Theory of Constraints Practitioners Alliance www.tocpractice.com

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Role of Buffers in CCPM

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ABOUT THE PRESENTER

- Recognized by TOCICO with Lifetime Achievement Award in 2016.
- Founder & CEO of Realization (www.realization.com), a provider of real-time scheduling software for projects based on CCPM concepts. Realization's 350+ customers have added a total of more than $6B to their bottom line by using its software.
- Before Realization, founded and led Thru-Put Technologies, a provider of real-time scheduling software for manufacturing.
- Started career at Xerox in its manufacturing operations after an MS in Management and Public Policy from Carnegie Mellon University, an MS in Mechanical Engineering from Virginia Tech and a BS in Mechanical Engineering from IIT-Delhi.

ABOUT THIS WEBINAR

- General Role of Buffers in Planning & Scheduling
- The Traditional View of CCPM Buffers
- The Reality of Projects
- My View of CCPM Buffers

PURPOSE OF BUFFERS

AVAILABILITY BUFFERS

Inventory Buffers @ Point of Sale in a Retail Environment

COMMITMENT BUFFERS

Shipping (Time) Buffers in Production

FLEXIBILITY BUFFERS

Inventory Buffers @ Divergent Points in a V-Plant

- Time
- Capacity
- Materials
- Space
- Scope
- Cash
- Budgets
- …

CCPM BUFFERS: ORTHODOX VIEW

- **BUFFERS ARE FOR PROTECTING COMMITMENTS**
- **BENEFITS COME FROM OPTIMIZING BUFFERS**
  - **Aggregation** (task-level buffers > project-level buffers)
  - **Exposing Buffers** (task-level buffers are hidden)
  - **Buffer Management** (priorities and advance warning)
  - **Buffer Diagnostics** (identify improvement areas)

SOME TYPICAL QUESTIONS

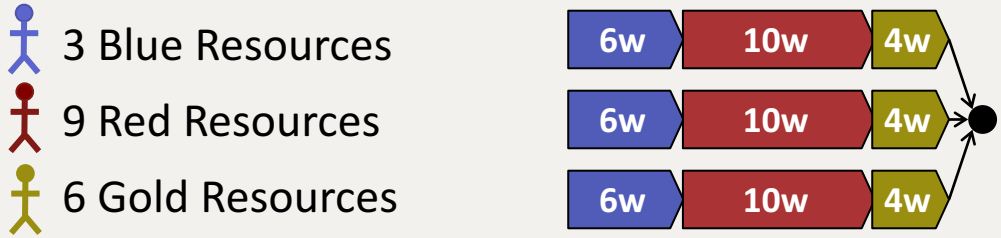
- **PLANNING**
  - Different duration reductions for different tasks?
  - Different sizes of buffers for different projects?
  - Which buffers are important (project or feeding)?
- **EXECUTION**
  - Setting Red/ Yellow/ Green
- **BUY-IN**
  - When CCPM is first implemented
  - For ongoing Usage of CCPM

REALITY OF CCPM

BENEFITS OF "FOCUS AND FINISH"
FAR OUTWEIGH
THE BENEFITS OF BUFFER OPTIMIZATION

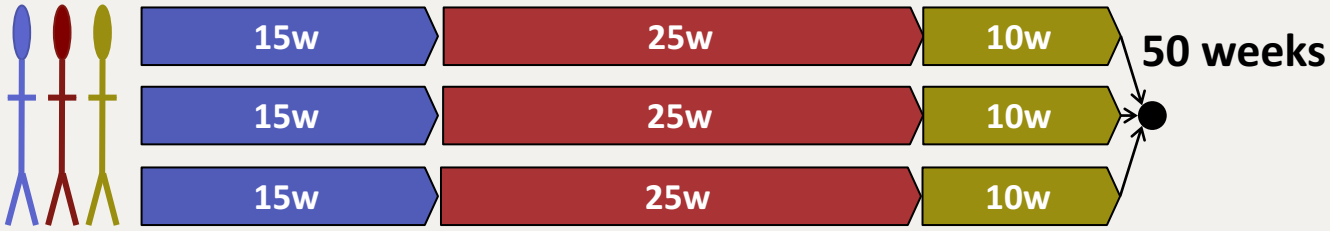
BENEFIT OF "FOCUS AND FINISH"

ILLUSTRATION

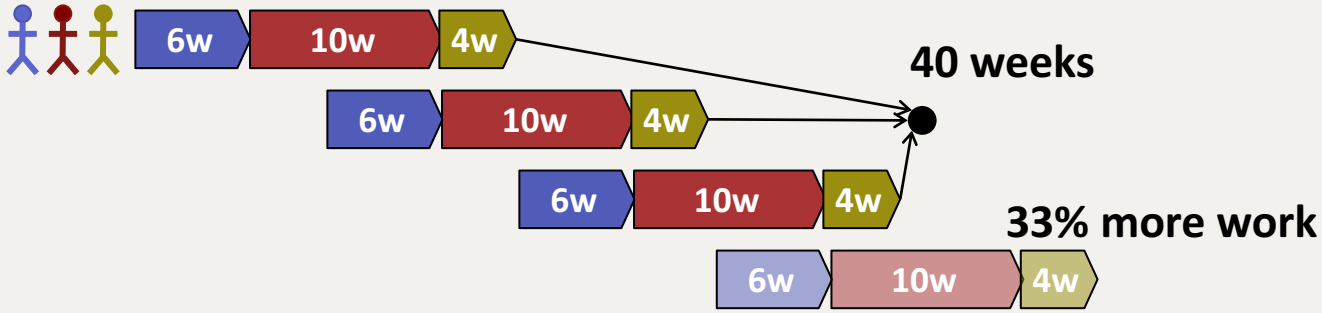


Durations include interruptions

MODE A: SPREAD RESOURCES THIN TO ACHIEVE HIGH UTILIZATION



MODE B: FOCUS AND FINISH TO ACHIEVE FAST CYCLE TIMES



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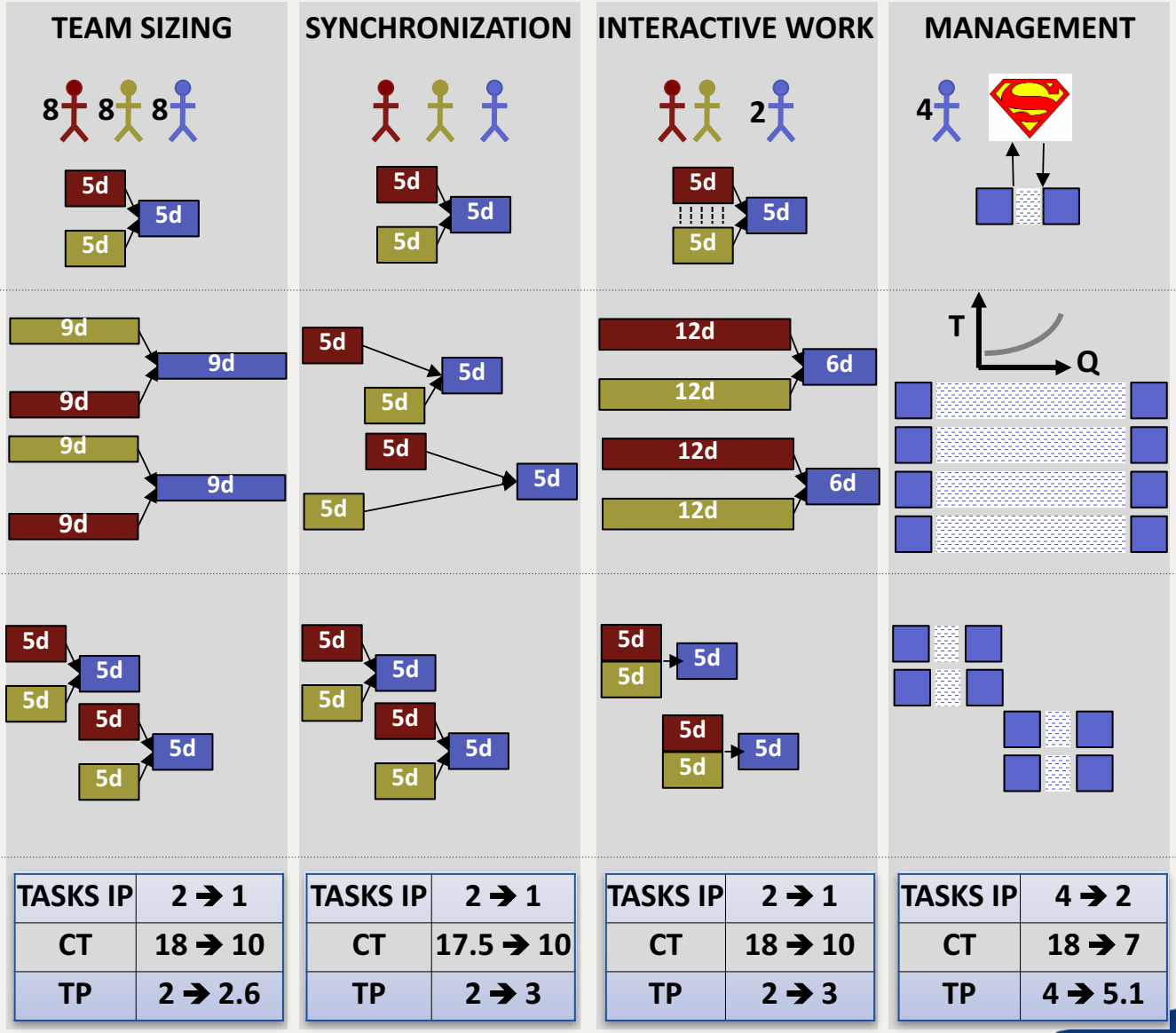
REALIZATION.

EXAMPLES OF ‘SPREAD THIN’ VS. ‘FOCUS & FINISH’



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LOGIC OF "FOCUS & FINISH"

- When resources are spread thin, every task takes much longer; the longer a task takes, the longer the downstream waiting time (ratio of "Touch Time" to "Lead Time" is very high in projects).
- When resources are spread thin, work finishes in bow waves – causing peaks and valleys in workload for downstream resources (even though valleys aren't easily visible in projects).

REALITY OF CCPM

BENEFITS OF "FOCUS AND FINISH" FAR OUTWEIGH THE BENEFITS OF BUFFER OPTIMIZATION

TASKS IN A "CHAIN" NOT ENOUGH TO TAKE ADVANTAGE OF AGGREGATION ANYWAY

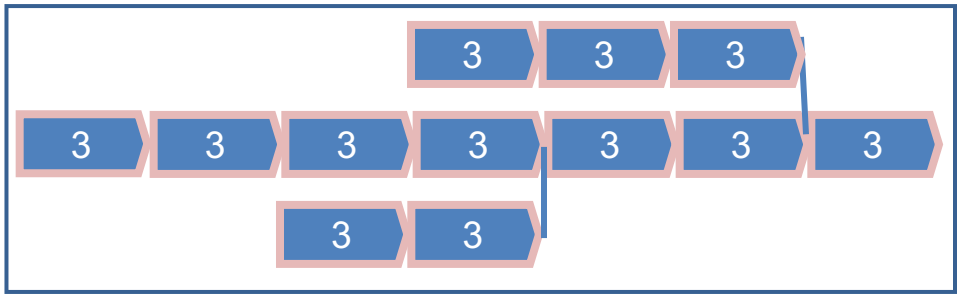
"HIDDEN" SAFETIES SOUNDS ACCUSATORY

PRIORITIES AND WARNING SIGNALS CAN BE CALCULATED WITHOUT BUFFERS TOO

ROLE OF BUFFERS IN PROJECTS

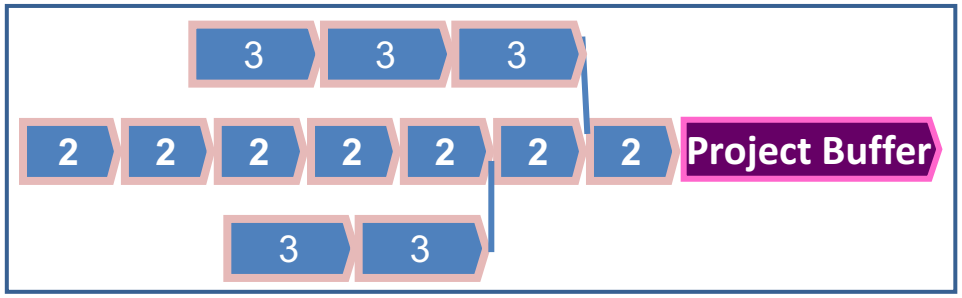
Buffers Create Slack on Feeding Chains; Critical Chain is More Stable, enabling "Focus & Finish" All Round.

WIHOUT PROJECT BUFFER



- *Critical Path/Chain is 21 weeks*
- *The top feeding chain is 9 weeks long; it finishes 3 weeks before project due-date and has zero slack*

WITH PROJECT BUFFER, BUT WITH SAME PROJECT DURATION



- *Moved 1 week from each task on Critical Chain into Project Buffer*
- *Project Buffer is 7 weeks*
- *Top feeding chain now finishes 9 weeks before project end – a slack of 6 weeks*

BUFFERS IN PROJECTS

AVAILABILITY BUFFERS

COMMITMENT BUFFERS

Capacity, Money, Other Resources for Schedule Recovery

FLEXIBILITY BUFFERS

Time Buffers (Project Buffer, Feeding Buffer.)

- Time
- Capacity
- Materials
- Space
- Scope
- Cash
- Budgets
- …

IMPLICATIONS

- **PLANNING**
  - Different duration reductions for different tasks? ---- **NO**
  - Different sizes of buffers for different projects? ---- **NO**
  - Which buffers are important (project or feeding)?---- **PROJECT**
- **EXECUTION**
  - Setting Red/ Yellow/ Green ---- **YELLOW NOT NEEDED**
    SETTING IS SUBJECTIVE
- **BUY-IN**
  - When CCPM is first implemented ---- **TIMELINES DICTATED BY MARKET, PROJECT BUFFER = 1/3rd to 1/2 OF TOTAL TIMELINE**
  - For ongoing Usage of CCPM ---- **TIMELINES DICTATED BY MARKET, PROJECT BUFFER = 1/3rd to 1/2 OF TOTAL TIMELINE**

SIDE NOTE ON AGILE/ SPRINTS

DO SCOPE-BOXING, NOT TIME-BOXING

Sprints are a way to focus on a set of features, but time-boxing can leave work half-done. (Backlog and quality issues keep growing.)