Retaining Women in Engineering:
The Empowerment of Lean Development

Bob.stavig@gmail.com

Promoting Change
Leanreimagine.com

The Three Root Causes
- Lack of Reusable Knowledge
- Lack of role models
- The work methods.

Robert N Stavig
Alissa R. Stavig, MD
© 2023

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.

*Percent Women: MD's and Engineers

Clarify the Problem…..

MD's — 35%

?

Engineers — 15%

* US Census
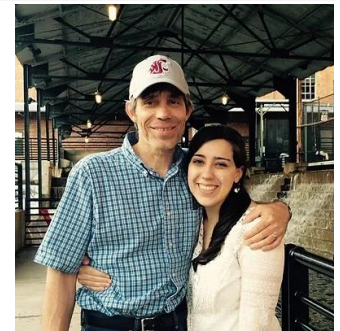
This book will help leaders at every level within an engineering firm, as well as women engineers and managers who want to grow to their full potential, and others who care about gender equity
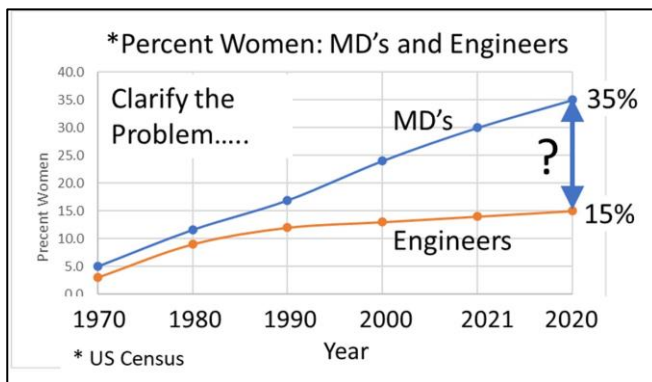
Leanreimangined.com
- Purpose is to **promote change** through changing the way engineering is done.
- **Lean Development is four times more efficient** than traditional development
- **Going Home on Time.** LD increases the learning rate and becomes a set of personal productivity tools.
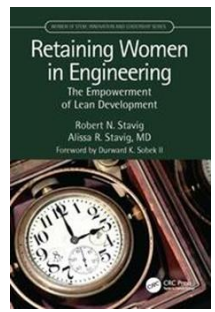
The book parts
I. The Problem
II. Analyzing the problem: Using an Engineering Process.
III. Developing a Solution: Lean as a Foundation for Change and Learning
IV. **Strategy 1:** Empowering Control over Career
V. **Strategy 2**: Enabling Leaders to Lead: Creating Satisfying Work
Appendix A: Going Home 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

© Robert N. Stavig, 2023

Promoting Change:
In the way engineering is done

Retaining Women in Engineering
The Empowerment of Lean Development
Robert N. Stavig
Alissa R. Stavig, MD
Foreword by Durward K. Sobek II

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, with requires understanding non-value add.

Worklife 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	Engineers
70%	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
		Implementation and actions
Proposal and Alternatives being considered		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 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?.