Critical Chain Project Management: An Introduction

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Presentation Outline

Motivation & Background

Problem [What to Change]
- Localized Risk Management
  - Task Level Insurance Policy
  - Student Syndrome
  - Parkinson’s Law

Solution [What to Change to]
- Global Risk Management
  - Project Level Protection
  - Systems Perspective
  - Execution Control
Motivation

• < 45% of all projects finish on schedule or before
• < 17% software projects completed on-time / on-budget.
• IT related projects
  • 23%+ of projects will be canceled before they ever get completed. Further results indicate
  • 50%+ of projects cost > 150% original estimates

Ref: www.it-cortex.com/Stat_Failure_Rate.htm
www.pqa.net/ProdServices/ccpm/W05002001.html
Results: Switching to Critical Chain

- Lucent Technologies
  - Outside Plant Fiber Optic Cable Business Unit reduced its product introduction interval by 50%, improved on-time delivery, and increased the organization's capacity to develop products.

- Seagate
  - Brings 1st 15,000 rpm disc drive to market ahead of its competition, causing all competition to pull out of the market. (circa 2000).

- Lord Corporation (high-end auto & aerospace OEM)
  - Capacity has increased, cycle time improved, and operating expense remained the same.
Are You a Responsible Person?

When asked for task estimate or asking for one:
What do you supply?

How do you work when assigned to a task?

How often is the "Three Point Estimation" used?
Three-point Estimation of Task Times

In three-point estimation, three figures are per task, based on prior experience or best guesses

\[ a = \text{the best-case estimate} \]
\[ m = \text{the most likely estimate} \]
\[ b = \text{the worst-case estimate} \]

Do most projects ask for these three?
Which of the estimates is closest to the estimate most people report when asked?
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Problem: Localized Risk Management

Task level insurance policy
** How safe is safe enough?**

10% confidence completing
50% confidence
90% confidence

Start

Student Syndrome

Parkinson’s Law
Self-fulfilling prophecy [good estimating?]

Multi-tasking [absence of priorities]
Multi-tasking / task switching has overhead causing more delays to spread across all projects.
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Governing Principle Behind *Critical Chain* is:

**Aggregation of risk...**

Benefits:
- Lower overall protection needed
- Higher degree of “coverage” achieved
- Leading to lower incidence of “failure”
1. Planning
   1. Project Level vs. Task Level Protection
   2. Systems Perspective for Multiple Projects
      Pipeline projects with overlapping resources

2. Execution Control
   1. Promote and encourage team culture
   2. Controlled work queues
   3. No multi-tasking work rules
   4. Task assignment prioritization
   5. Management by Exception
Critical Chain Planning Process

From Task to Project Protection

1. Traditional Plan

2. Safety Excluded

3. Resource Leveled

4. Critical Chain Marked

- Task T1
- Task T2
- Task T3
- Task T4
- Task T5
- Task T6
- Task T7
- Task T8
- Task T9
- Task T10
- Task T11

144 hours

72 hours

84 hours
Critical Chain Planning Process: Gantt

From Task to Project Protection

1. Traditional Plan

2. Safety Excluded

3. Resource Leveled

4. Critical Chain Marked in Yellow

144 Hours

72 Hours

84 Hours
The Concept of Risk Pooling:

Health Care Insurance Example:
Larger pool = Lower cost
Insurance is designed to work by spreading costs across a large number of people. Premiums are based on the average costs for the people in an insured group. This risk-spreading function helps make insurance reasonably affordable for most people.

http://www.insurance.wa.gov/legislative/factsheets/PoolingRiskReducingCost.asp
Critical Chain Planning

Aggregation Principle [where did some of the safety go?]:

1. Pooled protection provides more coverage
2. Location is just as important as amount
3. Sizing Rule of Thumb → Buffer is \( \frac{1}{2} \) of preceding chain

PB = Project Buffer    FB = Feeding Buffer

Compared to 144 hours traditional

132 hours
Critical Chain Planning

Schedule shown in Aurora

Proj_Buf = Project Buffer  FB = Feeding Buffer

132 hours compared to 144 hours in traditional schedule
Critical Chain in Execution

Schedule Before Execution Starts

T1  T2  FB  T3  T4  T5  T6  PB

T7  T8

T9  T10  T11  FB
Critical Chain in Execution

Schedule Before Execution Starts

- T1 & T7 finish on time
• T8 experiences increase in Scope or Delay
• First portion of delay absorbed by gap between T3 & T4

= Original T8 duration
Critical Chain in Execution

Schedule Before Execution Starts

AS OF DATE

- Rest of delay impacts the project buffer
- T11 also affected due to resource constraint
- E.g., So as of the “As of Date” project may be → 7% Complete with 30% Buffer Consumed

= Original T8 duration

= project buffer impact
Critical Chain in Execution

Schedule Before Execution Starts

- T1 & T7 finished on time
- T8 experienced increase in Scope or Delay
- First portion of delay absorbed by gap between T3 & T4
- Rest of delay impacted the project buffer
- T11 also affected due to resource constraint
- E.g., So as of the “As of Date” project may be → 7% Complete with 30% Buffer Consumed

“AS OF DATE”
Perspectives on Buffers

- Not “rear view mirror watching”
- Predictive/Preventative/Leading Indicator
- Mechanism to Promote and encourage Team Work
- Collaboration / Communication Incentive Mechanism
- Measuring device – Neutral, Normalized Metrics
- Real-time Risk Meter
- Encourages a holistic/goal oriented perspective
Critical Chain Priority Metric

Project Status Trend Chart or “Fever” Chart

LRC = Longest Remaining Chain
Project Status: Fever Chart
Results (2)

• Harris Corporation:
  • Construction of its $250 million wafer fabrication plant – 3 days ahead of 13 month schedule (original plan was for 18 months & 4% over budget at the start of the project).

• Balfour Beatty
  • Civil engineering projects ahead of schedule and under budget.

• FMC Energy Systems
  • Sub sea systems on-time performance went from < 50% to >90%.
Multi-Project Critical Chain

Systems Perspective for Multiple Projects

1. Should load for multiple projects be considered jointly?
   – Obviously

2. Why?
   – Prevent System Overload/Multi-tasking

3. How?
   – By taking a Systems Perspective
Creating a Multi-Project Schedule

Due Dates Are Derived

Ingredients:

1. CC Plans [shorter]
2. Strategic Pacing Mechanism
3. Strict Priority Scheme
4. Rate Limit Policy/Guidelines
Multi-Project Execution Control
Pipeline Status Snap Shot

By Portfolio of Projects

In Execution, Buffer Status Drives Priority Decisions, not Project Importance
Benefits
1. Operational Coherence – Stability
2. 20% Shorter Cycle-Times – Speed
3. On-time Performance – Reliability
4. More throughput – Growth

Challenges:
1. Simple but not easy to grasp – too simple?
2. Requires a change in mindset
3. Takes 120 days for typical 100 person team
4. We don’t need that much improvement
GRACIAS POR SU ATENCIÓN

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