

# The Tipping Point to Failure

**Avoiding the 'Tipping Point to Failure'**

- UTILITY RELOCATION S.W. to Water
- STORM SEWER
- EB FROM ROAD
- SH/33 EB/WB MAIN LANES
- 36" RCP Line 11"
- 36" & 24" RCP Line 10" & 11"
- 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**  
January 27-30, 2013  
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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## The 'Tipping Point'

- Very few projects slide elegantly into failure:



- You have some control in a steady slide

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## The 'Tipping Point'

- Most projects fall off a cliff:



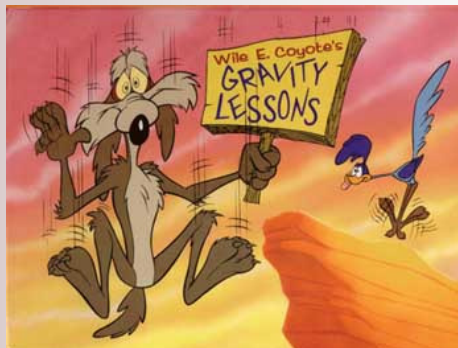
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## The 'Tipping Point'

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



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## The 'Tipping Point'

- 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***  
[http://www.mosaicprojects.com.au/Resources\\_Papers\\_070.html](http://www.mosaicprojects.com.au/Resources_Papers_070.html)

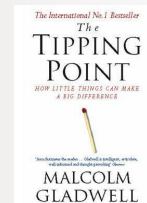
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## The 'Tipping Point'

- 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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## The 'Tipping Point'

- 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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## The 'Tipping Point'

- 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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## The 'Tipping Point'

- 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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## The 'Tipping Point'

- 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**

[http://www.mosaicprojects.com.au/WhitePapers/WP1058\\_Complexity\\_Theory.pdf](http://www.mosaicprojects.com.au/WhitePapers/WP1058_Complexity_Theory.pdf)

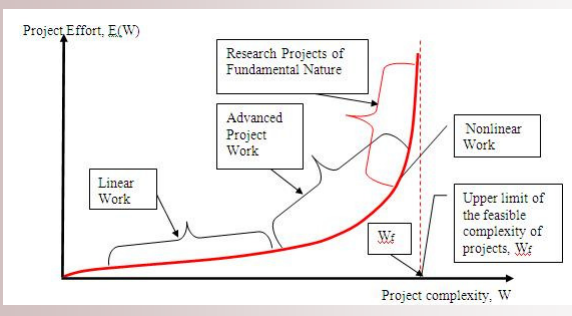
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## The 'Tipping Point'

- Research into projects shows a similar effect: Pavel Barseghyan



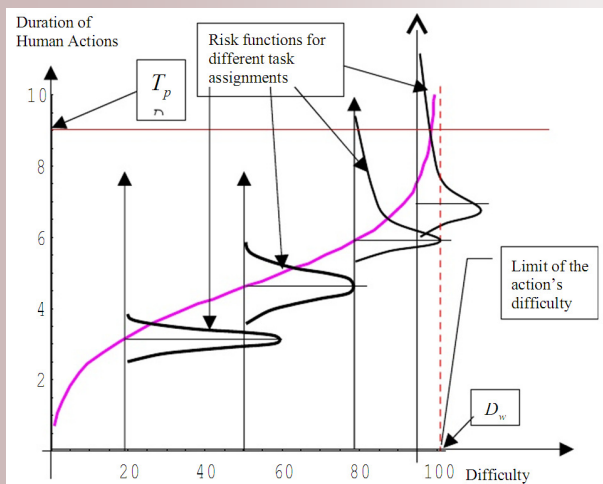
<http://pavelbarseghyan.wordpress.com/>

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## The 'Tipping Point'



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

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

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

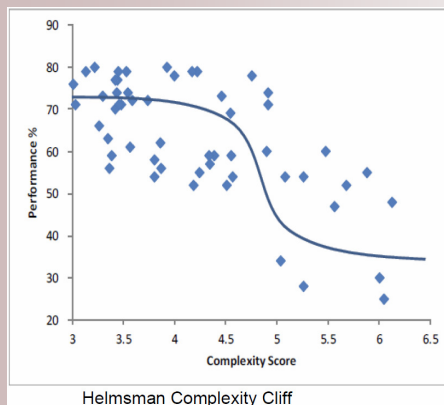
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## The 'Tipping Point'

- 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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## The 'Tipping Point'

### 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*

[http://www.mosaicprojects.com.au/WhitePapers/WP1072\\_Project\\_Size.pdf](http://www.mosaicprojects.com.au/WhitePapers/WP1072_Project_Size.pdf)

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# The Tipping Point to Failure

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

**Helmsman Complexity Scale**

Combines:

1. Context / Stakeholder
2. Social Factors
3. Ambiguity
4. Technical Complexity
5. Project Management maturity

**APMG – International**  
*Keith Williams*

**Helmsman Institute Pty Ltd**

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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

See: <http://www.stakeholdermapping.com/>

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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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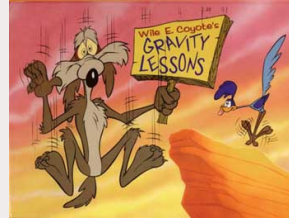
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## Conclusions

- 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....



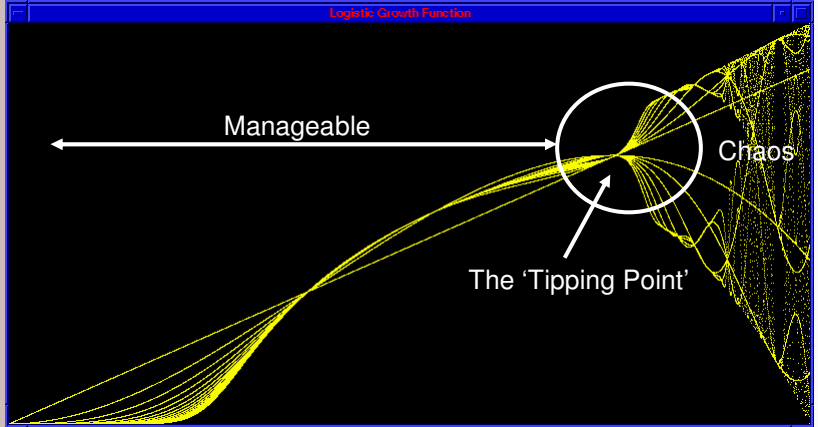
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## Conclusions

- Backed up by rigorous surveillance



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## Questions Please



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Mosaic's Scheduling home Page  
[www.mosaicprojects.com.au/Planning.html](http://www.mosaicprojects.com.au/Planning.html)

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