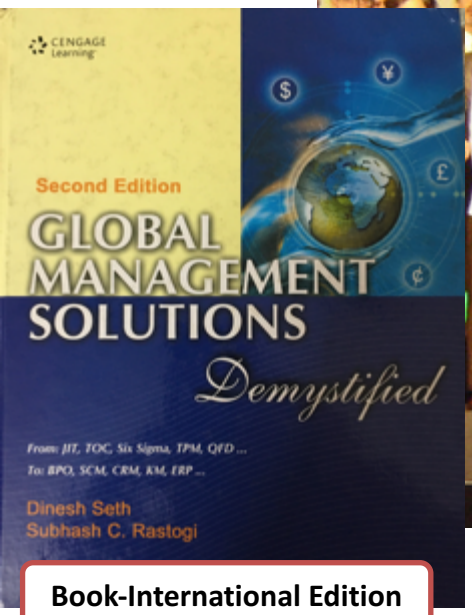
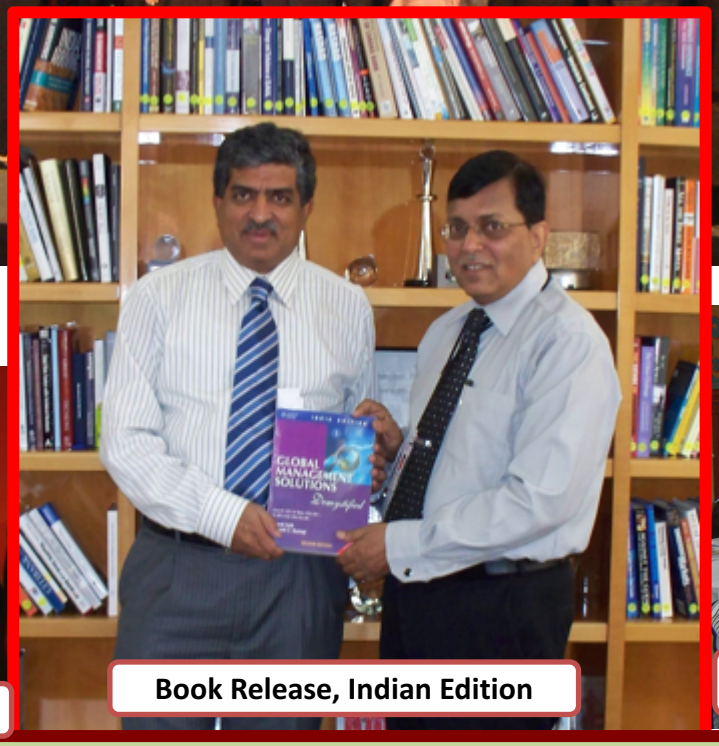
Lean Construction Project Management.



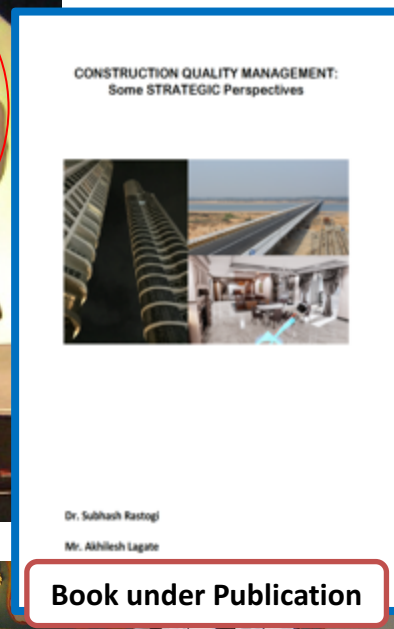
Book-International Edition

Global Award PMI USA

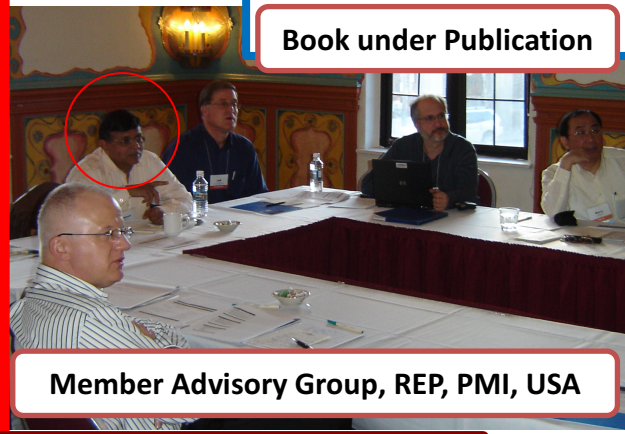
Global Leadership Award Tech Mahindra



Book Release, Indian Edition



Book under Publication



Member Advisory Group, REP, PMI, USA

Dr. Subhash Rastogi, Ph.D. (NITIE); B. Tech. & M. Tech. (IITK), PMP, PMI-ACP

Two International Awards from Corporate University Exchange, USA

> 20 Awards from Corporate like Infosys, HCL & Tech Mahindra

OUTLINE

WHY LEAN?

WHAT is LEAN PHILOSOPHY ?

KEY LEAN TOOLS &
METHODOLOGIES ADDED TO PM KIT

DIFFERENCE between
PROJ. MGT. & LEAN PROJ. MGT.

ONE PAGE SUMMARY OF LEAN PROJECT MANAGEMENT

VALUE of SUSTAINABILITY: Multiple Stakeholders

"WHY"

Investors/ Promoters

- •ROI
- •Growth/ Mkt Share
- •Branding

Govt./ Society

- • Exports/ Revenue
- •Employment
- • Environment
- •Societal welfare

Multinational Organization

Complexities:

- Complimentary & Conflicting Expectations
- Changing Priorities of 'The Key' Stakeholder

Employees

- •Compensation
- •Work Envirem't
- •Challenges
- •Security/ growth

Customers

- •Price
- •Quality
- •Delivery /availability
- •Flexibility + Service

Biz. partners

- • Profit
- • Growth
- • Relationship

Effective Project Manager's requirements

"WHY"

PROJECT Life Cycle Skills

- Domain Expertize
- Geography Knowledge of Work-site
- Current & Emerging Technologies

PROJECT MANAGEMENT Life Cycle Skills

- Activities performed during IPECC/ PDCA
- Use of appropriate PM Methodologies
- Risk Management

Proj. Mgt. LEADERSHIP Skills

- Client/ Users Involvement
- Rapport/ Relationships
- Motivating Team
- Knowledge of Cultural, Social, Political environment, globally

Proj. Mgt. ENTERPRENEURAL Skills

- Focus of Stakeholders' VALUE (Big Picture)
- Emotional maturity
- Innovating/ Alternate Thinking
- Speedy decision making

PM INEFFICIENCY is not widely recognised

"WHY"

Efficiency of Construction Processes in the Industry
(By Level of Lean Engagement)

Source: McGraw Hill Construction, 2013

Large number (100-14= 86%) of Non-Practitioners of Lean Concepts are not NOT EVEN ABLE to HUNT the Inefficient Processes

Most of Construction Projects in past have DELAYED..

..Leading to Over Budgets, Low Profitability, Disputes, Employees inconveniences even their Fury!!

"WHY"

Most Delay-Factors (frequently changing Target Dates!!) relate to Main Contractors' problems like:

Lack of 'shared vision/ VALUE' of the project; focus mainly of 'my work'

Poor Risks Identification & 'reactive' Management

Inefficient, Impractical or No 'EARLY micro Planning', hence False promises

Poor Communication, Collaboration, Coordination among Stakeholders (leading to fire-fighting & blame-game!!)

Very High Wasteful Activities & Frequent "Interruptions" in the flow of Project Work

Insufficient Managerial & Supervisory Skills

Low Machines & Labour Productivity/ Output

Poor Material Delivery/ SCM

ABOVE ALL: "Busy Syndrome": LACK of TIME for improving methods/ processes, to "MAKE-UP" for the LOST TIME in Execution

What is LEAN PHILOSOPHY?

"WHAT"

Lean is a management philosophy defined by **the** **Ideals** it pursues, the **Principles** followed in pursuit of these ideals, **&** the **Methods** **used to implement** these principles

IDEALS:

Give (both internal and external) customers **Value**

- The ***Internal*** customer (next person in a process after you)
- The External Customer
- Other Stakeholders (Investors, Biz Partners, Employees, Society around)
- The Mother Earth

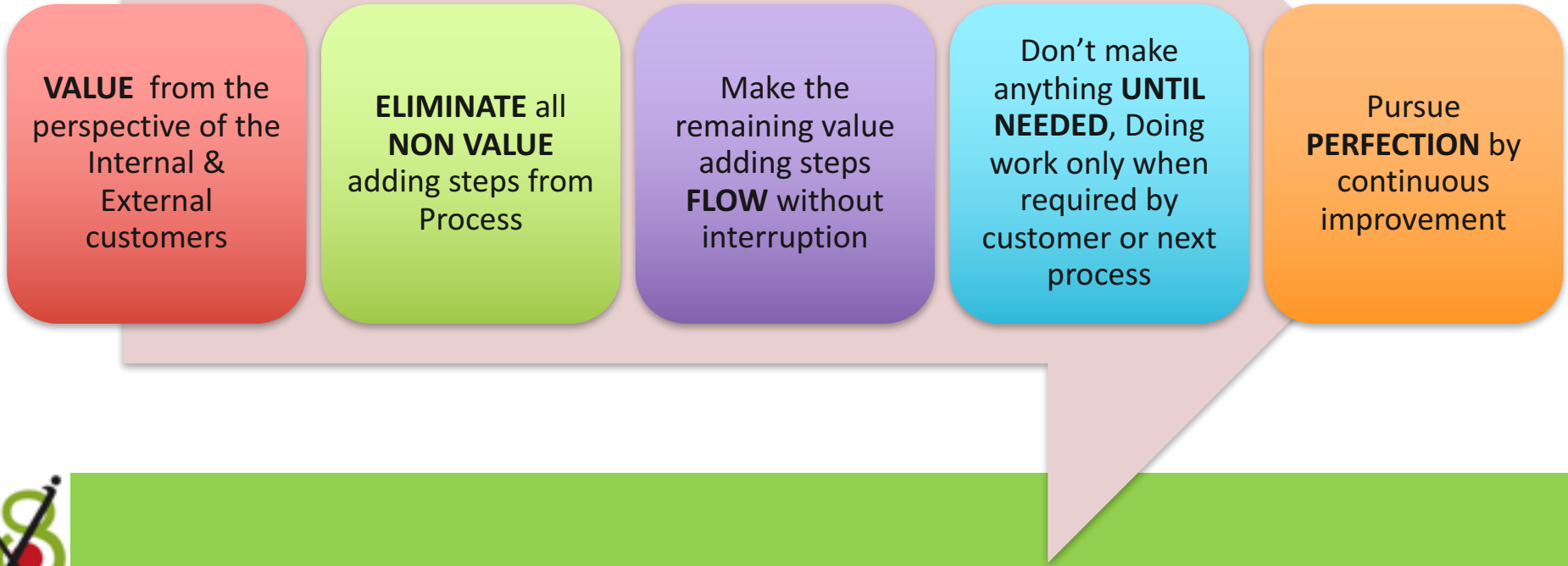
PRINCIPLES:

- Base Mgt. decision on Long-Term benefit @ expense of short-term
- Develop culture of 'stopping' work to find & fix problem: get right Quality first time, every time.
- Create continuous process work flow to bring problem to surface; to resolve
- Become continuous learning & continuous improvement Org.
- Grow Leaders, who understand & believe Lean Philosophy; Teach others

LEAN : A Comprehensive DEFINITION ?

"WHAT"

"A systematic approach to define VALUE, identifying and eliminating WASTE, bringing SPEED, PREDICTABILITY & CERTAINITY in WORKFLOW through PULL Planning and achieve PERFECTION through continuous improvement."



Methods to Implement Lean Principles

"WHAT"

Learn to DO things DIFFERENTLY, to achieve DIFFERENT RESULTS. Focus on:

Learn to also Identify INTERNAL CUSTOMERS and improve VALUE for them to accelerate work

Develop a 'HAWK EYE' to Hunt Eight Wastes & reduce by at least x % points

Learn "The Last (Lean) Planner" to collaboratively PLAN & micro-plan & 'STEER' Projects to Accelerate Workflow by y %

Identify the BOTTLENECKS to VALUE STREAMS and find INNOVATIVE (Low Cost) Solutions to improve Machines & Labour Productivity/ Output to reduce Construction Cycle Time by z %

PREDICT the nature of Defects and PREVENT those to occur, instead of finding and fixing those for better quality and to avoid Delays

Learn to COLLABORATE & COMMUNICATE among Key Stakeholders and realize its rewards in terms of lesser stresses and higher Profits

INVEST TIME for improving processes, to "MAKE-UP" for the LOST TIME in Execution in next Planning band

Lean Method 1: Hunting & Eliminating 8 Wastes

"WHAT"

WASTES	EXAMPLES
WAITING	Work Front; Materials; Equipments; Tools; Manpower; Drawings/ Approval/ Information; Favourable Weather; Safety , Space for work, Religeous Ritual to be over
REWORK	Functional or Aesthetic Defects/ Snags/ Punches due to poor workmanship/ material/ equipments or tools/ Old version of drawing/ last minute change by Client; Rejected Material
TRANSPORTATION	Unnecessary/ Double material movement; Transshipment; Searching for material; Unnessary/ Excess movement of Bulld Material (Cement; Steel; Excavation waste; Debries etc
MOTION	Unnecessary motion for going to different places for meetings; Tools; materials etc ; searching people, tools, documents etc; both in horizontal & vertical structures
OVER-PRODUCTIO	Incomplete work- not required by Internal or External customer at that time; WIP; Ordering more than required or ordered too soon; Constructing somethimg not required by Client
OVER-PROCESSING	Any non-value adding Task like excess supervision; Frequent Design/ Specs changes; Multiple approvals; redundant Reports etc internal or external client is not willing to pay for.
INVENTORY	Unnecessary Inventory blocking working space, working Capital ; Early Delivery of material Rejected / Scrap/ Damaged material/ Tools/ equipments;
UNDER-UTILIZED CAPABILITIES	Under-utilization of the Rated Capacity of Equipments; Under-utilization of Talent & creativity and capabilities of Human Resources

2. LEAN PLANNING & EXECUTION: Current Problems

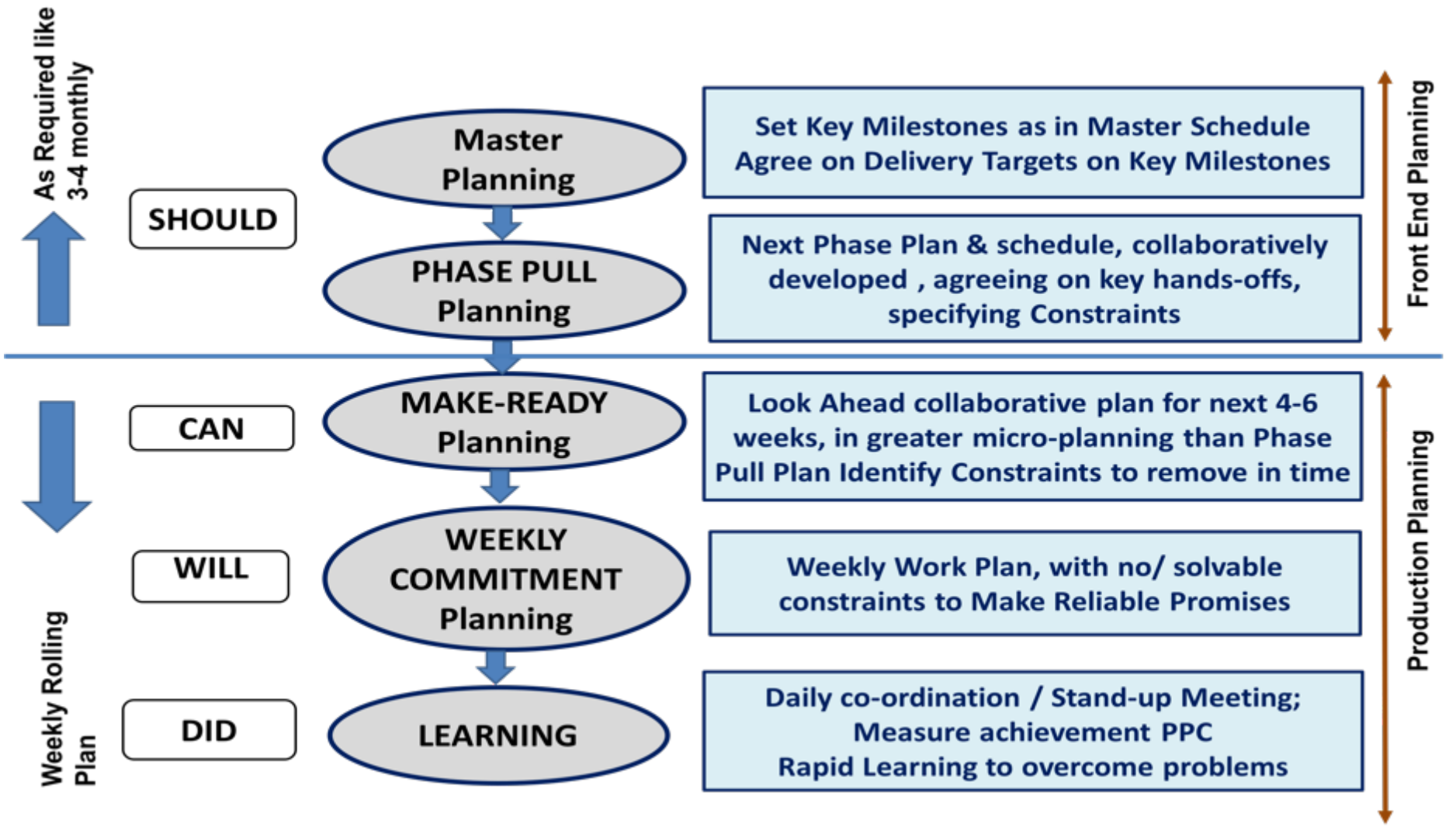
"WHAT"

- Frequently deferring Project Completion Target Dates
- False Promises made by Contractors, about Quality & Delivery dates.
- Poor Communication, Coordination and Collaboration among various Contractors & Consultants
- Fire-fighting & Blame Game: no concept of 'Internal' Customer
- Various Surprises & Project **Interruptions** at different point of time.
- **Variable day-to-day Productivity/ Output and hence Project planning uncertainties across project…& wastes & delays**
- High Inter-dependability of various trades of the Contractors
- Big mismatch between Corporate & Construction Site Planning
- Culture of **'Control & Command'** by the management rather than **'Enablement & Support'** to various contractors.
- Mostly Reactive/ Crisis management rather than Pro-Active management style. All **"7 requirements"** not taken care presently.
- All have Busy Syndrome: hence there is almost no time with anyone for improvement
- Very large number of speciality contractors
- Low usage of automation in general

Lean Method 2: The LAST PLANNER SYSTEM

"HOW"

(Collaborative, Early Alert, Pro-Active….)



Lean Method 2: The LAST PLANNER SYSTEM

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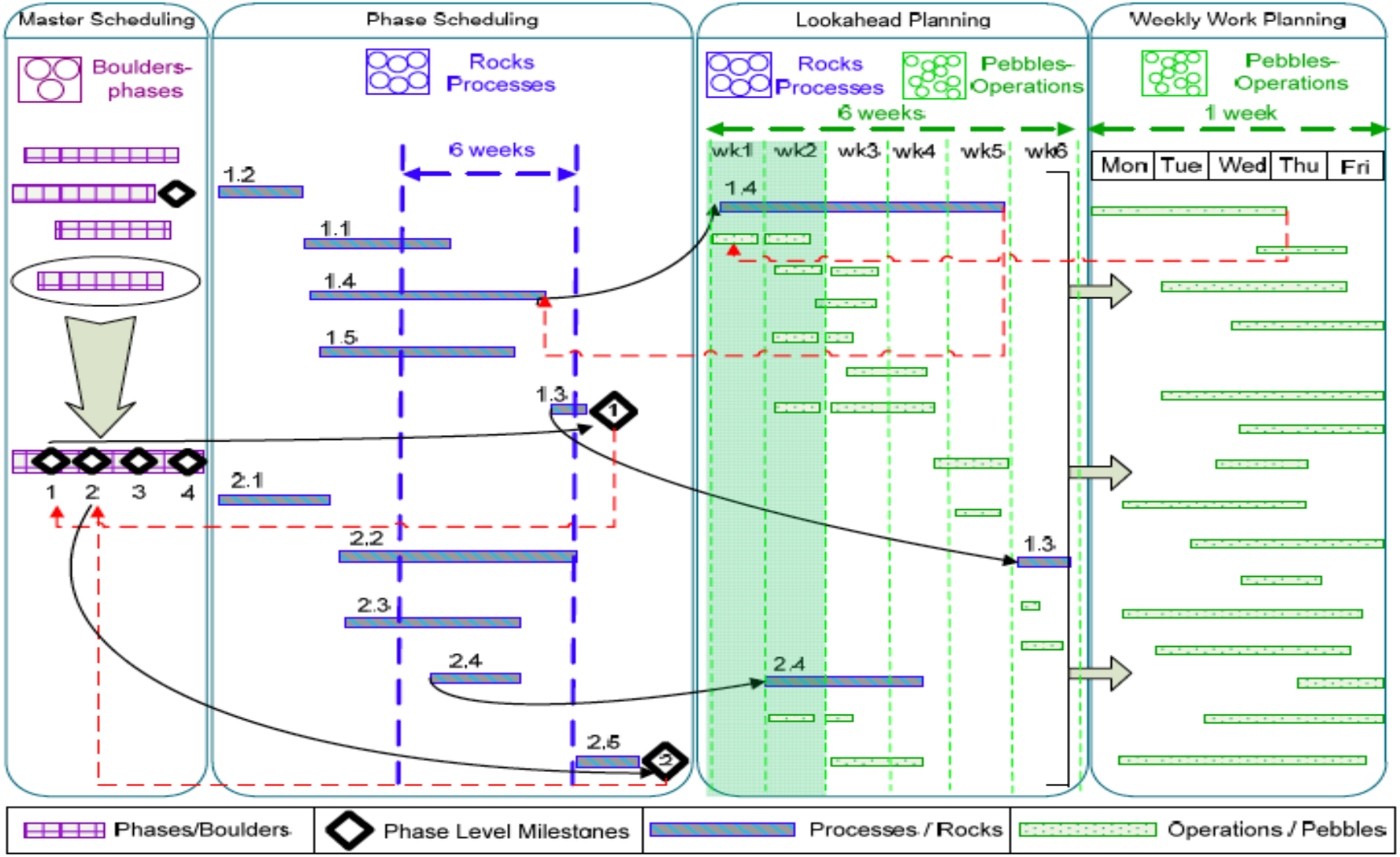


Lean Method 2: The LAST PLANNER SYSTEM

(Collaborative, Early Alert, Pro-Active….)

"HOW"

Using CPM/ PERT (thru MS-Project) for Mile-stones Planning as Corporate Commitments only (due to several uncertainties of Future Months)

Adding four Layer of Collaborative Macro & Micro Planning to CPM (e.g. SHOULD DO, CAN DO, WILL DO, DONE Planning & Execution) to manage Site short& mid-term project Constraints & interruptions

"STEERING" the project rather than "TRACKING"

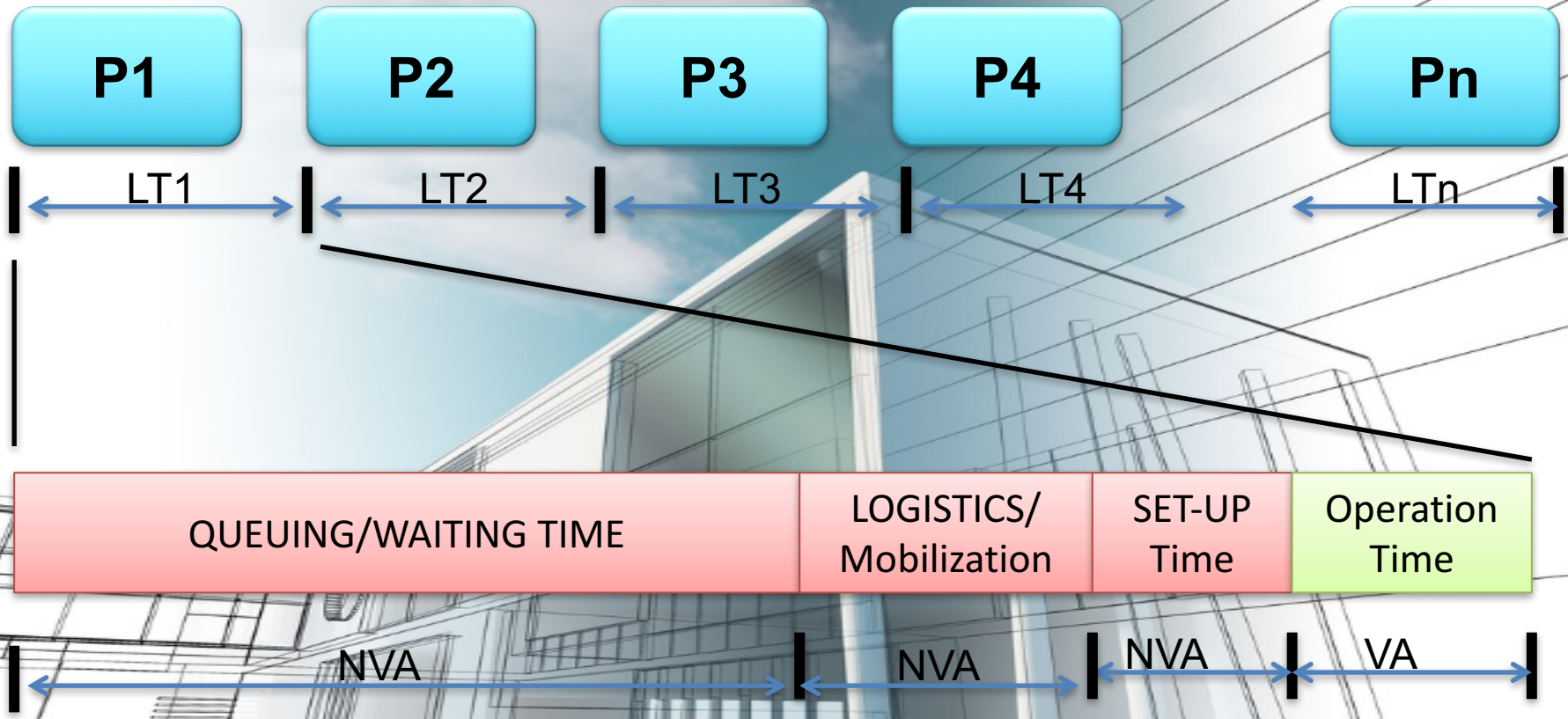
"MAKING WORK READY" Pro-Actively, rather than reactive "FIRE-FIGHTING" for seven key things: Information/ Approvals, Materials, People, Equipments & Tools, Previous work, Space/Safety & External Environment

"MAKING PROMISES" rather than "GIVING ORDERS"

"EMPOWEING" site People to take INNOVATIVE steps to 'Make-up' for any Delivery Date slippage

Lean Method 3: VSM – Value Stream Mapping (Material flow + information Flow)

"WHAT"



NVA (MGT): Eliminate/ Merge using 5 WHYs +5W1H

VA (ENGG): Eliminate/ Simplify/ Rearrange/ Automate

Lean Method 3: VSM – Value Stream Mapping

"HOW"

A "One-Page Big-Picture" approach to reduce the Cycle Time of the Key (repetitive/ imp.) Construction or Business Processes

Finding the KEY Bottleneck "Value-Adding" Processes and its "Current Status" and Completion Duration

Prepare a high-level "One-Page Big Picture" Pictorial Material & Information Flow Diagram

Find its "CURRENT" CYCLE TIME of completion & Set the target "FUTURE" CYCLE TIME

Challenge ALL 'HAND-OVERS' to other Dept./ Persons/ Equipments etc. and also other Reasons for 8 Wastes and Delays at EACH stage. Suggest Innovative low/no cost Solutions to achieve "FUTURE" State

Pilot the new "FUTURE" process, resolve all issues and standardize new Improved Process.

Lean Method 4: SNAG Prediction & Prevention

"WHAT"

Managing the **Defects Life Cycle** , in turns of Capturing, Predicting, Preventing, Containing and Planning Rework

Capturing involves identification of the Defects in each Work package on sampling basis

Predicting involved predicting number of Defects, Cost of repairs, Project Delays etc. due to defects for rest of the project

Preventing involved selecting one of the 14 Preventive methods, to prevent frequent & critical Defects to occur

Containing involves ensuring that no defect is missed or the forecasting parameters are improved

Planning Rework involves the planning of the manpower, materials, equipments etc required for reworking left defects

5 KEY WORDS for LEAN CONSTRUCTION

VALUE to CUSTOMER (incl. INTERNAL)

UN-INTERRUPTED **WORK FLOW**

ELIMINATION of **EIGHT WASTES**

PULL based Planning

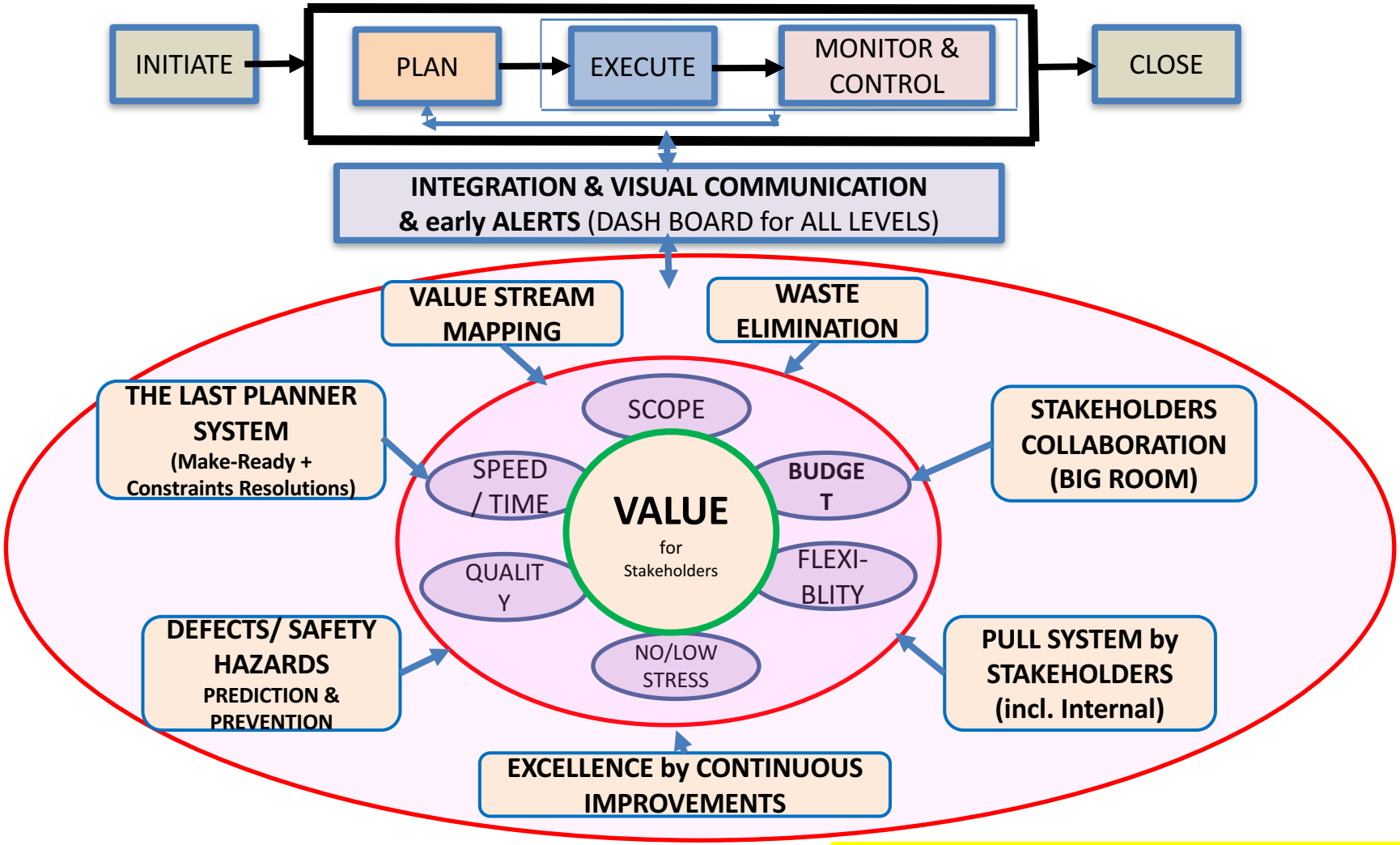
QUEST for **PERFECTION**

TRADITIONAL VS LEAN CONSTRUCTION PM

SUMMARY LEAN

Sr. No.		Traditional PM	Lean Construction PM
1	**Key FOCUS**	Try to be on Schedule, on Budget (but 'Mostly' FAIL) : HARD WORK	Eliminate 8 Wastes/ reduce costs; Reduce Bottleneck Lead Time, leading to Faster Completion & Better Quality at no Extra cost ; SMART WORK
2	**BUDGET**	Reduce Cost of EACH activity ("My Contract" Syndrome)	Reduce Total Cost of Project….even at higher cost of one activity : Think different Innovative Methods
3	**DELIVERY**	Focus on each transactions & Contracts in silos, "My Contract" Syndrome	Focus is on "My Project"/ shared Goal & total integrated Production System.
4	**PLANNING & EXECUTING**	**"PUSH"** planning by corporate Planner, without realizing the Site Conditions & interdependencies of Trades. Mostly "unrealistic" plan with TOO MANY milestones, "forced upon" site to follow	4-Levels **"PULL"** Collaborative **Micro-Planning**, aligned to non-negotiable major (BOULDER) Milestones, involving relevant Contractors/ Designers/ Procurement teams. Adopt "INTERNAL Customer". Thinking DIFFERENT Innovative Construction Processes/ Sequences for "Making-Up" for the "LOST Time", even due to un-controllable Factors like Weather.
5	**MONITORING & CONTROL**	Post-Mortive Review of Progress. (driving thru "Rear-Mirror"). Review is "Control" focused, and not "Enablement". All blame to "Others". Stakeholders interests not aligned: More focus on Tools, Techniques, Methods & Results	"Visual Management" + "Early Alert System" to pro-actively "NAVIGATE" the project to success thru weekly "Make Ready" and daily "Stand-up" meetings . (Driving thru "Wind-Screen" and "Rear Mirror"). Better communication, co-ordination & commitment by Stakeholders. More focus on Culture, Partnership, behaviours, Change, learning for Improvements. Continuous Learning & Improvements

SUMMARY: LEAN PM PROCESSES



Let us work together to make INDIA WORLD-CLASS

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