractor
* Supervision of the making good of defects detected in the inspections before the end of the guarantee periods
* Depending on local laws, inspections for up to five years after completion
* Systematic compilation of the drawings and calculations related to the project

Additional services

* Setting up, supervision and implementation of a payment plan
* Setting up, supervision and implementation of comparative time, cost or capacity plans
* Acting as the agent responsible for the works, as far as these duties go beyond the responsibilities listed as basic services
* Setting up of progress plans
* Setting up of equipment and material inventories
* Setting up of security and care instructions
* Site security duties
* Site organisation duties
* Patrol of the project after handover
* Supervision of the security and care tasks
* Preparation of the measurement data for an object inventory
* Enquiries and calculation of costs for standard cost evaluations
* Checking the building and business cost-use analysis

3.2 Aims/risks of construction supervision

Construction supervision consists of two major elements:

Control, measurement, accounting in relation to the contract conditions and plan of work, and *building programme planning* through the use of project management techniques (availability of people, machines, material at the right time, in the right amount, at the right place). Important aids include operation planning

techniques and time planning techniques using various recognised methods.

Poor building supervision and insufficient control lead, among other things, to unsatisfactory execution of the works, faults (obvious or hidden), faulty measurements and payments for work, additional costs, and danger to operatives (accidents) and materials. Unsatisfactory project management and poor co-ordination normally lead to building delays and extra costs.

3.3 Means and tools of construction supervision

Standard procedures vary according to the country and profession, together with techniques/instruments for project management. Supervision of the works, measurement of works and accounting is based on the drawings (production drawings, detail drawings, special drawings), specifications, schedules, possibly a bill of quantities, and the contract conditions.

The techniques of operation and time planning make use of various common methods: bar charts, line diagrams and networks.

Bar charts (according to Gantt, bar drawings), show the work stages/trade duties on the vertical (Y) axis, and the accompanying building duration or time duration (estimated by experience or calculation) on the horizontal (X) axis. The duration of the various stages/duties are shown by the length of the particular bars (shown running horizontally).

Building stages which follow on from another should be depicted as such on the chart. The description of the building stages and trade categories help in the setting up of the bar chart, and make possible the comparison of the planned programme and the actual progress of the work.

* Advantages: provides a good overall view; clarity; ease of interpretation (type of presentation shows time scales)
* Disadvantages: strict separation of work tasks; no identification of sub-tasks; difficult to show connections and dependence relationships of the work stages (thus critical and non-critical sequences are not identified, and if altering the time duration of one stage will result in the alteration of the duration of the whole project)
* Context of use: illustration of straightforward, self-contained building projects which have a simple sequence of tasks and no directional element (e.g. as in road construction), planning of individual tasks, resource planning (staffing programme/equipment and plant planning) → ① p. 49

Line diagrams – speed–time distance–time (or quantities–time diagrams) – show measures of time (selected) on the one axis (which ones depending on the building task), and measures of length (or, less frequently, building quantities) on the other axis. The speed of the production process (the slope of the line), and the division (in terms of time and space between tasks) are clearly portrayed.

* *Advantages*: clear presentation of speed of progress and critical separations
* *Disadvantages*: poor portrayal of parallel and layered task sequences (spacing and timing of tasks which have no directional element)
* *Context of use*: illustration of building projects with a strong directional element, e.g. length, height,(roads or tunnels) or (towers or chimneys) → ② p. 49

Networks resulting from network planning techniques (as part of operational research) → ③ p. 49 help in the analysis, presentation, planning, directing and control of tasks. The relationships between different operations show how they are influenced by many possible factors (e.g. time, costs and resources).

To calculate the overall project duration, assume a project starting point at time PT_0 and show (calculating forward) the earliest point in time ET (earliest time of start event EST/ earliest time of finish event EFT) for each task (D = duration, time span, beginning/finish of the task). The overall project duration is the duration of project path (critical path)/project finish time ET_n. Incorporating estimated float (buffer time) elements (added together) produces the given project finish time point PT_n. To determine the latest project start time, perform a backward pass (from right to left), taking the latest time point LT (latest time of start event LST, latest time of finish event LFT) for each task (calculating backwards), and hence the latest project start time for the project PT_0, respectively the total float TF of the individual tasks = (latest time point LT – latest start/finish LST/LFT) – (earliest time point – earliest start/finish EST/EFT) → ④ p. 49

The critical path method (CPM) puts task arrows into order. Nodes show the start or finish events of the tasks. The fundamental arrangement of relationships (= dependence between tasks, quantifiable) in CPM is the normal sequence (order relationship from the finish of the previous to the beginning of the following; finish event of task A = start event of task B). The time frame is determined (i.e. the task is allotted a definite estimated duration time). Tasks which are running parallel and are dependent on each other, dependencies of parts of tasks with each other which are a condition for the progress of a further task, are displayed as dummies (dummy arrows, order relationships in the network with time interval of 0). → ① + ② p. 50

The content of the critical path chart mirrors the list of tasks (list of individual activities together with timing estimates). → ③ p. 50

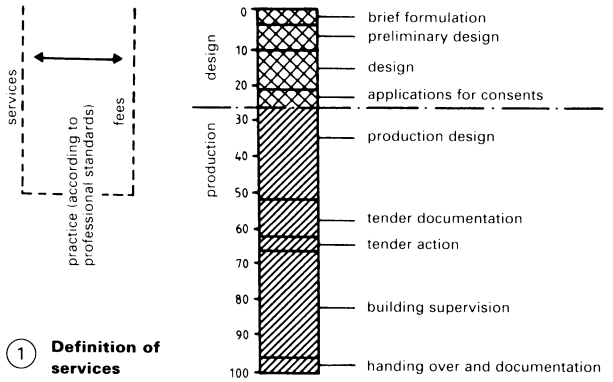
The metra-potential method (MPM) orders the task nodes. Arrows display the order relationships. The fundamental arrangement of relationships with MPM is the order of starts (order relationship between the start of the previous task to the start of the following task; start event of task A = start event of task B). The time frame is determined (as with CPM). The content of the task node network mirrors the list of tasks (compare with CPM). → ②, ③, ④ p. 50

The programme evaluation and review technique (PERT) orders the task nodes. Arrows display the order relationships. The time model is normally stochastic (i.e. the determination of the time intervals between the events is by probability calculations). Geometric models of PERT + CPM can be combined in a mixed presentation (tasks as arrows, and events as nodes). Theoretically, an event arrow-network plan is feasible; however, no practical method is available.

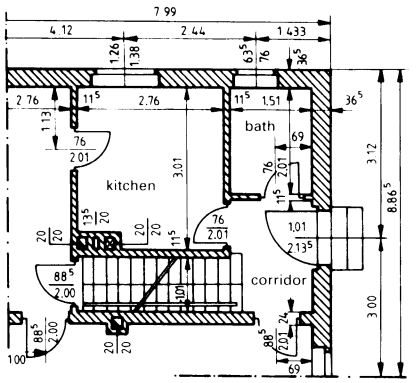
Advantages/disadvantages/appropriate applications of the various network planning methods:

* Pre-organised networks with deterministic time model (CPM/MPM) are the most suitable for detailed direction/control of building operations (emphasis on individual tasks).
* Event-orientated networks (PERT) are more suitable for strategic planning and overview of the project (events = milestones).
* Task node networks (MPM) are easier to set up and alter (consistent separation of tasks planning/time planning), and reproduce a greater number of conditions than task arrow networks (CPM; however, CPM is more widely used in practice, being older, more developed, and because 70–80% of ordering relationships which occur in network plans are standard sequences).

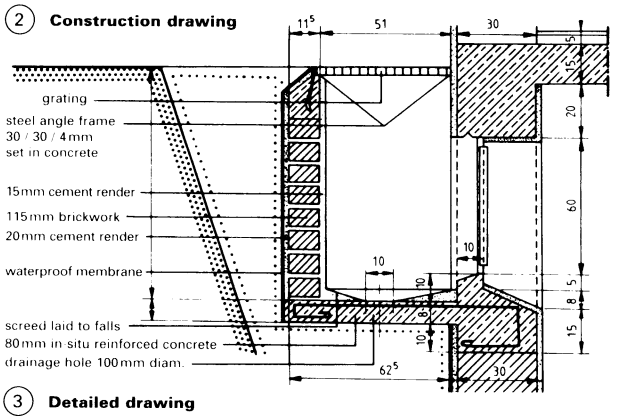
Networks are primarily very detailed but are difficult to read, so additional presentation of the results as a barchart/diagram is necessary. Computers are predestined to be an aid, particularly in setting up large networks (resulting from entries of relevant data from the list of tasks). Suitable software is available (the majority being for CPM).



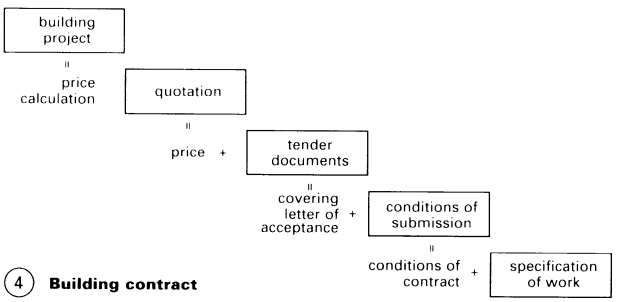
① **Definition of services**



② **Construction drawing**



③ **Detailed drawing**



④ **Building contract**

ARTICLES OF AGREEMENT

1 contractor's obligations
2 contract sum
3 architect
4 quantity surveyor
5 settlement of disputes

Conditions: Part 1: General

1 interpretation, definitions, etc.
2 contractor's obligations
3 contract sum – additions or deductions – adjustment – interim certificates
4 architect's instructions
5 contract documents – other documents – issue of certificates
6 statutory obligations, notices, fees and charges
7 levels and setting out of works
8 materials, goods and workmanship to conform to description, testing and inspection
9 royalties and patent rights
10 person-in-charge
11 access for architect to the works
12 clerk of works
13 variations and provisional sums
14 contract sum
15 VAT – supplemental provisions
16 materials and goods unfixed or off-site
17 practical completion and defects liability
18 partial possession by employer
19 assignment and subcontracts, fair wages
20 injury to persons and property, and employer's indemnity
21 insurance against injury to persons and property
22 insurance of the works against perils
23 date of possession, completion and postponement
24 damages for non-completion
25 extension of time
26 loss and expense caused by matters materially affecting regular progress of the works
27 determination by employer
28 determination by contractor
29 works by employer or persons employed by employer
30 certificates and payment
31 finance – statutory tax deduction scheme
32 outbreak of hostilities
33 war damage
34 antiquities

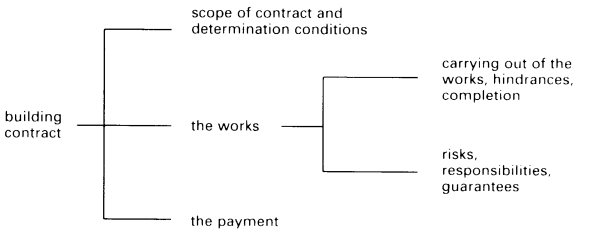
Conditions: Part 2: Nominated subcontractors and nominated suppliers

35 nominated subcontractors – general, procedure for nomination, payment, extension of period for completion of works, failure to complete works, practical completion, final payment, position of employer in relation to subcontractor, etc.
36 nominated suppliers

Conditions: Part 3: Fluctuations

37 choice of fluctuations conditions
38 contribution, levy and tax fluctuations
39 labour and material cost, and tax fluctuations
40 use of price adjustment formulae

⑥ **Typical headings for contract clauses**



⑦ **General contract conditions**

groundworks
excavations
boreholes
diversion of springs
retaining walls
bored piling
water retention works
land drainage
underground gas and water mains
underground drainage
consolidation
retaining works on water courses, ditches and embankments
underwater excavation, dredging
underpinning
sheet piling
sprayed concrete work

construction work
brickwork
concrete and reinforced concrete work
stonework
blockwork
carpentry work
steelwork
waterproofing work
roofing and tiling work
plumbing work

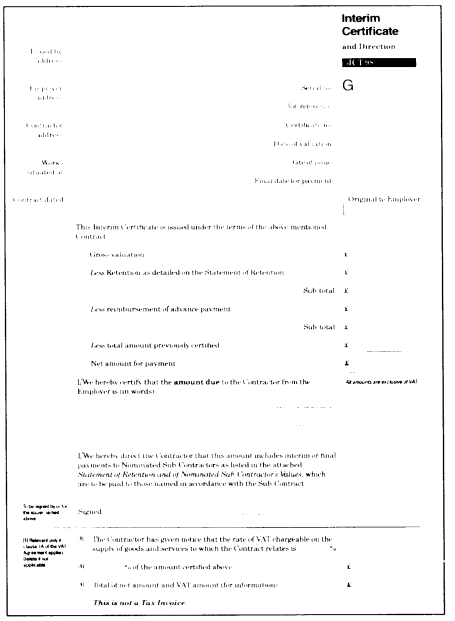
finishing work
plastering and rendering
floor and wall tiling, and paving work
screeding work
asphalt laying
joinery work
floor laying and finishing work

⑧ **Typical division of the work into sections**

A2 room description					B2 room dimensions						B4 service connections for						B5 values			
1			2	3	1		2		3		1	2	3	4	5	6	1	3	6	
prov. room number			use	user	type	area	type	height	type	volume	heating	ventilation	sanitation	elec. supply	other wiring	mech. conv.	temp.	vent.	light	notes
A	B	C				m^2		m		m^3							°C	per h	lux	(key)
	W	104	hall		N	6.92	L	2.47	N	14.87	–	–	–	SW CL FB	TS SI	–	20	1		AS aerial socket CL ceiling light SSO spurted socket outlet TF transformer SW switch SI sink IC intercom SO socket outlet TS telephone socket BA bath WB wash basin WL wall light without switch SWL wall light with switch WC WC FB fuseboard CH central heating MV mechanical ventilation
	W	204	bath/WC		N	3.47	L	2.475	N	8.588	CH	MV	BA WB WC	WB SO TF	–	–	24	7		
	W	304	kitchen		N	6.09	L	2.47	N	15.04	CH	MV	SI	SW SO SWL SSO CL	–	–	20	4		
	W	404	loggia		N	1.69	L	2.363	N	4.000	CH	MV		–	–	–	–	–		
	W	504	liv./din.		N	19.77	L	2.47	N	48.63				SW SO CL	AS	–	21	1		
	W	604	service rm		F		L	2.475	N	0.891				–						

⑤ **Example of a room schedule (Raumbücher in Germany) (abbreviated version)**

Information on this page was provided by the Stanley Partnership, Cheltenham.



Interim Certificate
and Direction
JCT 98

This Interim Certificate is issued under the terms of the above mentioned Contract

Gross valuation £
Less Retention as detailed on the Statement of Retention £
Sub-total £
Less reimbursement of advance payment £
Sub-total £
Less total amount previously certified £
Net amount for payment £

I/We hereby certify that the **amount due** to the Contractor from the Employer is (in words)

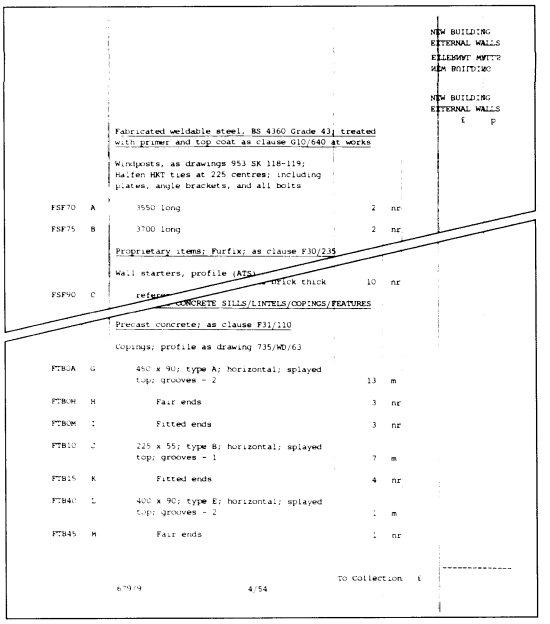
I/We hereby direct the Contractor that this amount includes interim or final payments to Nominated Sub-Contractors as listed in the attached *Statement of Retention and of Nominated Sub-Contractors' Values*, which are to be paid to those named in accordance with the Sub-Contract

Signed

The Contractor has given notice that the rate of VAT chargeable on the supply of goods and services to which the Contract relates is %
% of the amount certified above £
Total of net amount and VAT amount (for information) £

This is not a Tax Invoice

1 **An interim certificate according to RIBA**



NEW BUILDING
EXTERNAL WALLS
ELEMENT UNITS
NEW BUILDING
NEW BUILDING
EXTERNAL WALLS
£ p

Fabricated weldable steel, BS 4360 Grade 43A treated with primer and top coat as clause G10/640 at works

Windposts, as drawings 953 SK 118-119; Haifen HKT ties at 225 centres; including plates, angle brackets, and all bolts

FSF70 A 3550 long 2 nr
FSF75 B 3700 long 2 nr

Proprietary items; Purfix; as clause F30/235

Wall starters, profile (ATS) [illegible] thick 10 nr
FSF90 C refer

CONCRETE SILLS/LINTELS/COPINGS/FEATURES

Precast concrete; as clause F31/110

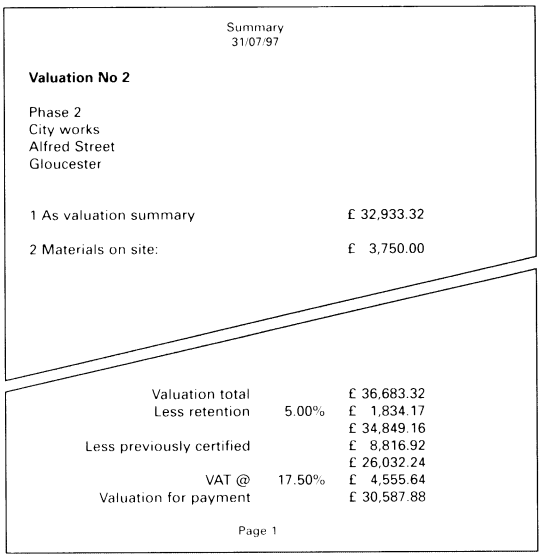
Copings; profile as drawing 735/WD/63

FTB0A G 450 x 90; type A; horizontal; splayed top; grooves - 2 13 m
FTB0H H Fair ends 3 nr
FTB0M I Fitted ends 3 nr
FTB10 J 225 x 55; type B; horizontal; splayed top; grooves - 1 7 m
FTB15 K Fitted ends 4 nr
FTB40 L 400 x 90; type E; horizontal; splayed top; grooves - 2 1 m
FTB45 M Fair ends 1 nr

To Collection £

670/9 4/54

3 **Extract from a bill of quantities**



Summary
31/07/97

Valuation No 2

Phase 2
City works
Alfred Street
Gloucester

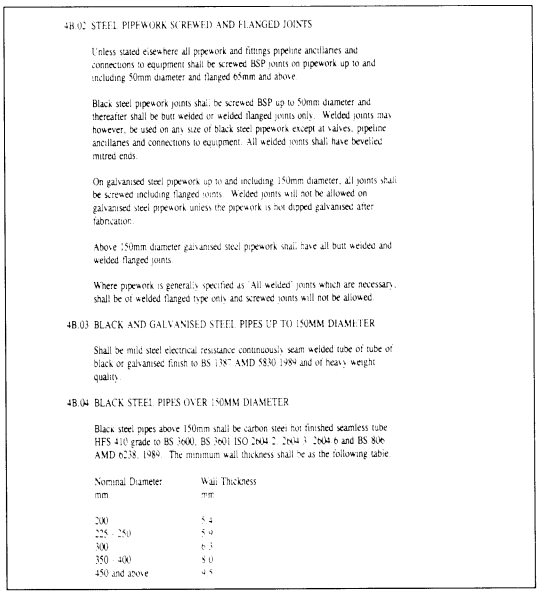
1 As valuation summary £ 32,933.32

2 Materials on site: £ 3,750.00

Valuation total		£ 36,683.32
Less retention	5.00%	£ 1,834.17
		£ 34,849.16
Less previously certified		£ 8,816.92
		£ 26,032.24
VAT @	17.50%	£ 4,555.64
Valuation for payment		£ 30,587.88

Page 1

5 **Example of architect's valuation**



4B.02 STEEL PIPEWORK SCREWED AND FLANGED JOINTS

Unless stated elsewhere all pipework and fittings pipeline ancillaries and connections to equipment shall be screwed BSP joints on pipework up to and including 50mm diameter and flanged 65mm and above

Black steel pipework joints shall be screwed BSP up to 50mm diameter and thereafter shall be butt welded or welded flanged joints only. Welded joints may however, be used on any size of black steel pipework except at valves, pipeline ancillaries and connections to equipment. All welded joints shall have bevelled mitred ends.

On galvanised steel pipework up to and including 150mm diameter, all joints shall be screwed including flanged joints. Welded joints will not be allowed on galvanised steel pipework unless the pipework is hot dipped galvanised after fabrication.

Above 150mm diameter galvanised steel pipework shall have all butt welded and welded flanged joints

Where pipework is generally specified as 'All welded' joints which are necessary, shall be of welded flanged type only and screwed joints will not be allowed.

4B.03 BLACK AND GALVANISED STEEL PIPES UP TO 150MM DIAMETER

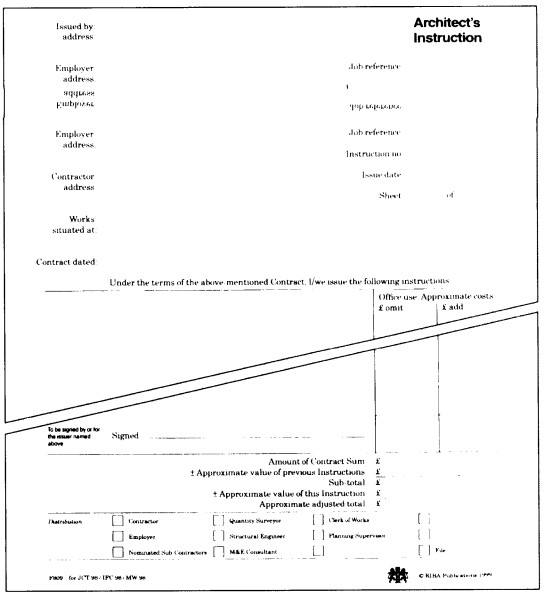
Shall be mild steel electrical resistance continuously seam welded tube of tube of black or galvanised finish to BS 1387 AMD 5830 1989 and of heavy weight quality.

4B.04 BLACK STEEL PIPES OVER 150MM DIAMETER

Black steel pipes above 150mm shall be carbon steel hot finished seamless tube HFS 410 grade to BS 3600, BS 3601 ISO 2604 2 2604 3 2604 6 and BS 806 AMD 6238, 1989. The minimum wall thickness shall be as the following table

Nominal Diameter mm	Wall Thickness mm
200	5.4
225 - 250	5.9
300	6.3
350 - 400	8.0
450 and above	9.5

2 **Extract from a specification of piped services**



Architect's Instruction

Issued by: address
Employer address
Job reference
Employer address
Job reference
Instruction no
Contractor address
Issue date
Sheet of
Works situated at
Contract dated

Under the terms of the above-mentioned Contract, I/we issue the following instructions

Office use: £ omit | Approximate costs £ add

To be signed by or for the person named above

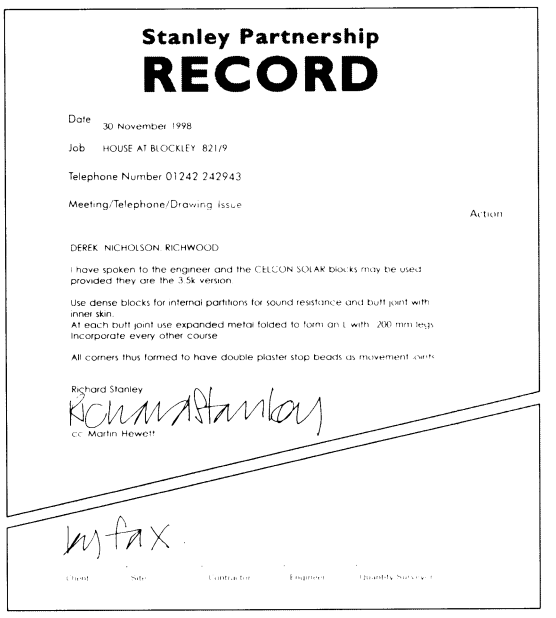
Signed

Amount of Contract Sum £
± Approximate value of previous Instructions £
Sub-total £
± Approximate value of this Instruction £
Approximate adjusted total £

Distribution: Contractor, Quantity Surveyor, Clerk of Works, Employer, Structural Engineer, Planning Supervisor, Nominated Sub-Contractors, M&E Consultant, File

P1609 for JCT 98 / IPC 98 / MW 98 © RIBA Publications 1999

4 **An architect's instruction according to RIBA form**



Stanley Partnership
RECORD

Date 30 November 1998

Job HOUSE AT BLOCKLEY 821/9

Telephone Number 01242 242943

Meeting/Telephone/Drawing issue

Action

DEREK NICHOLSON RICHWOOD

I have spoken to the engineer and the CELCON SOLAR blocks may be used provided they are the 3.5k version

Use dense blocks for internal partitions for sound resistance and butt joint with inner skin.
At each butt joint use expanded metal folded to form an L with 200 mm legs incorporate every other course

All corners thus formed to have double plaster stop beads as movement joints

Richard Stanley

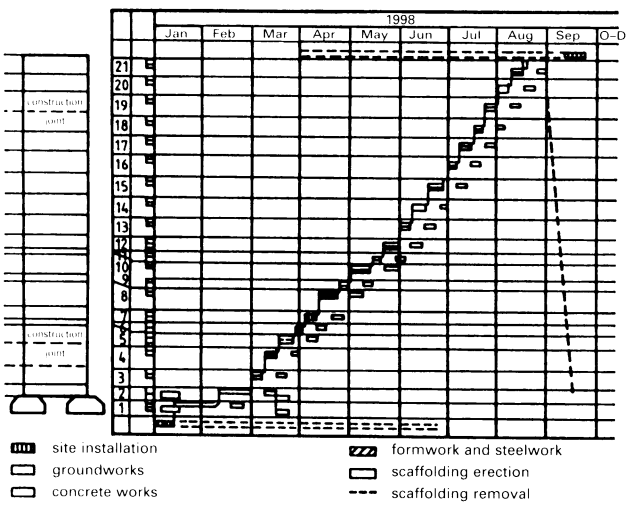
cc Martin Hewett

fax

Client Sub-Contractor Engineer Quantity Surveyor

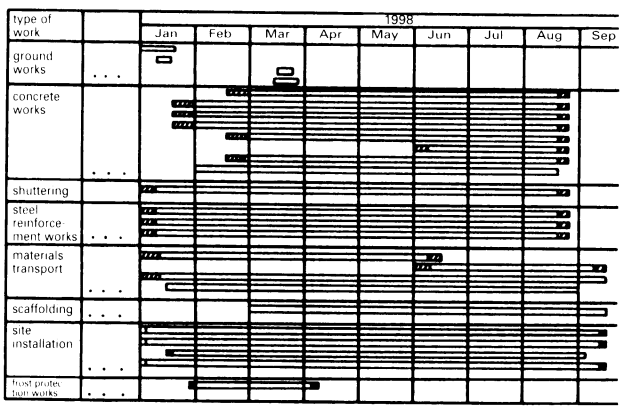
6 **Architect's record of a communication**

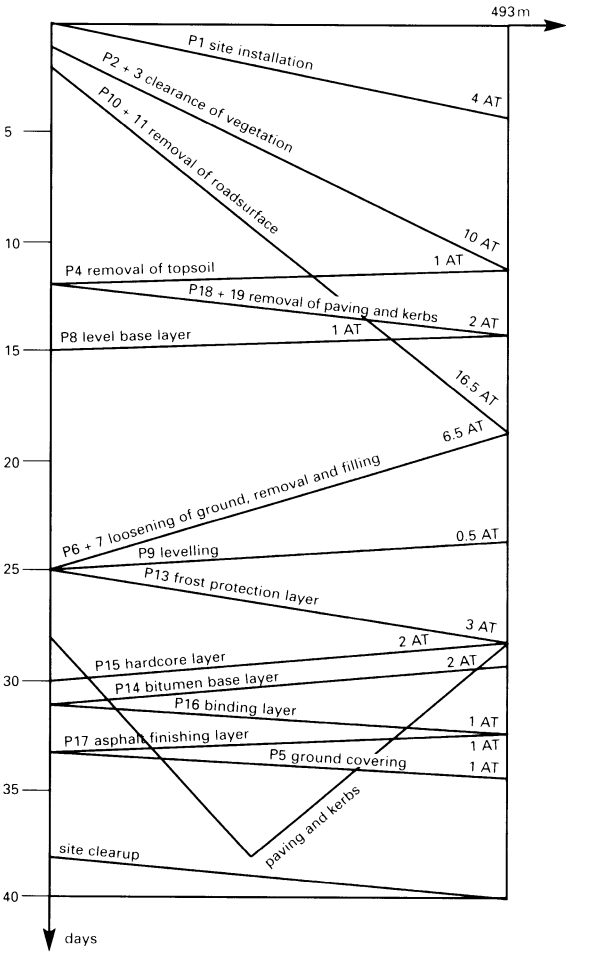
building programme



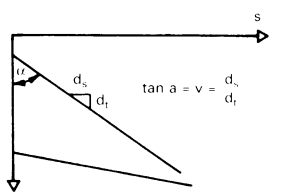
timetable bar diagram, divided into separate trades

plant and equipment programme

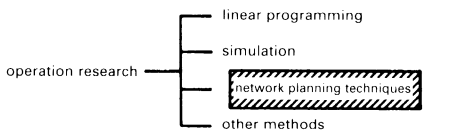




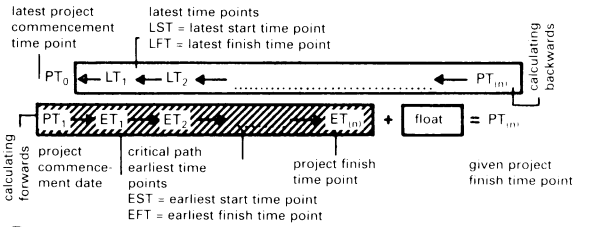
sequence of works:
site installation and clearing
demolition and earthworks
construction of road profile
metalling, paving and kerbs



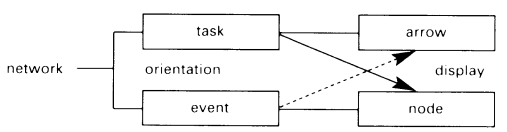
(2) **Building time plan**



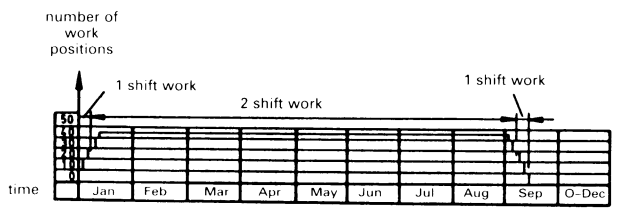
(3) **Network**



(4) **Network calculation**

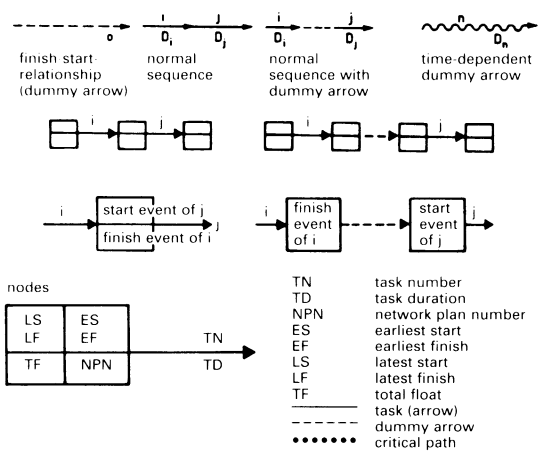


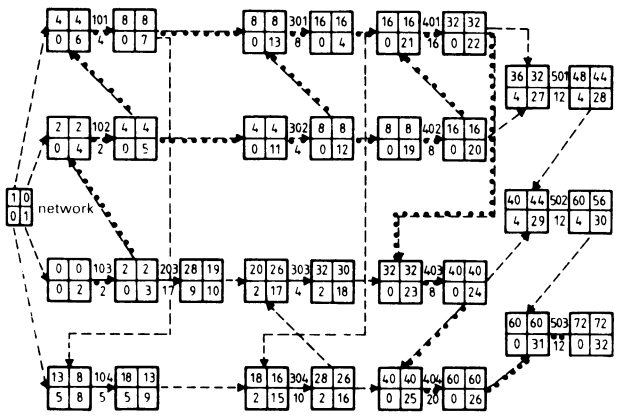
(5) **Network orientation and precedence**



list no.	building section	job description	unit	amount	consumption h/E	Σh	duration h/time unit (day, week, month)	comparison	
								should be	
								is	
								should be	
								is	
								should be	
								is	

(1) **Check list for measured work**





① **Task-arrow network planning method**

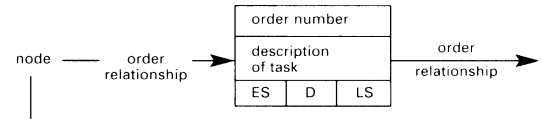
standard methods		network planning methods		
line diagrams	bar charts	order labelling	CPM arrow-orientated	MPM node-orientated
		normal sequence (NS) = 0		Z = D_i
		normal sequence (NS) = 1		Z = D_i + 1
		start sequence (SS) = 0		Z = D_0
		start sequence (SS) = 1		Z = D_i
		normal sequence (NS) = 1 or 2		Z = D_i + 2 Z = D_j + 2 Z = D_j + 2

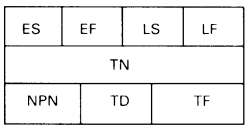
② **Comparison of the display forms of different process diagrams**

pos. no.	short description	duration	point of time: from	point of time: to	dummy: from	dummy: to	earliest: begin	earliest: finish	latest: begin	latest: finish	total float time [1]
			task number		task number						
103	excavation P2	2	2	3	1	2	0	2	0	2	0
102	excavation P1	2	4	5	1 or 3	4	2	4	2	4	0
101	excavation W1	4	6	7	1 or 5	6	4	8	4	8	0
104	excavation W2	5	8	9	1 or 7	8	8	13	13	18	5
203	piling	17	3	10			2	19	11	28	9
302	foundations P1	4	11	12	5	11	4	8	4	8	0
301	foundations W1	8	13	14	7 or 12	13	8	16	8	16	0
304	foundations W2	10	15	16	9 or 14	15	16	26	18	28	2
303	foundations P2	4	17	18	10 or 16	17	26	30	28	32	2
402	concrete columns P1	8	19	20	12	19	8	16	8	16	0
401	concrete columns W1	16	21	22	14 or 20	21	16	32	16	32	0
403	concrete columns P2	8	23	24	18 or 22	23	32	40	32	40	0

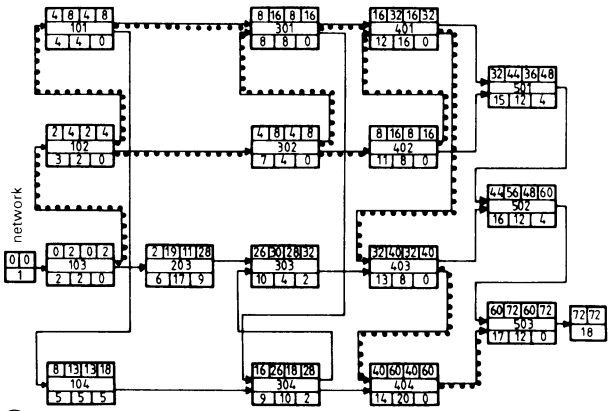
[1] added up

③ **Task list (CPM) cf.** → ①





TN task number
TD task duration
NPN network plan number
ES earliest start
EF earliest finish
LS latest start
LF latest finish
TF total float
→ arrow (relationship)
critical path



④ **Network plan (CPM)**

pos. no.	description of task	duration	previous task	earliest: begin	earliest: finish	latest: begin	latest: finish	total float time [1]
103	excavation P2	2		0	2	0	2	0
102	excavation P1	2	103	2	4	2	4	0
101	excavation W1	4	102	4	8	4	8	0
104	excavation W2	5	101	8	13	13	18	5
203	piling	17	103	2	19	11	28	9
302	foundations P1	4	102	4	8	4	8	0
301	foundations W1	8	101, 302	8	16	8	16	0
304	foundations W2	10	104, 301	16	26	18	18	2
303	foundations P2	4	203, 304	26	30	28	32	2
402	concrete columns P1	8	302	8	16	8	16	0
401	concrete columns W1	16	301, 402	16	32	16	32	0
403	concrete columns P2	8	303, 403	40	60	40	60	0
501	beams P1–W1	12	401, 402	32	44	36	48	4
502	beams P1–W2	12	403, 501	44	56	48	60	4
503	beams P2–W2	12	404, 502	60	72	60	72	0

[1] added up

⑤ **Process list (MPM) cf.** → ④