

# Retaining Women in Engineering: The Empowerment of Lean Development

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Promoting Change  
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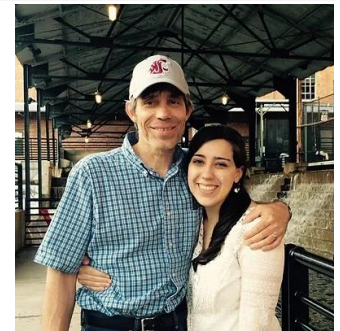
## The Three Root Causes

- Lack of Reusable Knowledge
- Lack of role models
- The work methods.

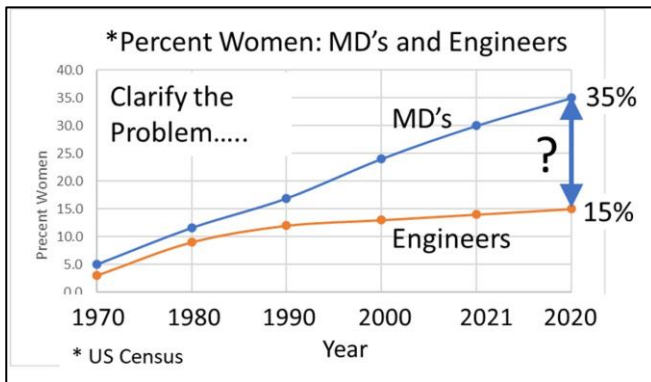
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Diversity drives better business results; however, despite decades of effort, women make up only 15% of engineers. Retaining Women in Engineering approaches the problem of women leaving engineering from a systems-level perspective to change the way engineering is done and level the playing field between men and women.

This book utilizes the six principles of Lean Development and draws from the learnings of the field of medicine, recognizing that access to a vast amount of written knowledge is an important part of a physician's learning process. Using these principles, the book provides leaders with concrete strategies and methods to change the way engineering is done and learning occurs.



This book will help leaders at every level within an engineering firm, as well as women engineers and managers who want to grow to their full potential, and others who care about gender equity



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- Purpose is to **promote change** through changing the way engineering is done.
- **Lean Development is four times more efficient** than traditional development
- **Going Home on Time.** LD increases the learning rate and becomes a set of personal productivity tools.

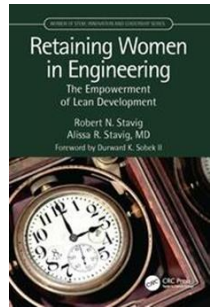
## The book parts

- I. The Problem
- II. Analyzing the problem: Using an Engineering Process.
- III. Developing a Solution: Lean as a Foundation for Change and Learning
- IV. **Strategy 1:** Empowering Control over Career
- V. **Strategy 2:** Enabling Leaders to Lead: Creating Satisfying Work
- Appendix A: Going Home On Time

## The Principles of Lean Development

1. The Creation of Reusable Knowledge
2. Cadence, Pull, and Flow
3. Visual Management
4. Entrepreneurial System Designer
5. Set Based Design
6. Build Teams of Responsible Experts

# Promoting Change: In the way engineering is done



## Strategy 1:

### Empowering Control over Career

- Create a level playing field
- Lean Development
- Role Models, Technical Coaches, and Mentors

## Managing a career and Going Home Ontime

begins with:

Understanding value add, which requires understanding non-value add.

**Work life Balance, additionally** means a firm focuses on enabling parttime work without comprising a persons career objectives.

## Strategy 2:

### Enabling Leaders to Lead: Creating Satisfying Work

- Lead the Change to the Way the Work is Done.
- Leading the Development of Engineers and Managers

## The Learning Process, of an engineer.

### Web Based Learning

Physicians

70%

Engineers

20%

- The remaining learning is dependent on others.
- For Engineers, this high level of dependency creates an environment that may promote bias towards women.

## Accelerate Learning Create Reusable Knowledge The A3 Problem Solving Process

11 x 17 inch, one side, clear and concise,

Title	Name(s) Date
Background and Current Situation, Goal.	The Flow of Learning
Proposal and Alternatives being considered	Implementation and actions
	Next Steps
	Team:

Figure A2. A3 Template

## At the University Level

Within an Engineering Program

### Implementing Change: Appendix B

#### *Freshman Engineering Introduction Class*

- Teach the tool of an A3 Problem Solving Process

#### *Each Term: Subsequence Engineering Classes*

- For each engineering term, identify one class that requires the creation of an A3 (team or individual).

#### *Engineering Classes with Design Components*

- Identify a principle of LD to bring into the class.

#### *Senior Design Class*

- Teach the principles of LD.
- Utilize A3's for all the development work, at end of class move A3 learnings to A3 Knowledge sheets.
- Stop using PowerPoint Presentations.

## Hold a SWE Event

Objective: Communicate the challenges women face in engineering and the opportunities to mitigate those through the methods in the book.

### Goal

1. Women understand the challenges and possible solutions (the book)
2. Women understand what they might want their first job to be and how to find it.
3. 100% of women have a physical copy of the book in fall of junior year. (prior to looking for an internship.) Able to buy the book at \$10.

### Approach

1. Lead by: chapter president, SWE Local rep, and corporate sponsor (ideally a female engineer)
2. 30 minute intro of the book (content on web site)
3. 15 min of dialog/questions
4. 15 min, next step, start a book club?.