

Planning and Resourcing **(In works Implementation)**

*Presentation for RAP3 Senior Technical
Management Course*

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Module Contents (Supervision and Executing i.e. 'RAP the Contractor')

- I. Principles of Works Contract, Plan
- II. Interrelation of Time, Quality and Cost
- III. Plan based on Design, Drawings and Specifications
- IV. Resource Planning
- V. Planning and Contract Management
 - Time schedule
 - Updating
 - Supplies and Consumption
 - Reporting
 - Reacting

I. Principle of Works Contract

- ❖ Reference to PPA 2063, Chapter 1, section 2 (d), “Construction Work” means work such as site preparation, excavation, erection, building, installation of equipment or goods and decoration etc., associated with the construction, reconstruction, demolition, repair or renovation of any structure or works,...
- ❖ Principles of works Contract apply equally to RBG works, where RAP3 is the ‘Contractor’ (‘Construction Managers’ (CM) not Resident Engineer’s (RE))
- ❖ Prior to procuring construction works:
 - ❑ Shall have to prepare specifications, plan, drawing, design, special requirement or other descriptions pertaining thereto (Refer: PPA 2063, chapter 2, section 4.)

Why Plan ?

❖ Planning is one of the management tools

(Reference: Principles of Management in Nepal, G R Agrawal, Chapter 5: Planning)

- ❖ Planning is deciding in advance about what to do, how to do it, when to do it and who is to do it . It is time bound.
- ❖ Planning is the process of establishing goals, choosing a course of action for achieving those goals and it guides managers to focus their attention on what is important.
- ❖ It serves as a guide for allocating resources in a coordinated way.
- ❖ Importance of Planning: uncertainty reduction, goal focus, better coordination, efficiency, commitment and control

II. Interrelation - Time, Quality and Cost

- ❖ Successful project management is both an art and science and attempts to control resources within the constraints of time, cost and performance (quality).
(refer to the next slide time-cost-performance triangle)
- ❖ Time, cost and performance is the 'magic combination'
- ❖ Project is usually well defined in cost, time and quality
- ❖ Most projects find crisis to attain the desired quality within time and cost.
- ❖ It is not always possible to sacrifice one of these items without affecting the others.
- ❖ Managing projects within time, cost and quality is easier said than done.

Interrelation of Time, Cost and Quality Graph:

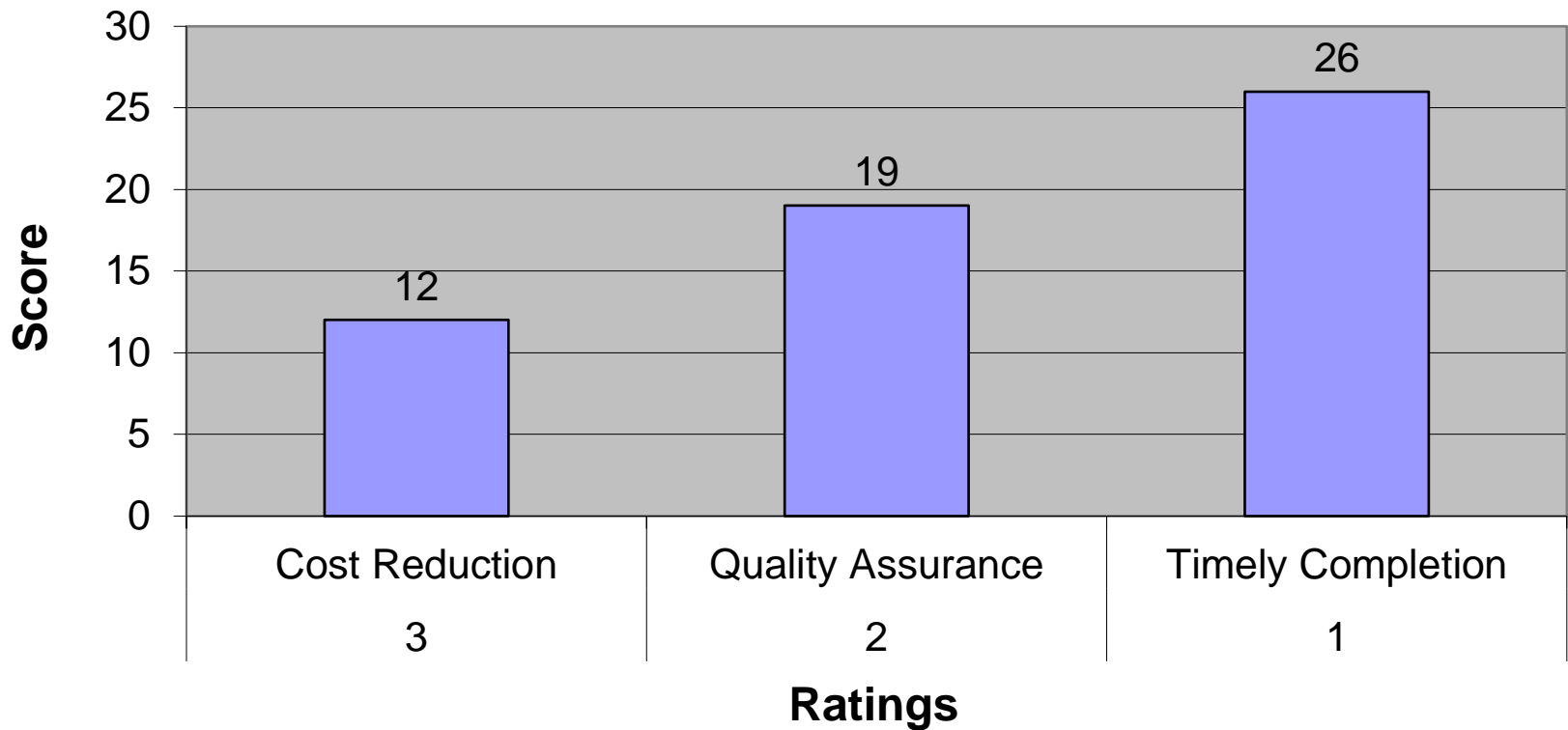
(Reference: Project Management, A System Approach to planning, Scheduling and Controlling, Second Edition, by Harold Kerzner, Content 16. p 760)



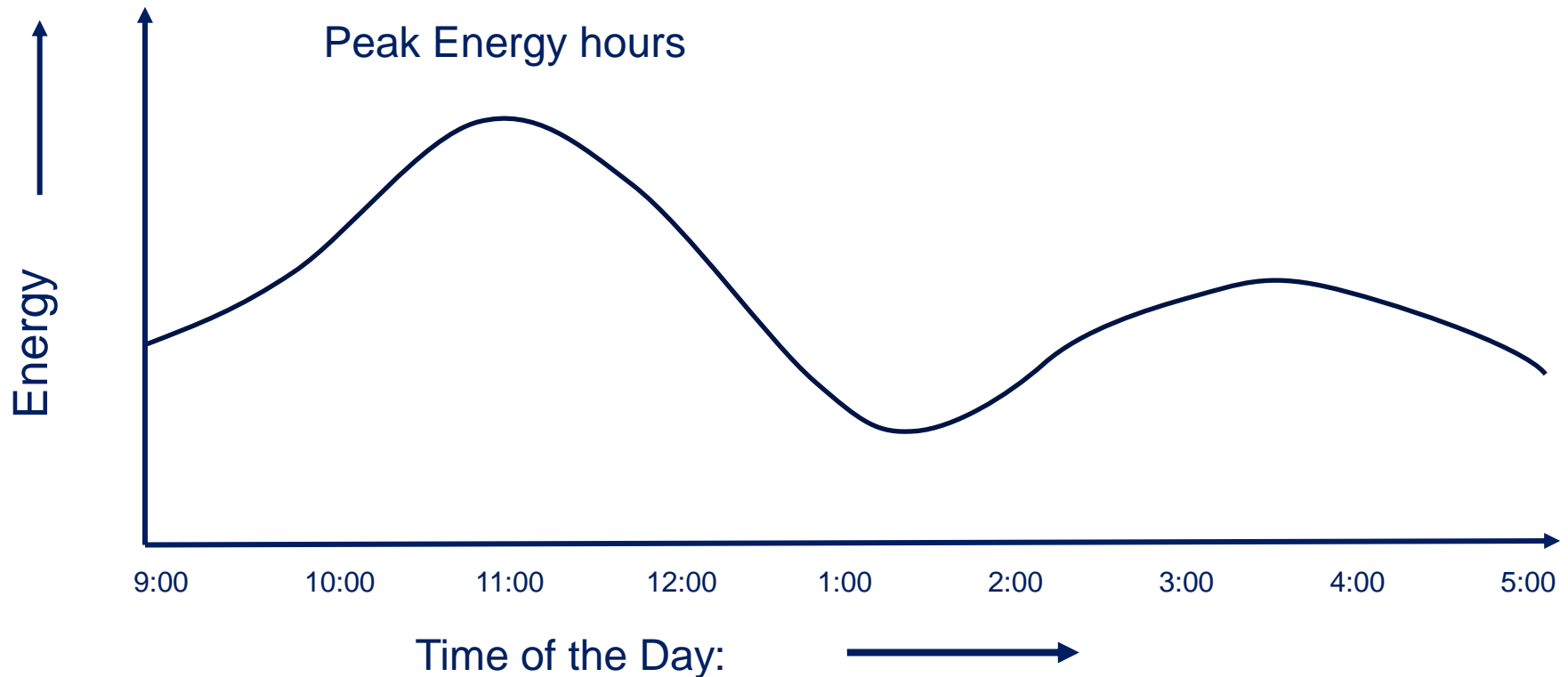
Benefit of Planning in Time, Quality and Cost:

(Reference: Study of Site Management in Building Construction projects by Mahendra Kumar Shrestha, Fig 4.3.23, M. Sc. Thesis)

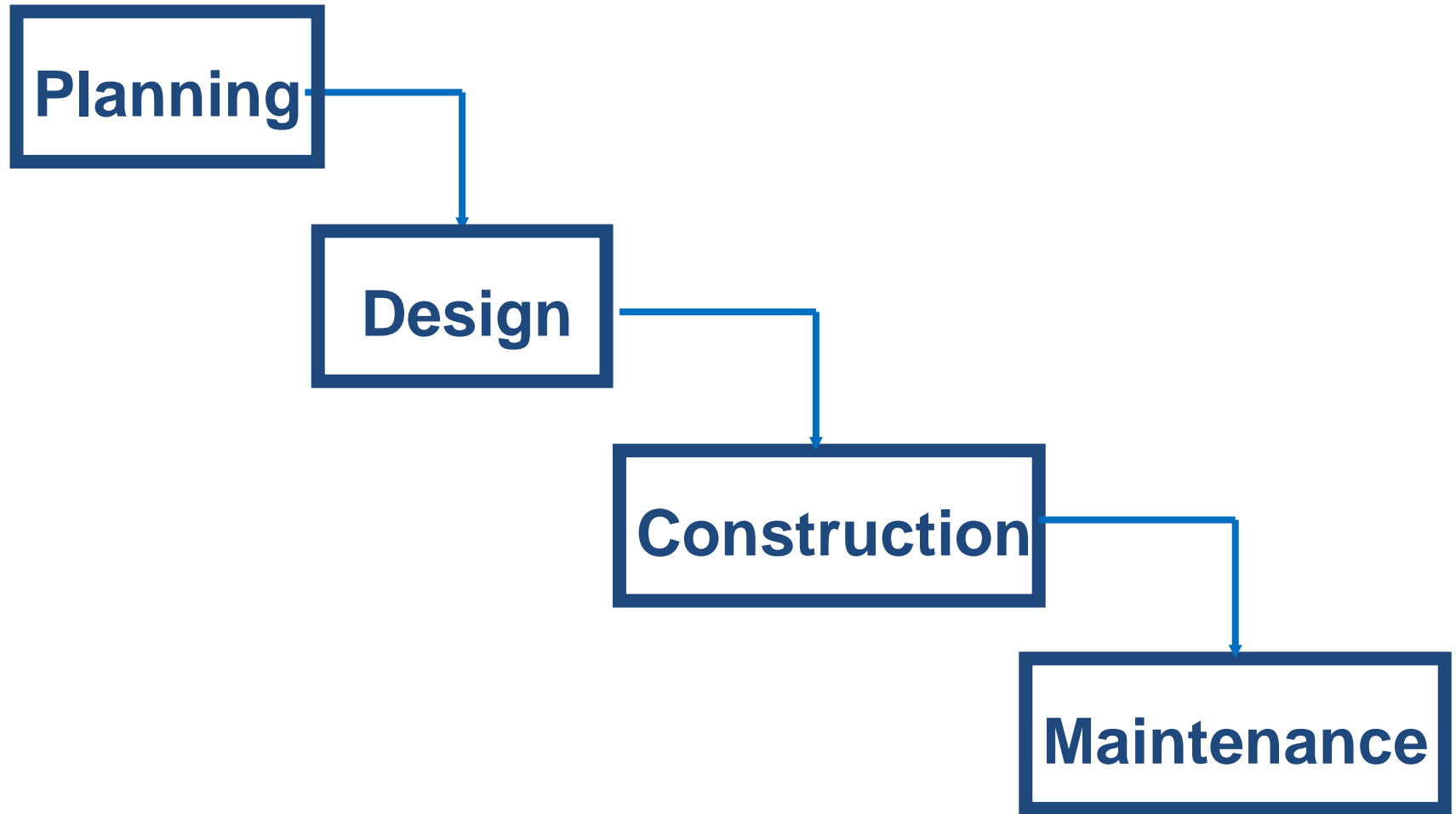
Benefit of Management (Planning) in:



Energy Level Per Day: (Reference: Project Management, A System Approach to planning, Scheduling and Controlling, Second Edition, by Harold Kerzner, Content 6. p 322)



III. Planning and Major Stages of Construction Process



Plan Based on Design (Drawings and Specification)

Manager shall efficiently and effectively manage resources (Capital, Labour and Material) for attaining desired quality of performance within the stipulated time and cost. E.g.:

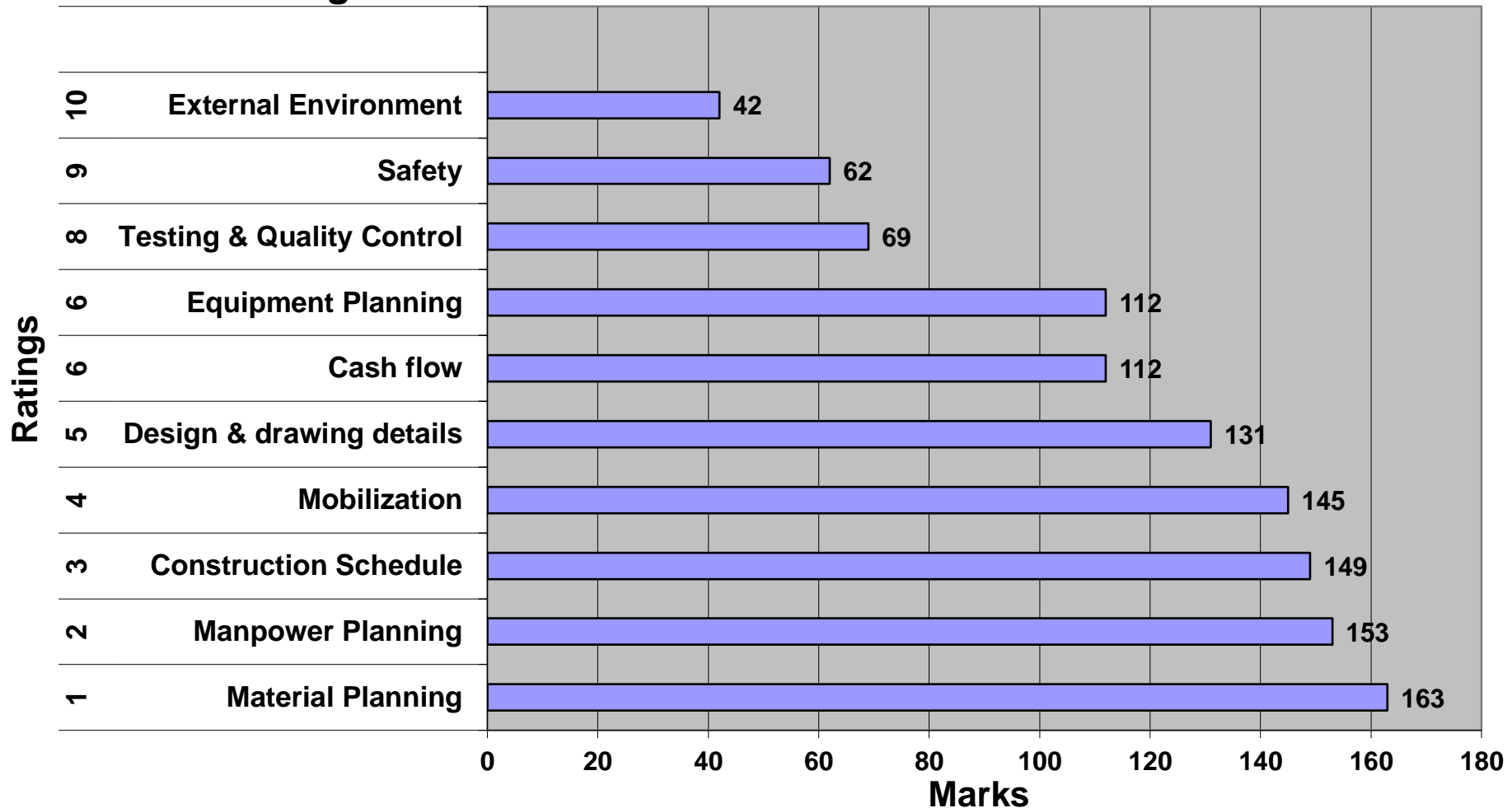
- ❖ Specification of work (quality), design and drawings
- ❖ Tests: before execution of works and during the execution of works
- ❖ Approvals required: When and duration (e.g. mix designs, trial sections etc.)
- ❖ Time: Project duration (commencement and Completion date) construction schedule, 'duration & milestones / key events' and unusable time (festivals, monsoon etc.)
- ❖ Importance of 'Order / Sequence' (e.g. if you haven't received your geotextile you can't start your backfill)
- ❖ Minimising Risk (e.g. accelerate rather than enter monsoon)

Plan Based on Design (Drawings and Specification) Contd.

- ❖ Resources and Output:
 - ❑ Cost: Contract Amount, cash flow, profit / savings, likely variations or amendments if any,
 - ❑ Labours: availability where?, subcontractor required?
 - ❑ Construction materials and equipment: Locally available, Not available in local market (purchased from Other countries e.g. geotextile not available in huge quantities, requires three month for its transportation from Europe to Nepal)
 - ❑ Quality of Output: matches specifications!
- ❖ Compensation events, Taxes, Price Adjustment, Bonus, Liquidated damage, Retention money
- ❖ Other Contract clauses such as Mobilization Advance, Insurance,
- ❖ Safety Issues
- ❖ Bar Chart (With Resources)

Rating of work Construction Activities: (Reference: Study of Site Management in Building Construction projects by Mahendra Kumar Shrestha, Fig 4.3.21 M. Sc. Thesis)

Rating of Work Activities:



IV. Resources Planning:

Management of :

- ❖ Labour
- ❖ Materials
- ❖ Capital

Labour

- What labour is required for output, within allocated time and cost
- Availability of labour in local market or shall be taken from other districts or other countries
- Foremen, skilled, semi-skilled and unskilled labor: 80-90% of construction employment. On-site labor: about 30% of construction cost
- Under-utilized labor force in developing countries

Labour Contd.

- The level of knowledge, skills, attitude and experience, mobility, and farming seasons of the labor force might be of concern.
- Employment instability, low wages, low training and development opportunities, poor working conditions, and lack of social legislations are difficult situations for labor.
- Factors that affect labor productivity: Natural conditions; The nature and quality of management and organization; The nature and quality of labor; The availability of capital; and The level of technology

Materials

- Check what type of materials are required for the project to be completed. Is it locally available or shall be imported ?
- Know, what procurement process needs to be followed to get the materials and how long it takes.
- Estimate the quantities & cost, prepare bid document, publish tender notice, receive bids, evaluation, Lol, Contract award and note: contract duration (generally supplier supplies during end dates)

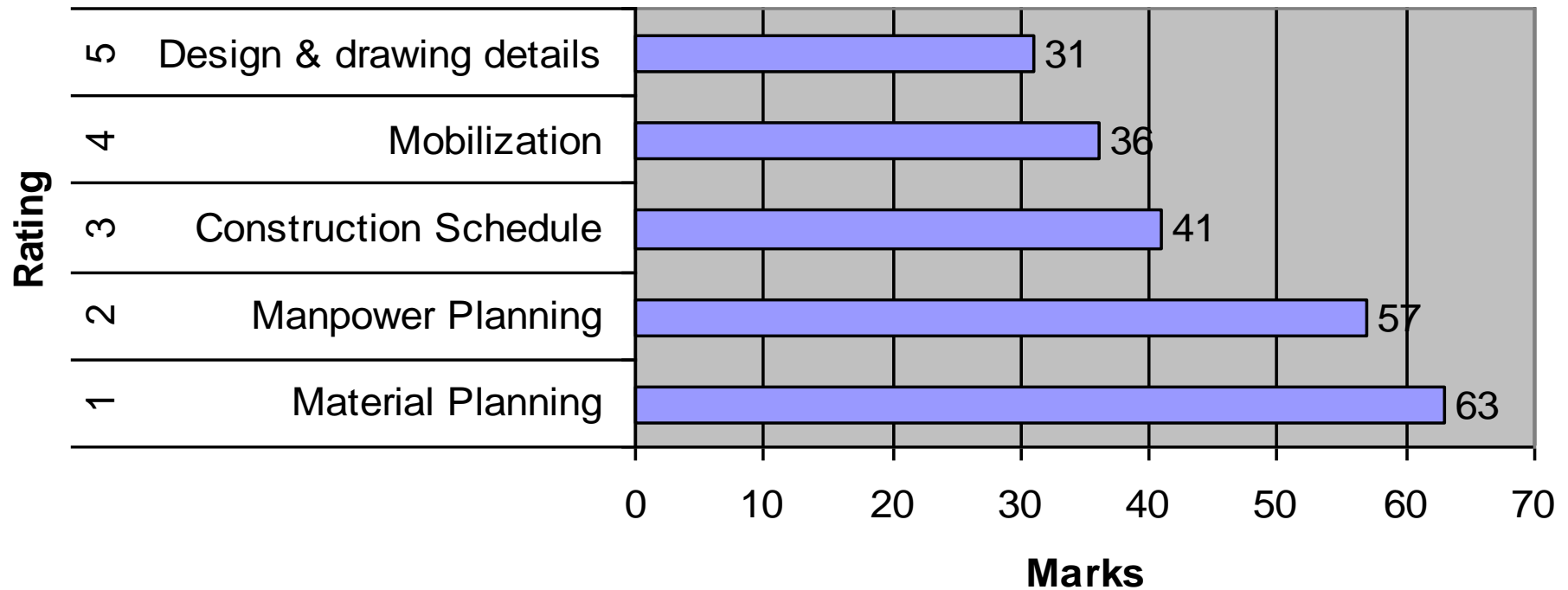
Materials Contd.

- Note: About 60% of construction materials are imported in developing countries. The value of imported construction materials is between 5% to 8% of total value of imports in these developing countries.
- Imported materials are costly, and they may replace the opportunities to explore and produce potential local materials.
- Quality Vs Cost – is it worth spending more for a better tools or material? is it better to replenishment more frequently?

Factors to be considered while preparing work plan

(Reference: Study of site management in Building Construction projects by Mahendra Kumar Shrestha, Fig 4.3.42 (M. Sc. Thesis))

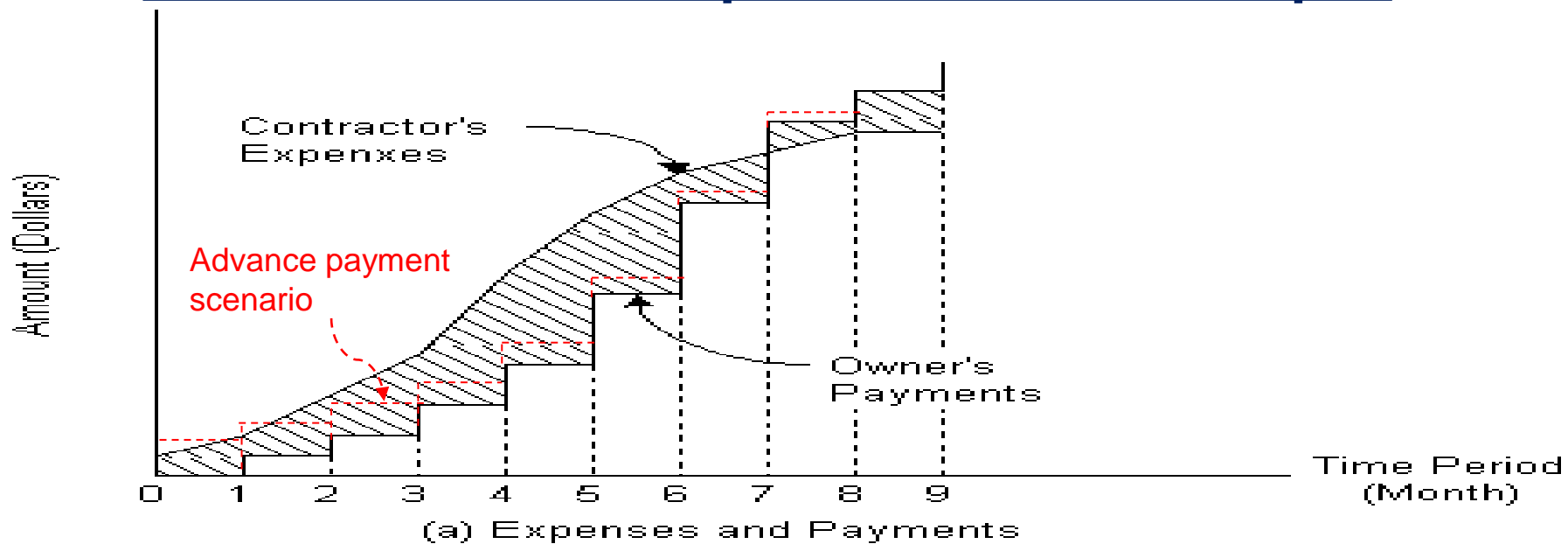
Fig. 4.3.42 Factors to be considered while preparing Work Schedule



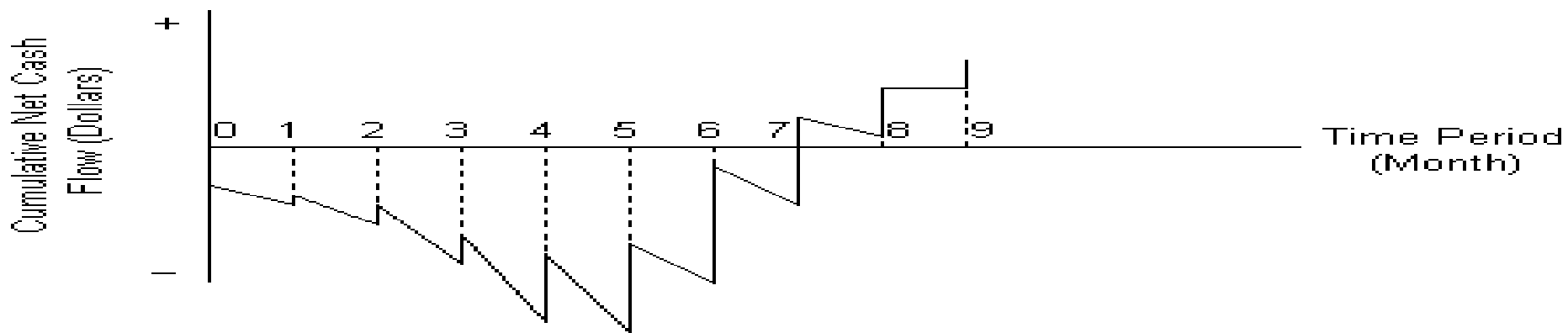
Capital / Cash Flow:

- ❖ **Cash flow: cash flow into and out of project (incoming vs outgoing)**
- ❖ **Source for working capital: For RAP interventions, except Improvement works contracts (Govt. fund), for all other interventions, the funding agency is DFID.**
- ❖ **Work contracts (under Contractor):**
 - ❑ **Working capital for Contractors: Financial institutions (LoC)**
 - ❑ **Advance money (which is seldom enough to get IPC 01)**
 - ❑ **Difficulties in maintaining sufficient capital for contractors: late bill submission, long bill process, Unreasonable payment delays from the client; delay materials supply, unavailability of manpower; High equipment costs and scarce rental provisions; scarcity for equipment, materials**
 - ❑ **Insurance: Insurance practice of contractor's activities are still in limited practice if not non-existent**

Income Vs Expenditure Graph



(a) Expenses and Payments



(b) Cumulative Net Cash Flow of Contractor

V. Planning and Contract Management

- **As defined earlier, planning is one of the management tools.**
- **Lack of management skills hampers managing a contract, hence, for excellent management Manager, he should know:**
 - Types of Procurement**
 - Working Modality**
 - Procurement Plan**
 - Contract methods**
 - Time schedule**
 - Updating**
 - Supplies and Consumption**
 - Reporting**
 - Reacting**

Time Schedule

- ❖ Annual Procurement Plan Schedule / Programme covering timing of (Rule 8(3)):
 - ❑ Preparation of Specification (Goods)
 - ❑ Cost Estimate,
 - ❑ Standard forms and formats
 - ❑ Publication of Notices
 - ❑ Evaluation of Bids
 - ❑ Acceptance of Bids
 - ❑ Entering into Contract
 - ❑ Commencement of work
 - ❑ Completion of Work
- ❖ Target maximum use of available season – ‘start early’
- ❖ Note GoN financial year / preclusion on carry-over
- ❖ Monsoon and festival periods
- ❖ Special demands e.g. emergency maintenance peak following monsoon
- ❖ Nature of works (e.g. continuous routine maintenance or one-off intervention)

Updating the Plan

- ❖ Progress made to date
- ❖ Changes in Works quantity (Design)
 - VOs(+ve and –ve) and amendment
 - Note: in RBG works, there should be similar principle, written order to change the design
- ❖ Changes in available time
 - e.g. EoT
 - Acknowledged overrun

Supplies and Consumption

- ❖ Let's illustrate with an example of large concrete pour. What we need: design mix details, enough aggregates, sand, cement, water, admixtures, weighing machine, cube box, slump test equipment, cube mould, facility for lighting, back-up equipment (tested and reserve units), if it rains then covers, breaks & food for workers, protection for curing etc.
- ❖ Stock / Stores (accurate knowledge of contents): Store management - maintain register and bin cards of received and issued goods, protect from damage, issue goods in the right quantity at the right time to the right place

Photographs of Stocks at store



Supplies and Consumption Contd.

- ❖ Goods received notes (GRN) and their importance:
 - ❑ Receiver counts, confirms and signs the supplier's chalan / delivery note. DTL confirms the quality and signs the GRN. Note defectives if received
 - ❑ TMO aspect to receive GRN with notes (quality in remarks) within one week of delivery. No payment to the supplier without GRN and Quality appraisal.
 - ❑ Respect Contract clause to pay within 28 days of supplier's application for payment. (GRN confirms the delivery of goods)
 - ❑ Refer to next slide for GRN format

GRN / Quality Checked

| Name of Supplier: | | | | | | | | | |
|-------------------|--------------|------|----------------------|---------------|-------|---------------------|--------------|-------------|---------------------------|
| Name of Contract: | | | | | | | | | |
| Contract No.:- | | | | | | | Date:- | | |
| S.N | Descriptions | Unit | Total Agreement Qty. | Delivery date | | Total delivery Qty. | Balance Qty. | % Delivered | Remarks / Quality Checked |
| | | | | Date1 | Date2 | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
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| | | | | | | | | | |
| | | | | | | | | | |

Received by:

Signature:.....
 Name:.....
 Position/Firm:.....

Checked by:

Signature:.....
 Name:.....
 Position/Firm:.....

Approved by:

Signature/Stamp:.....
 Name:.....
 DTL, RAP3



Rural Access Programme

Development through access

Supplies and Consumption Contd.

- ❖ Consumption till date (know what you've used):
 - ❑ Keep record of consumption till date and balance quantity, this will give you knowledge of what you've used and what is the remaining balance.
 - ❑ Very essential to know for material management.
- ❖ Rate of consumption / extrapolation / duration of stocks / when to re-order:
 - ❑ As a CM, DTL shall know the rate of consumption.
 - ❑ He shall extrapolate the duration up to when the balance is enough to execute the work on site.
 - ❑ He shall know exactly when to order taking into account procurement process and likely delivery time, so that the work won't hamper in absence of material

Reporting

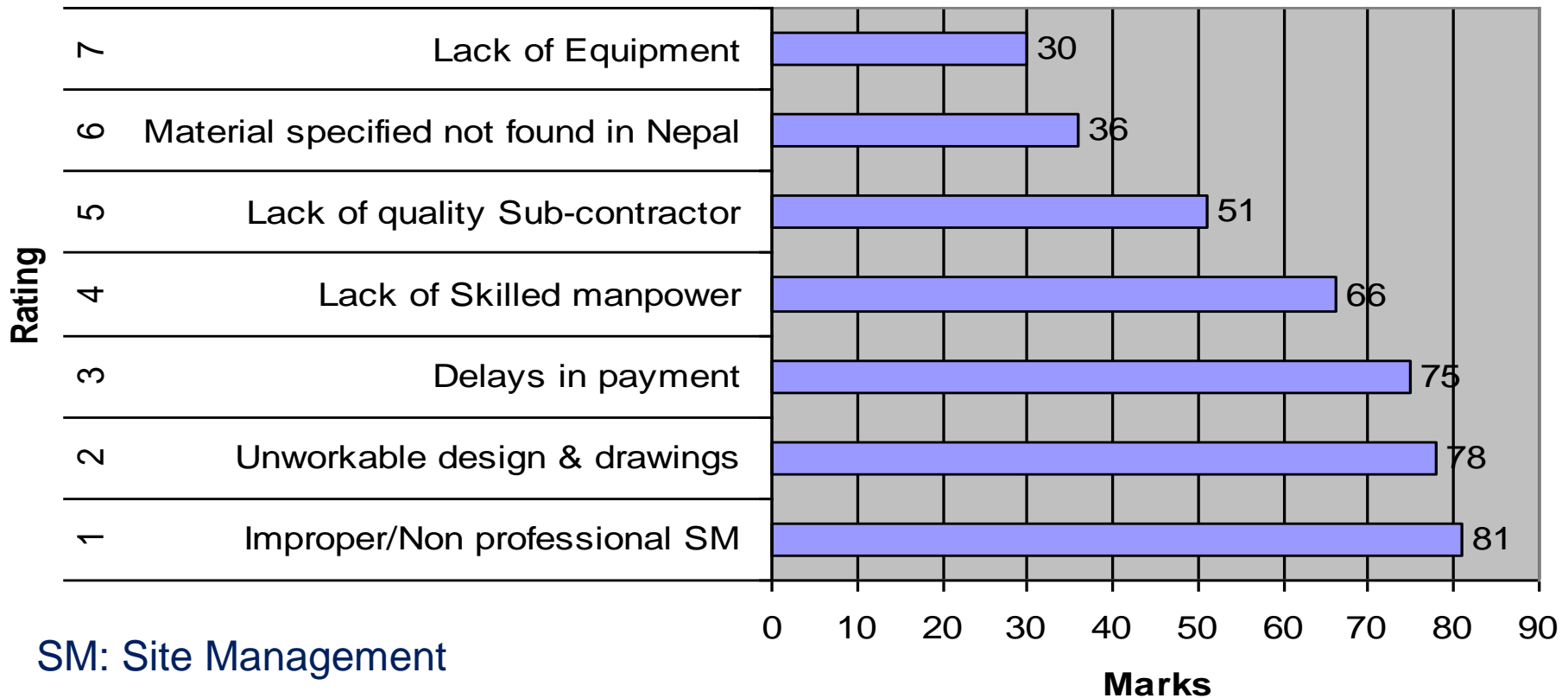
- ❖ Progress report is a necessary part of any project.
- ❖ DTA needs to submit the progress report to TMO through DC. It's a communication between DTA and TMO.
- ❖ It gives an idea on what was wanted (programme) and what is achieved (progress)
- ❖ In RAP, TMO needs to know the progress so that it can act on time and adopt steps to achieve the target/goal (Contingency plan)
- ❖ Correctness of report (check and review entries before sending)
- ❖ Logic checks (no 109% progress please, e.g. road open data with more than 100%, is it possible?)
- ❖ If any corrections, please update and explain if any progress has suddenly gone backwards.

Reacting

- ❖ Constant knowledge of status – am I on track?
- ❖ For an example of goods supply:
 - ❑ Update the store and stocks- check availability and foresee, does the quantity meet the demand up to...?
 - ❑ Please avoid last hour request
 - ❑ Check regularly as procurement takes at least four months to reach the districts! Know regular procurement schedule and delivery time (generally early December).
- ❖ Recovery / Acceleration: Know the goal, completion time; Check rate of consumption / extrapolation / duration of stocks / when to re-order
- ❖ Foresee likely delays.

Causes of Delays: (Reference: Study of Site Management in Building Construction projects by Mahendra Kumar Shrestha, Fig 4.3.42 (M. Sc. Thesis))

Fig. 4.3.55 Root Causes for Delays



Case Examples:

Case example 1: Geotextile consumption on a remote site

- ❖ A RAP-3 district had two regular procurements of Geotextile in Yr-I and Yr-II as per the District's requested quantity. The supply was on time. However, three months after due supply date of Yr-II contract, there was a sudden request of about 6500sqm of geotextile, and supply was made possible by issuing VO through negotiation with the supplier from Yr-II contract, while technically out of Supplier's contract completion date. Now the bid evaluation is in process for Yr-III. Regular supply contract and supply will be possible in end of November or early December 2016, but the district now has no geotextile and needs supply in first week of September 2016 to run the work. Although not strictly in accordance with PPA/R, direct procurement is in process to try to meet their demand.

Case example 1 Contd.

❖ Suggestions:

- ❑ Know the Designed quantity and confirm corrections regularly
- ❑ Know the rate of consumption
- ❑ Do extrapolation
- ❑ Check duration of stocks
- ❑ Know it takes three months for transportation from third country to Nepal
- ❑ Define when to re-order
- ❑ Try to fit in regular yearly procurement cycle, generally supply takes place in end of November or first week of December (due to weather windows). Recheck if supply quantity is enough to carry out the construction work up to next supply season, if not act before the contract expires.
- ❑ Know that very little stock is available with the local suppliers

Case example 2: ‘New Construction project design – Gabion quantities and wastage of excess’

- ❖ About 75% of the total designed gabion box quantity had been procured and delivered in Yr-I and Yr-II supply contract. The Yr - II supply end date was on 26th May 2016.
- ❖ During the recent DC visit, he acknowledged that the quantity delivered is already more than actual need on site.
- ❖ Due to overdesign, the supplied gabion box quantity for the particular road is in excess and will be wasted.

Case example 2 Contd.

❖ Suggestions

- ❑ Know the designed quantities and confirm corrections regularly. Note at what chainages, the designed gabion boxes were unwanted and reconfirm quantities regularly.
 - ❑ Confirm the changes made on site are okay.
 - ❑ Know rate of consumption, do extrapolation, check duration of stocks
 - ❑ Outline when to re-order or cancel the order
- ❖ TMO thought that 75% was on safer side not realising no proper checks were being performed.
- ❖ Question – if the excess materials cannot be utilised or need cost for transportation, who should bear the cost?

END

