

The Tipping Point to Failure

Avoiding the 'Tipping Point to Failure'

• UTILITY RELOCATION S.W. to West
• STORM SEWER
• EB FROM ROAD

PHASE 1 EB/WB MAIN LANES

- 36" RCP Line "T"
- 36" & 24" RCP Line "O" & "T"
- MSE#33 42" Drill Shafts
- MSE#33 CIR Wall
- EB ML Rdwy. Embk. Ty C/B-EB (205-243)
- MSE#33 Screen Wall
- MSE#32 Leveling Pad
- EB ML 6" L.T.S.
- MSE#32 Set Panels
- EB ML 12" Flex Base (205-243)
- EB ML 6" Ty A ACP (205-243)
- EB ML 11" CRCP (205-243)
- WB ML (205-243) Guard Rail

Construction CPM Conference
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New Orleans
Patrick Weaver PMP, PMI-SP

Presentation Outline

- The Problem
- The 'Tipping Point'
- Three Primary Causes
 - The bow-wave effect
 - Change overload
 - Relationships
- Early warning indicators
- Conclusion



Have you ever noticed?

- All projects usually start out OK
- Most projects continue for a while OK
- Some projects actually finish OK
- Others suddenly crash!
- This paper looks at why:
 - Most crashes are unexpected
 - The consequences are severe
 - Recovery is very difficult

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- Very few projects slide elegantly into failure:



- You have some control in a steady slide

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- Most projects fall off a cliff:



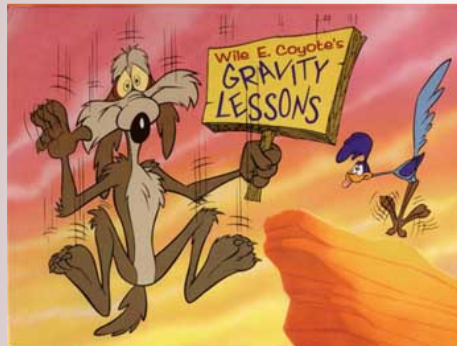
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- And you have no control once you are over the edge:



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- The Tipping Point is a construct within Complexity Theory. It:
 - Describes the way natural systems can absorb influences with minimal (or predictable) change until the 'tipping point' is reached and then there is a sudden catastrophic change.
 - The 'tipping point' cannot be predicted in advance

See: **A Simple View of 'Complexity' in Project Management**

https://mosaicprojects.com.au/PDF_Papers/P070_A_Simple_View_of_Complexity.pdf

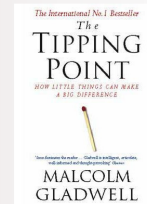
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The 'Tipping Point'

- The Tipping Point:
 - Once a system has 'tipped' the change is irreversible
 - Experience of similar systems 'tipping' provide an indication of what to expect
 - But it is never the same twice!
- Malcolm Gladwell's book:



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- Project teams are 'complex adaptive systems' that function by communicating
- The 'team' includes:
 - Client / end user
 - Designers and specifies
 - External agencies / authorities / senior management
 - The core 'workers' and managers
 - Suppliers and subcontractors

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- CRPR, the Complex Responsive Process of Relating. Successful teams:
 - Use information exchange within relationships to create the knowledge needed to fulfill their objectives
 - Social Capital of the team:
 - Existing knowledge of each individual
 - Effectiveness of the relationships (communication)
 - Ability to process new information to create new knowledge
 - Willingness to create and use the new knowhow

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- Teams can adapt to change
 - Change and stress can strengthen teams
 - All teams can absorb some levels of change and stress with limited or (predictable) damage
 - Repair and recovery is practical
 - Excessive stress destroys teams
 - The *'tipping point'*
 - Repairing the damage is not possible – reconstruction is needed

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- A dysfunctional team:
 - Spends time fighting
 - Does not communicate
 - Does not solve problems efficiently
 - Does not develop the new knowledge needed to deliver the project efficiently
 - Winning is more important than doing
- Communication failure = project failure

See: **Complexity Theory**

https://mosaicprojects.com.au/WhitePapers/WP1058_Complexity_Theory.pdf

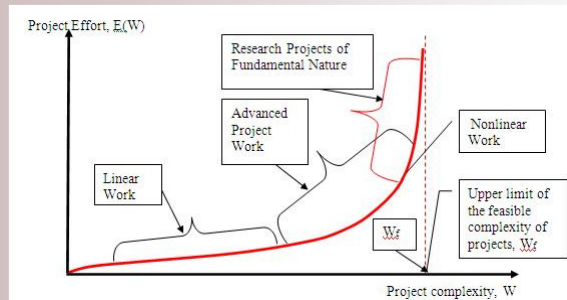
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- Research into projects shows a similar effect: Pavel Barseghyan



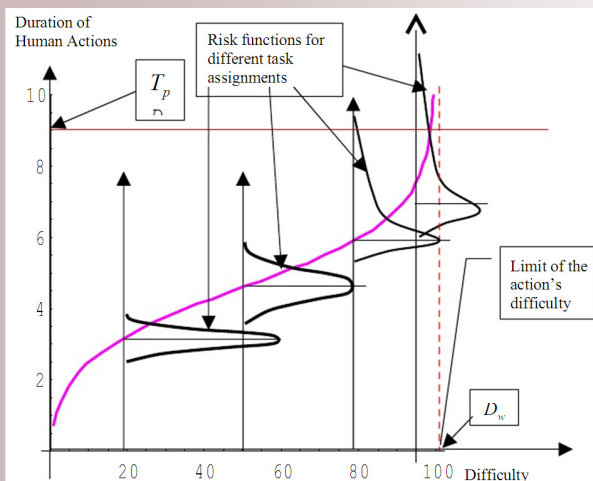
<http://pavelbarseghyan.wordpress.com/>

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<http://pavelbarseghyan.wordpress.com/>

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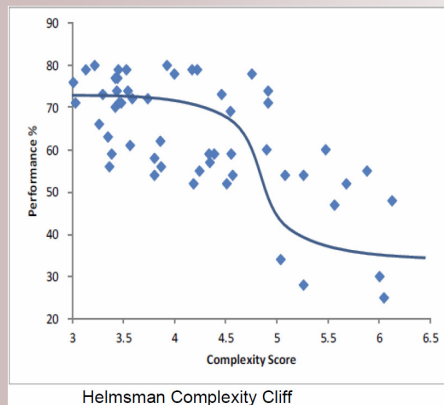


Within 'normal' work, the range of outcomes tends to a 'normal' distribution.

After the 'tipping point' there are extreme outliers that become unpredictable.

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- Research into projects shows a similar effect: The Helmsman complexity cliff



When complexity increases beyond the organization's capability the performance decreases significantly

This applies to both
- The organisation
- And the project!

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Two basic facts:

- 1 Once a system has tipped it can never go back to its original state!
- 2 You cannot predict the tipping point in advance
 - But you can recognize similar trends and patterns to know one is approaching

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Project Complexity

- There are four basic dimensions to every project:
 - Its inherent size;
 - The degree of technical difficulty in creating the output (complication);
 - The degree of uncertainty involved in the project; and
 - The complexity of the relationships both within the project team ('small p' politics) and surrounding the project.

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Project Complexity

- In combination these create the innate 'complexity quotient' for the project
- The innate complexity of the project should be compensated by the skills of the project organisation and the team
- The Helmsman model is built around organisational ability to manage complexity

See: *Project Size and Categorisation*

https://mosaicprojects.com.au/WhitePapers/WP1072_Project_Size.pdf

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The Tipping Point to Failure

<p>Helmsman Complexity Scale</p> <p>Combines:</p> <ol style="list-style-type: none"> Context / Stakeholder Social Factors Ambiguity Technical Complexity Project Management maturity <p>APMG – International <i>Keith Williams</i></p> <p>Helmsman Institute Pty Ltd</p>	Helmsman Scale	Organisational Level	Difficulty Level	Project Characteristics	Examples
	< 4	SME	Minor	Projects that can be done by smaller organisations	Build new custom home
	4 - 5	Large	Small	Projects normally performed in the business units of large organisations.	Product maintenance and competitive enhancements to ongoing business operations
	5 - 6		Core	Standard core projects in the top 50-100 organisations. Normally have executive attention.	Regulatory, environmental, business upgrades. GST, Y2K, Clean fuels
	6 - 7		Large	Largest projects commonly undertaken across the top 50-100 organisations. Normally have board attention.	Merger integration, core system replacement. A380 introduction
	7 - 8	National	Large National	Largest projects commonly undertaken in the Nation. Create noticeable impacts on the economy.	BHP Olympic dam, National Broadband Network Some defence projects
	8 - 9		Nationally significant	Rare and highly complex projects, seldom undertaken in the Nation. Create significant impacts on the national economy.	Snowy River scheme, Sydney Olympics, Collins submarines
	9 - 10	International	International	Significant multi-national project	Hadron Collider, Joint Strike Fighter, BASEL II

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Project Complexity

- The ability to manage 'complexity' is innate to the organisation – the location of the 'cliff' depends on the organisational capabilities
- Assuming the initial project, the organisational capabilities and the team design are balanced.....

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Project Complexity

- Most project teams can manage a 'bit more' complexity caused by the actions of others in the 'team'
- Until the 'tipping point' is reached
- **This is the space where project control systems add value!**
- Three basic sources of 'added complexity' are:

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Cause 1

- Burning contingencies too quickly
 - Caused by inadequate output
 - Consuming float and delaying non-critical work
 - Over consuming calculated risk management contingencies
 - Frequently hidden (end dates are 'OK')
 - **Tipping point:** Sudden massive increase in output required when the project 'hits the wall' but no spare capacity

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Cause 2

- Excessive change
 - Change orders / changing requirements
 - Changes in strategy
 - Changes in project team (eg, suppliers)
 - Under control, changes incorporated and communicated in a timely manner
 - **Tipping point:** changes not incorporated
 - Rework and delay – late communication
 - Changes to changes to fix issues

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Cause 3

- Failing relationships
 - Inefficient communication
 - Ineffective problem solving
 - Emergence of the 'blame game'
 - In control – open communication and trust
 - **Tipping point:** All communication verified (eg, in writing) – no trust.
 - Slow and ineffective communication
 - Ineffective problem solving and limited knowledge creation

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See: <https://mosaicprojects.com.au/PMKI-TPI-075.php>

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Causes of a 'Tipping Point'

- All three causes interact and feed off each other
- Management cannot cope with the issues and complexity
- Relationships fail, communication breaks down
- Project 'tips' into failure

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Causes of a 'Tipping Point'

Problems cannot be solved at the level of awareness that created them.

Albert Einstein

Once a project has tipped, the current team is incapable of reversing the problem.

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Early Warning Indicators

- Project controls can help predict the emergence of a 'tipping point'
- Timely management action to reinforce the current team may avoid the 'cliff'
- But the indicators are subtle and previous experience of a 'tipping point' is essential

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Early Warning Indicators

- Productivity issues (cause 1)
 - Measure the consumption of 'float'
 - Use Earned Schedule and TCPI(t)
 - Measure consumption of contingencies
- Solution
 - Identify the problem early
 - Identify the cause (usually management)
 - Take strong corrective actions early
 - Trust your planners and controls people!

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Early Warning Indicators

- Excessive change (cause 2)
 - Measure the time to **resolve** changes
 - Measure the # late changes (rework)
 - Measure the # open changes (trends)
- Solution
 - Understand what is 'normal'
 - Identify abnormalities early
 - Add appropriate resources early
 - Work with the source of the changes

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Early Warning Indicators

- Relationship breakdown (cause 3)
 - Assess stakeholder relationships regularly
 - Plan to build robust relationships and test their effectiveness
 - Track trends: overall and key individuals
- Solution
 - Don't let key relationships fail!
 - Get outside help if needed
 - Pre-plan escalation paths

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Early Warning Indicators

- Organisational resilience is the key:
 - Open and robust communication
 - Some spare capacity and unused capability
 - Willingness to seek help and accept assistance
 - Focus on problem solving and outcomes (not the 'blame game')
 - Management prepared to make decisions and change decisions as things emerge

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Dealing with Disaster

- Remember everyone is in the 'same boat' – including the client!
- The current team can only 'hold the line'
- Massive support is needed quickly to:
 - Rebuild relationships
 - Determine the scale of the problem
 - Stop the situation getting worse (triage)
 - Repair the damage
 - Establish a new capability to finish

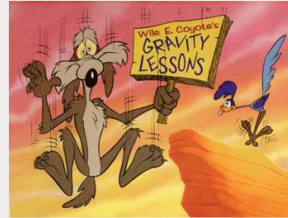
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Conclusions

- Once you have 'tipped into failure' it is too late!
- The team that 'tipped' cannot recover themselves
- Look for the warning signs and act early
- But the preventative action cost money and introduces its own complexity



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Conclusions

- Preparation is the key
 - Understand the organisation's capability
 - Understand the project team's capability
 - Understand you clients capability
 - Pack your parachutes....



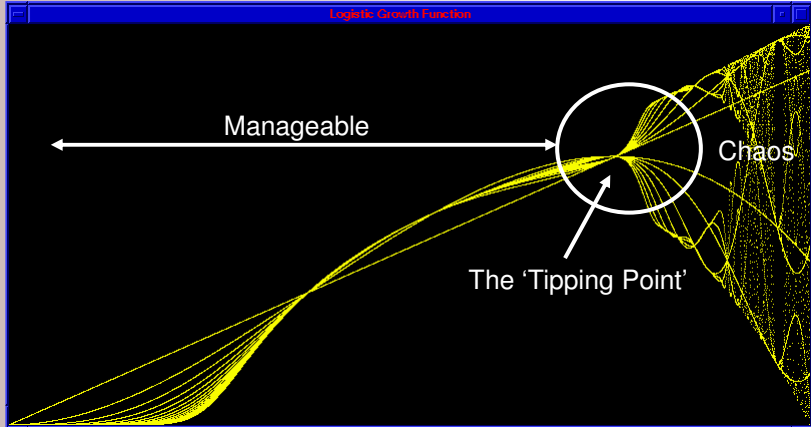
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Conclusions

- Backed up by rigorous surveillance



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Questions Please



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Mosaic's Scheduling home Page

<https://mosaicprojects.com.au/PMKI-SCH.php>

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