



Why Projects Need Process Standards: It's the Biology!

Lewis Gray, Ph.D.



Acknowledgments

SMCMM Integration and CMMI are service marks of Carnegie Mellon University.

®Abelia is registered in the U.S. Patent and Trademark Office.

®CMM, and Capability Maturity Model are registered in the U.S. Patent and Trademark Office.

“Software Process Standards”

◆ **Examples:**

- **Capability Maturity Model for Software (SW-CMM[®]) v1.1**
- **IEEE/EIA 12207 “Software Life Cycle Processes”**
- ***Draft: Capability Maturity Model[®] - Integrated - Systems/Software Engineering (CMMISM-SE/SW) v0.2***

- ◆ **Standards provide models of certain software life cycle practices and their relations with one another.**



Why Don't Level 1 Projects Build Software Better?

**Level 1 organizations resist project
planning and standard
software processes**

Why Don't Projects Build Software Better? A Phony Conflict

◆ Process vs. People

“It’s more about people working together than it is about defined processes.”

“Process out, quality in.”

“Processes don’t build high-quality software...a fool with a ‘process-tool’ is still a fool.”

◆ Good process and good people are both needed.

Why Don't Projects Build Software Better? The Real Conflict

- ◆ **The Conflict:** Given a group of software people (developers and managers) on a project --



Guiding the people to cooperate in a pre-defined good software process

vs.

Allowing the people to make up their software process as they work.



- ◆ **SEPGs avoid ad-hoc processes**

Why Are Ad-Hoc Software Processes a Bad Idea?

A project needs a good process most when there are multiple crises and different people are rushing to make their own incompatible fixes.

This is the very worst time to create a process ad-hoc. People are hitting their biological limits. So, when they create their ad-hoc process, they screw it up.

Superman is Only a Cartoon

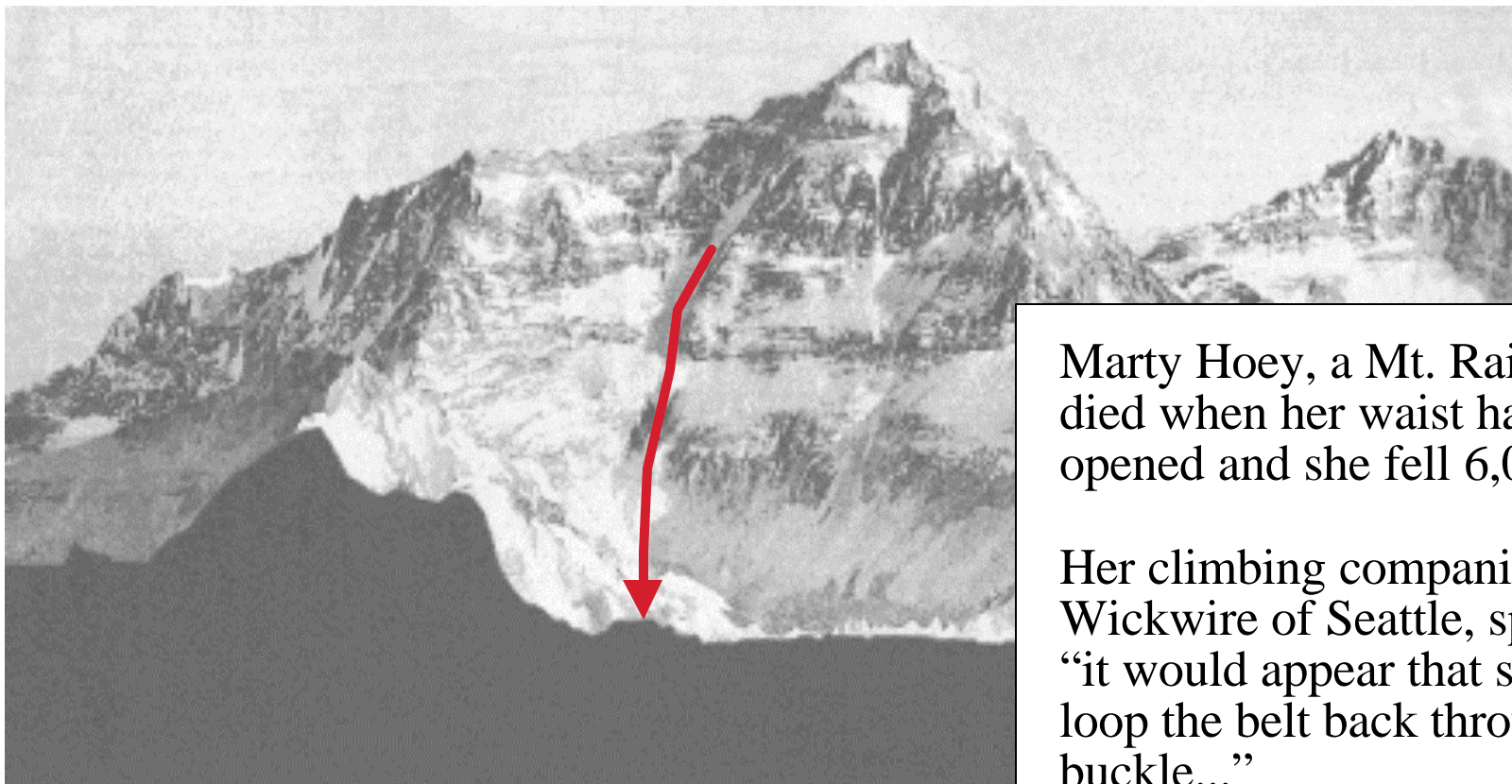




Biological Limits on Professional Performance

Closer than you may think

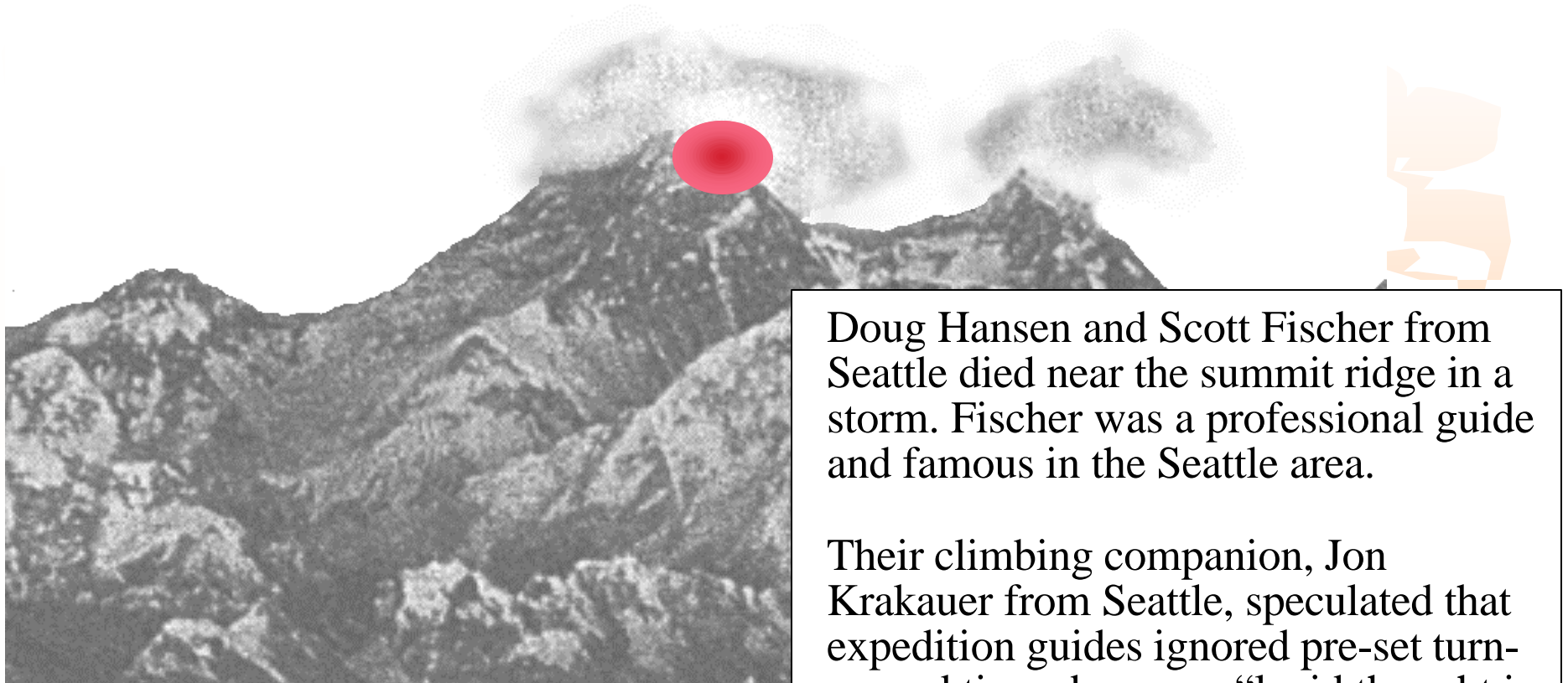
1982: North Face of Everest (Tibet)



Marty Hoey, a Mt. Rainier guide, died when her waist harness opened and she fell 6,000 feet.

Her climbing companion, Jim Wickwire of Seattle, speculated, “it would appear that she did not loop the belt back through the buckle...”

1996: Everest South-East Ridge (Nepal)



Doug Hansen and Scott Fischer from Seattle died near the summit ridge in a storm. Fischer was a professional guide and famous in the Seattle area.

Their climbing companion, Jon Krakauer from Seattle, speculated that expedition guides ignored pre-set turn-around times because, “lucid thought is all but impossible at 29,000 feet.”

Hypoxia -- Insidious, Deadly

- ◆ **“Scientists believe that many, if not all, of the [eight deaths on Everest in 1996] could have been due to hypoxia, or lack of oxygen to the brain.”**
Jodie Foster, narrator of *Everest - The Death Zone*
- ◆ **“Everyone thinks that they’re thinking very clearly up high, and yet, by virtue of going up into that atmosphere, you greatly increase your likelihood of making an error.”**
David Breashears, in *Everest - The Death Zone*
- ◆ **People suffering hypoxia and common medical problems from climbing high (e.g., racking coughs) have impaired judgment, may not tie a rope correctly, may not tie into their harness correctly...**
Peter Hackett, MD, in *Everest - The Death Zone*

Performance Concerns with Hypoxia

- ◆ **Incapacity**
You break.
- ◆ **Unawareness (or denial)**
You think you're okay.
- ◆ **Timing**
You break just when you can least afford to.

Climbers' Antidotes for Performance Problems Caused by Hypoxia

Planning

- Checklists (reports from earlier climbs)
 - Routines (past experience, advice)
 - Milestones (past weather patterns)

Practice

- Routines (melt snow, drink the water)
- Milestones (turn around at 2 PM)

NOTE: These don't prevent hypoxia, they compensate for it.

Effects of Prolonged Stress*

- ◆ **Middle-aged men who report that they are highly stressed are more likely to have heart attacks and strokes.**
- ◆ **People who are highly stressed get colds more often, and don't respond as well to flu shots.**
- ◆ **The longer people experience work or interpersonal stress, the more likely they are to catch a cold.**
- ◆ **Prolonged emotional and intellectual stress is associated with impaired memory and cognition, and with a potbelly!**

*"Stress," in *Newsweek* June 14, 1999.

Fatality at a Beltway Bandit*

Bob Lewis writes in *InfoWorld* that after he and his former colleague Gary Fuller accepted project manager assignments on cutthroat contracts, his colleague died from the stress:

“Both our contracts were underbid...badly underbid...Gary and I were both under a great deal of stress. Every day was another crisis, and the only way to keep our heads above water was to work too-long days and too many of them.

“[Gary] was under deadline pressure, there was no way his team could make the delivery date, and he was frantic.

“Then his heart failed, and he dropped dead on the office floor.

“If you’re the reason crisis is a way of life...then at some point in your career your leadership will result in tragedy.”

*“IS Survival Guide,” in *InfoWorld* December 20, 1999

Stress is Familiar

- ◆ **Stress triggers are familiar to everyone:***
No raise, no promotion, job or career change, loss of control, career success, conflict or criticism, rejection.
- ◆ **Stress is widely reported and seen:**
“Three out of four Americans complain of chronic stress. Two out of every three visits to the family doctor are thought to be stress-related, and the top-selling prescription drugs (Zantac, Prozac, Procardia) are for ulcers, depression, and hypertension.”**

* “Stress, Coping, and the Meaning of Work,” in *Stress and Coping: An Anthology*, 1991.

***Data Smog: Surviving the Information Glut*, 1997.

Effects of Information Overload*

- ◆ **Impaired Judgment:**

“...as information load increases, integrated decision making first increases, reaches an optimum...and then decreases...”

- ◆ **Overconfidence:**

“...as people were given more information, confidence in their judgments increased, but accuracy did not...”

**Data Smog: Surviving the Information Glut, 1997.*

Related Performance Concerns

- ◆ **Incapacity**

You break.

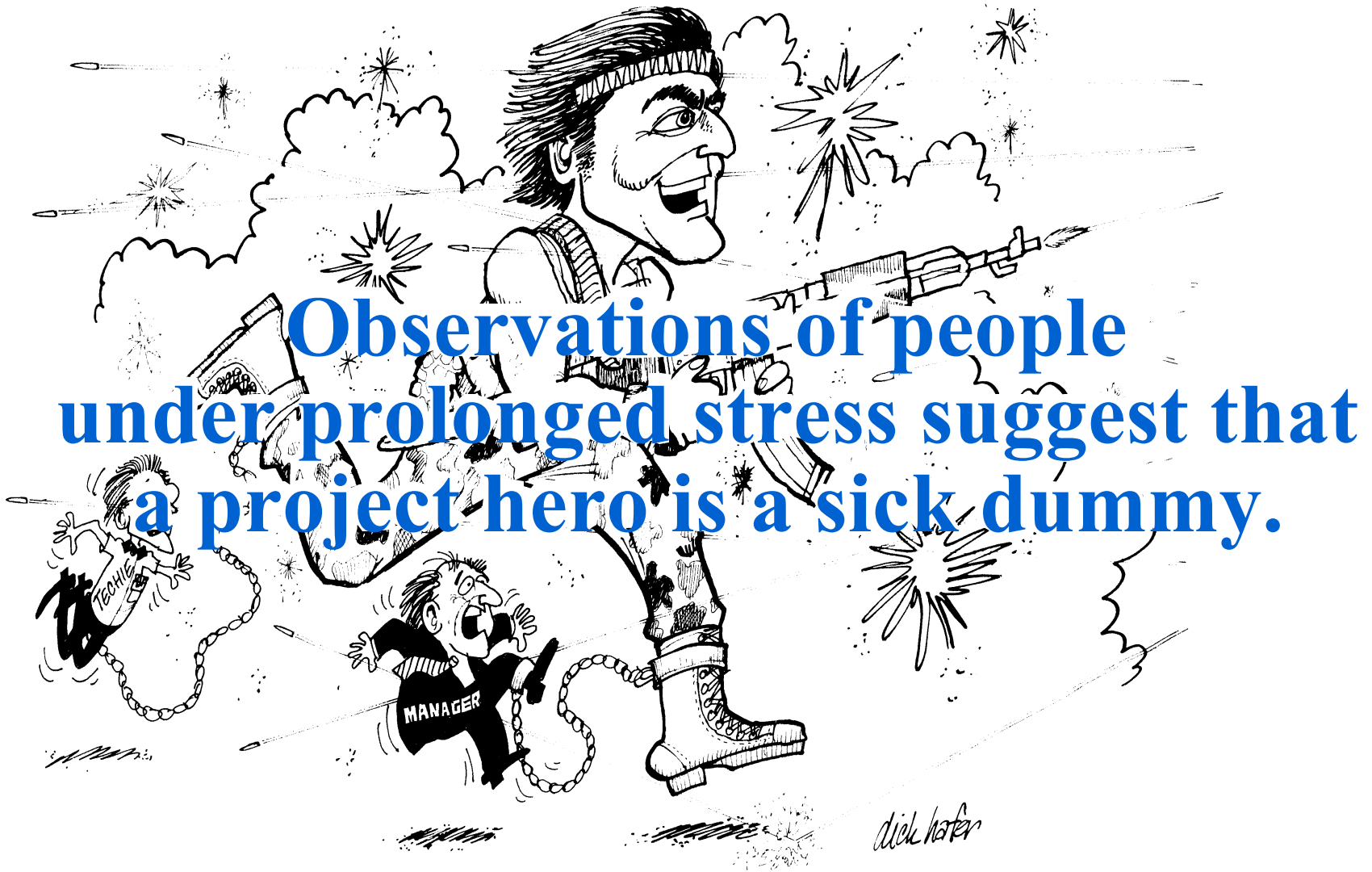
- ◆ **Unawareness (or denial)**

You think you're okay.

- ◆ **Timing**

You break just when you can least afford to.

The Cost of Project Heroism



Living With Stress and Information Overload: Suggested Antidotes for the Performance Problems

Planning

- Checklists (experience, CMMs, IEEE/EIA 12207)
- Routines (experience, CMMs, IEEE/EIA 12207)
- Milestones (experience, life cycle & parametric models)

Practice

- Routines (standard software processes)
- Milestones (e.g., requirements, design, etc.)

These aren't antidotes for stress, they are antidotes for poor performance under stress!

How are Process Standards Used?

Standards are used as aids for project planning and for defining an organization's standard software life cycle processes.



Why are Software Process Standards so Complex?

Software development itself is very complex.

“The intellectual challenge of software is unsurpassed...”

Watts S. Humphrey, in *Managing the Software Process*



To Recap: Why Are Ad-Hoc Software Processes a Bad Idea?

Biology, Biology, Biology

People create ad-hoc processes at the last minute, when there are multiple crises and different people are rushing to solve them in their own, incompatible ways.

This is the very time the project people hit their genetic, biological limits from prolonged stress -- they are sick and mentally impaired. So, their ad-hoc processes are bad and the project suffers.



Why Do Software Projects Need Software Process Standards?

To avoid ad-hoc software processes.



Contact Information

Lewis Gray

Abelia Corporation

12224 Grassy Hill Court

Fairfax, VA 22033-2819 USA

703-591-5247 (F) 703-591-5005

Email: lewis@abelia.com

<http://www.abelia.com>



Acronyms & Sources

◆ Acronyms:

CMM - Capability Maturity Model

CMMI - Capability Maturity Model - Integrated

SEPG - Software Engineering Process Group

◆ Sources:

- Lewis Gray, “No Hypoxic Heroes, Please!” in *CrossTalk*, December 1998.
- *Everest North Wall*, narrated by Robert Redford, Pal Productions video (206-361-9366), Seattle, 1982.
- Jon Krakauer, *Into Thin Air*, Villard, New York, 1997.
- *Everest - The Death Zone*, narrated by Jodie Foster, NOVA Adventures in Science, WGBH Boston Video (800-255-9424), 1998.
- Jerry Adler, “Stress,” in *Newsweek*, June 14, 1999.
- Bob Lewis, “IS Survival Guide,” in *InfoWorld*, December 20, 1999.
- Edwin A. Locke and M. Susan Taylor, “Stress, Coping, and the Meaning of Work,” in *Stress and Coping: An Anthology*, Third Edition, edited by Alan Monat and Richard S. Lazarus, Columbia University Press, New York, 1991.
- David Shenk, *Data Smog: Surviving the Information Glut*, HarperCollins, New York, 1997.