goto;

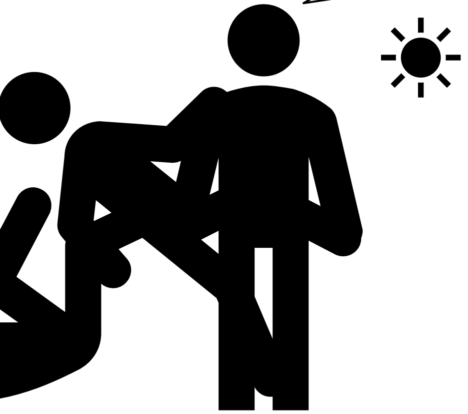
GOTO CHICAGO 2023

#GOTOchgo

Are we *really* engineers?

Is Software Development a Branch of Engineering?

If builders built houses the way programmers built programs, the first woodpecker to come along would destroy civilization.



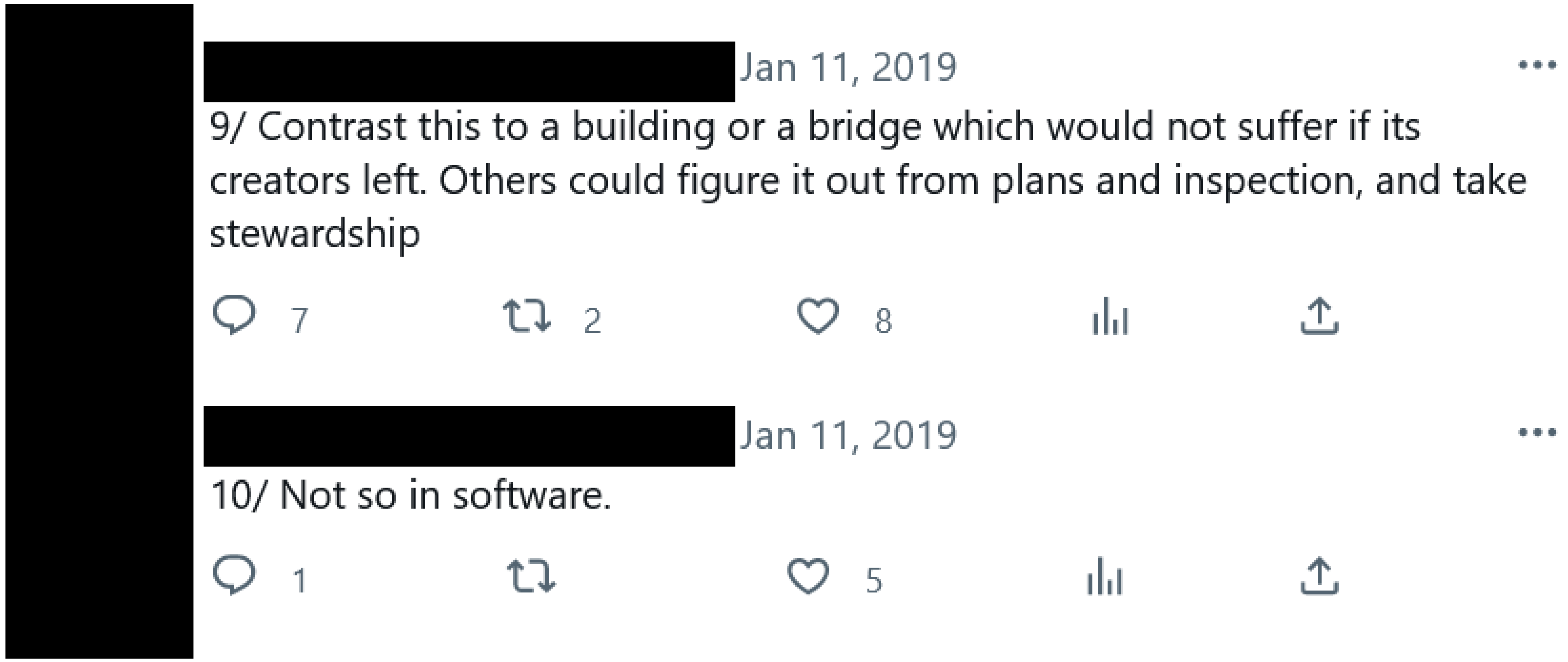
Gerald Weinberg

Software development is only like bridge building if you're building a bridge on the planet Jupiter, out of newly invented materials, using construction equipment that didn't exist five years ago.

Jeff Atwood

Advertisement

```
fun leftpad(str, size=0, c=' ') {
  while(str.len() < size) {
    str = c + str;
  }
  return str;
}
```



[redacted]

[redacted] Jan 11, 2019

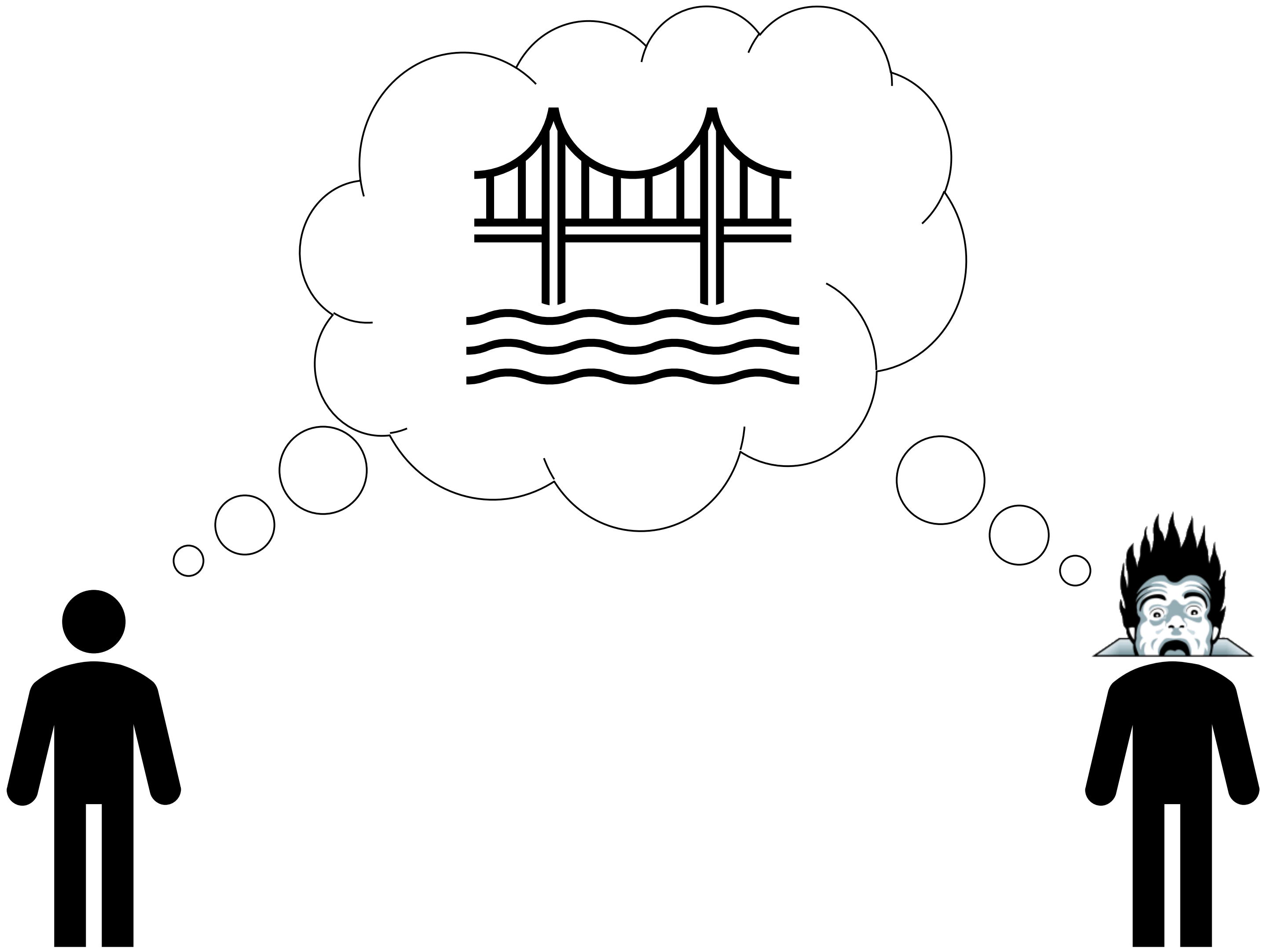
9/ Contrast this to a building or a bridge which would not suffer if its creators left. Others could figure it out from plans and inspection, and take stewardship

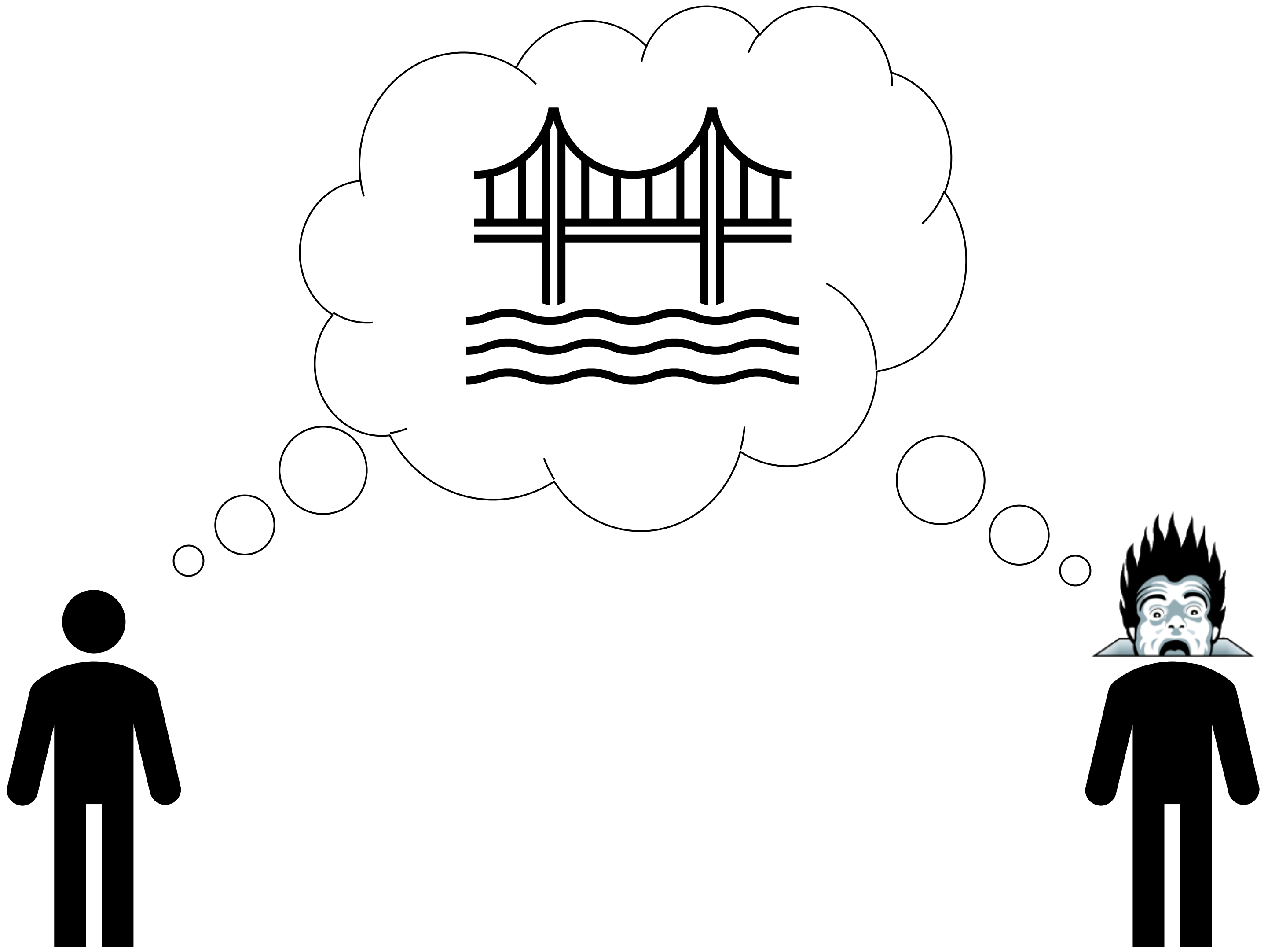
7 2 8

[redacted] Jan 11, 2019

10/ Not so in software.

1 5



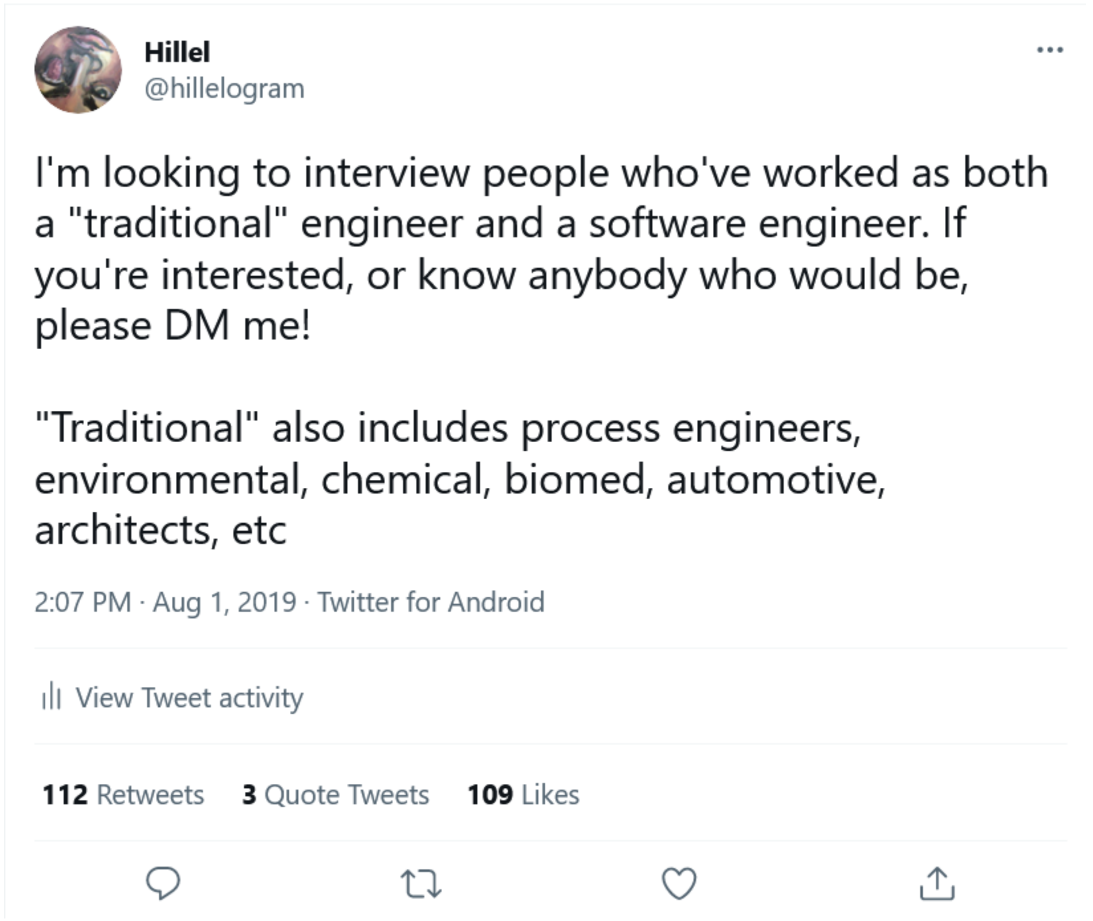


Mega Advertisement

Let's **talk** to engineers!

Crossover: someone who worked in both software and "real" engineering.

I. Are we really engineers?
II. How similar are we to engineers?
III. What can we learn from each other?


Hillel
@hillelogram

I'm looking to interview people who've worked as both a "traditional" engineer and a software engineer. If you're interested, or know anybody who would be, please DM me!

"Traditional" also includes process engineers, environmental, chemical, biomed, automotive, architects, etc

2:07 PM · Aug 1, 2019 · Twitter for Android

View Tweet activity

112 Retweets **3** Quote Tweets **109** Likes

17

6

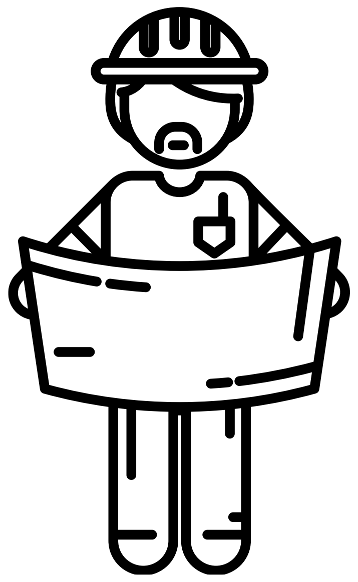
12

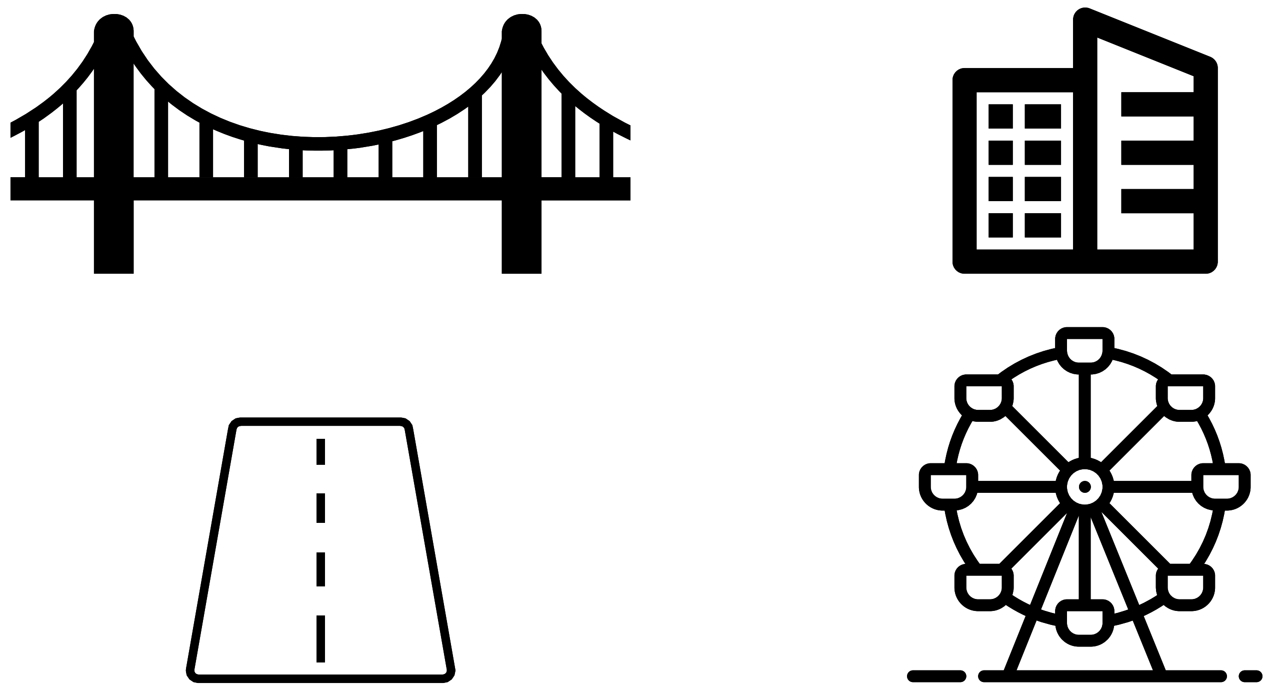
I. Are we really engineers?

What's "engineering"?

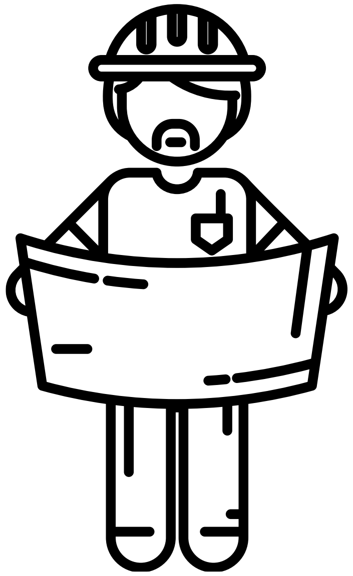
"Anything required for a living city"

20%





20%

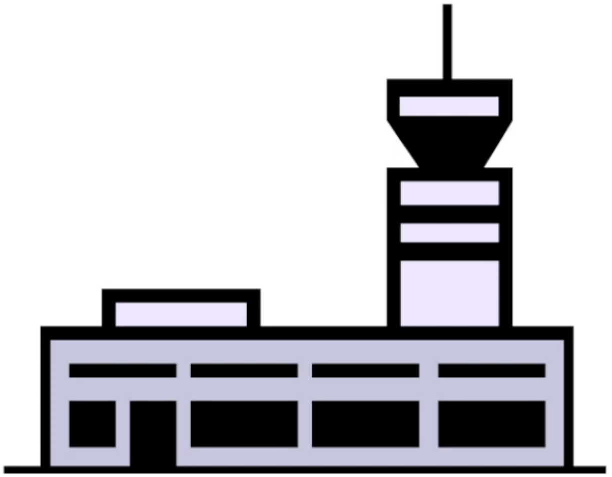


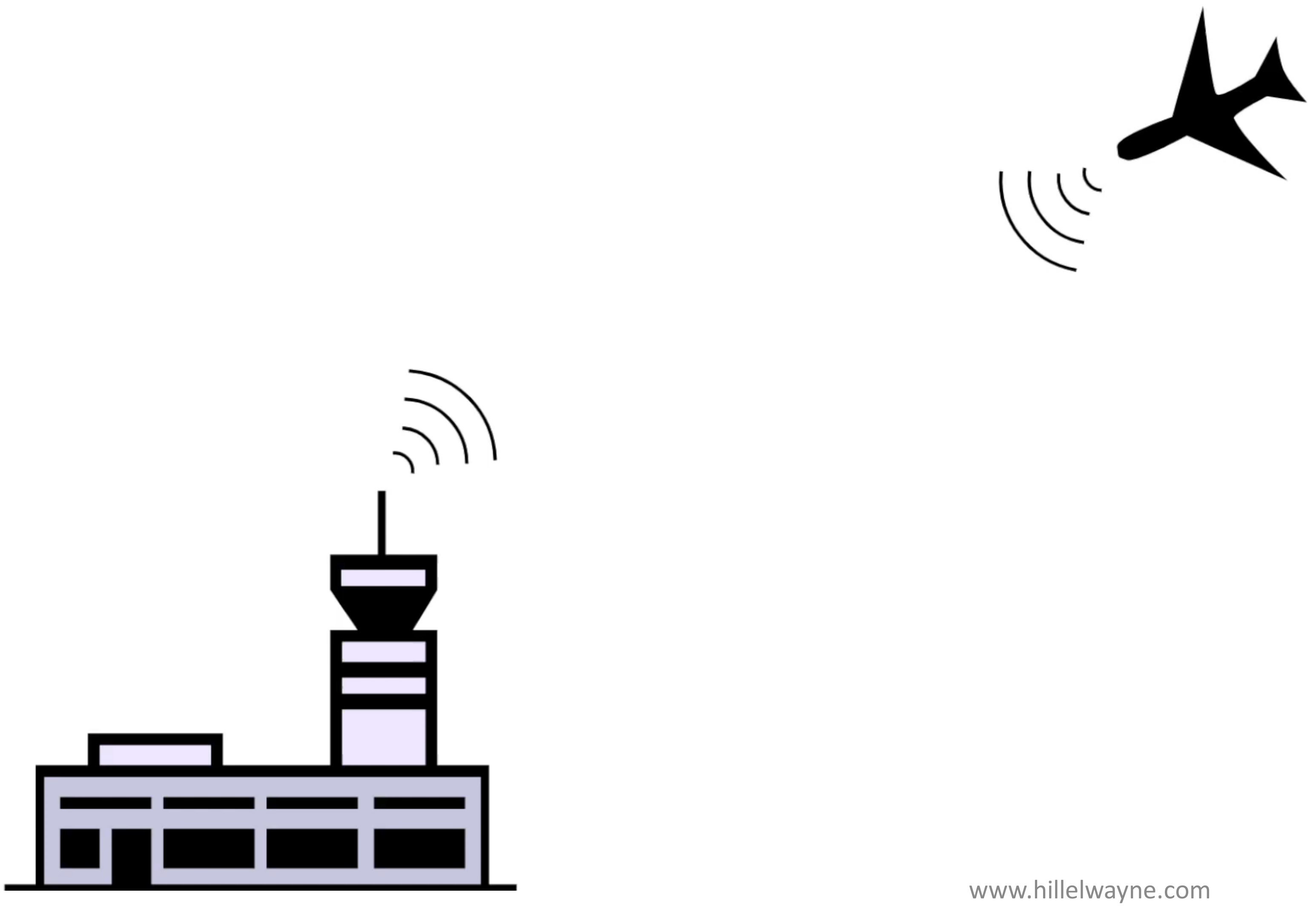
Mechanical
Electrical
Chemical
Industrial
Nuclear
Aerospace

Engineering is:

a. physical
b. consequential
c. licensed

a. "Engineering is physical."





Uniqueness Principle

Each project should be regarded as different from previous seemingly similar projects.

People-Design Principle

Stakeholders must have a role in finding and implementing the solution.

Uniqueness Principle

Each project should be regarded as different from previous seemingly similar projects.

People-Design Principle

Stakeholders must have a role in finding and implementing the solution.

Agil

Engineering is:

a. ~~physical~~
b. consequential
c. licensed

b. "Engineering is consequential."

A preventable coding error knocked out 911 service for millions

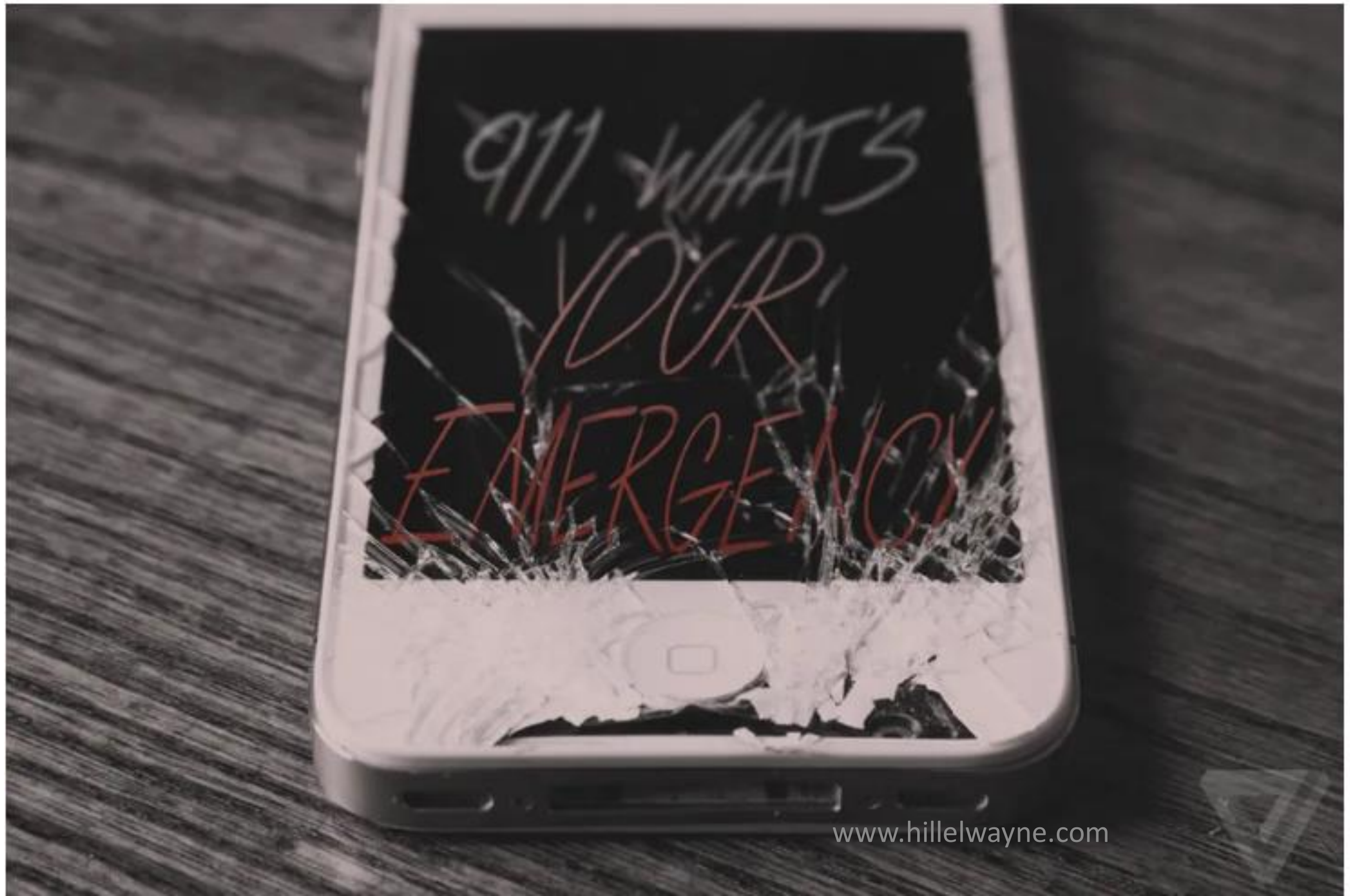
24

In a new report, the FCC also says such outages are on the rise

By Colin Lecher | @colinlecher | Oct 20, 2014, 11:14am EDT

Source FCC

SHARE



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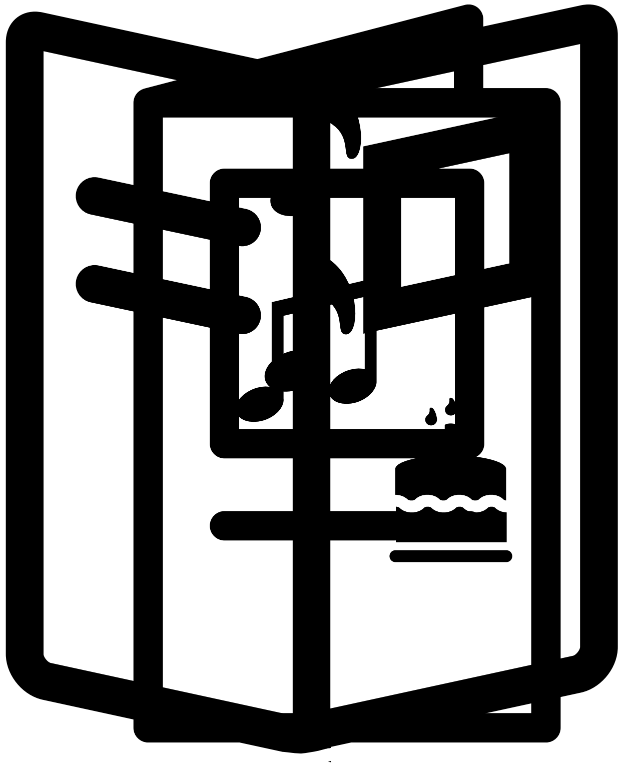
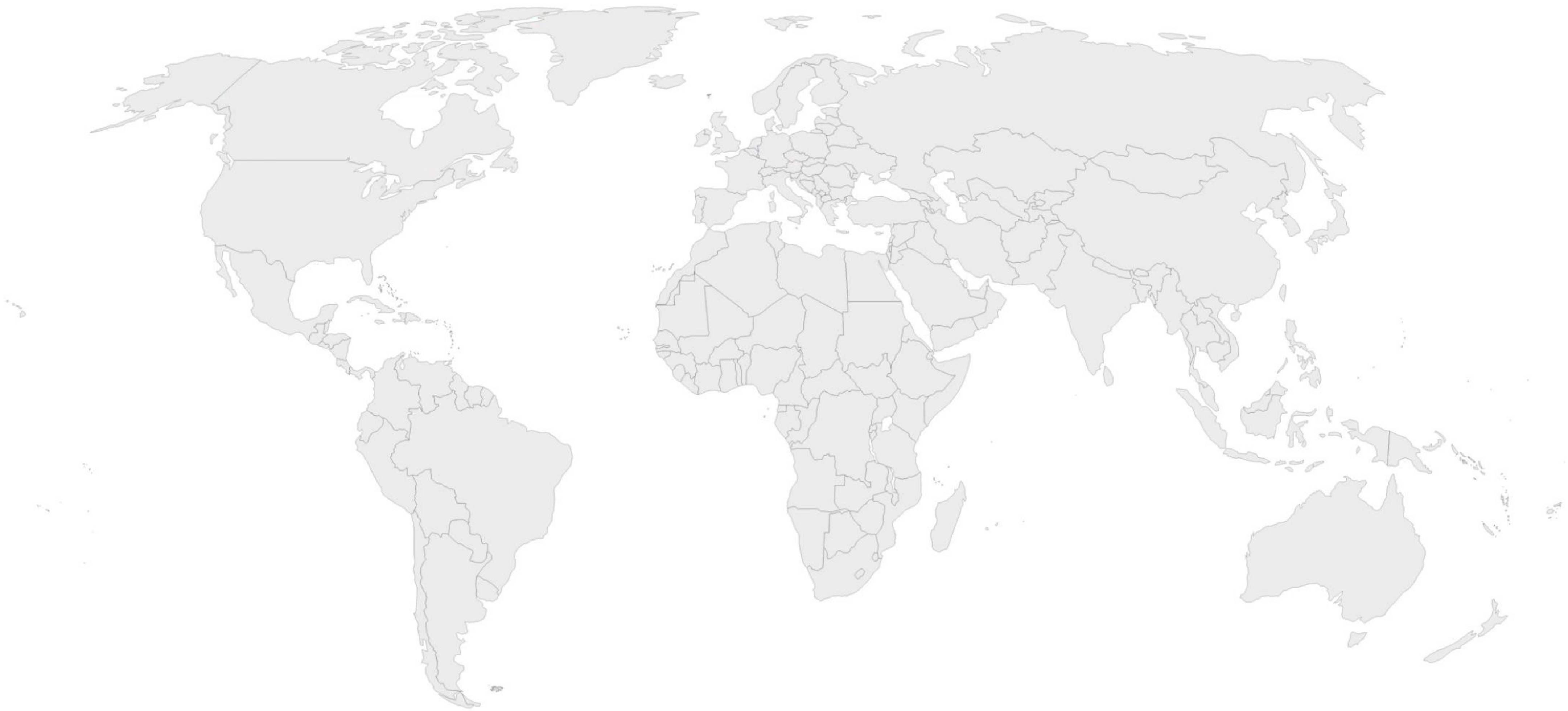
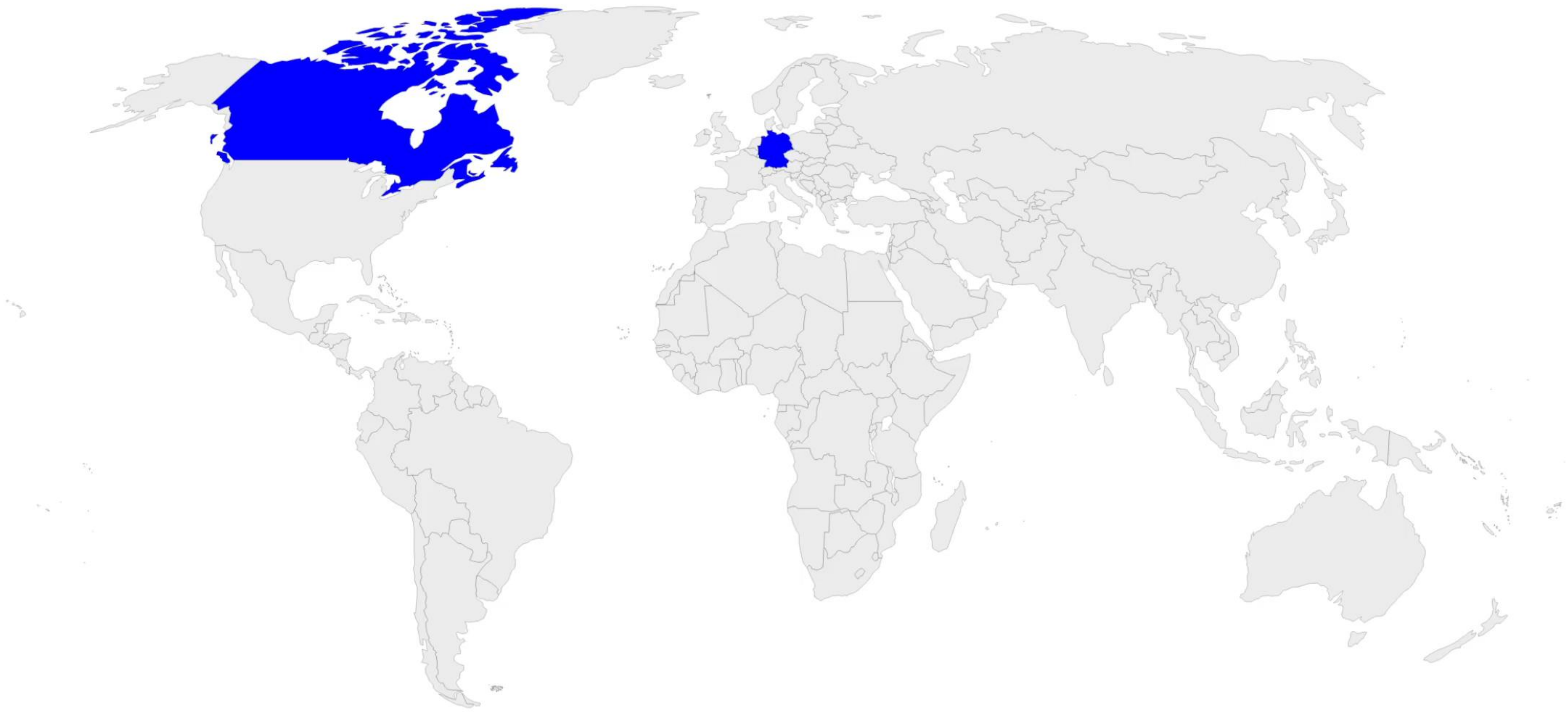


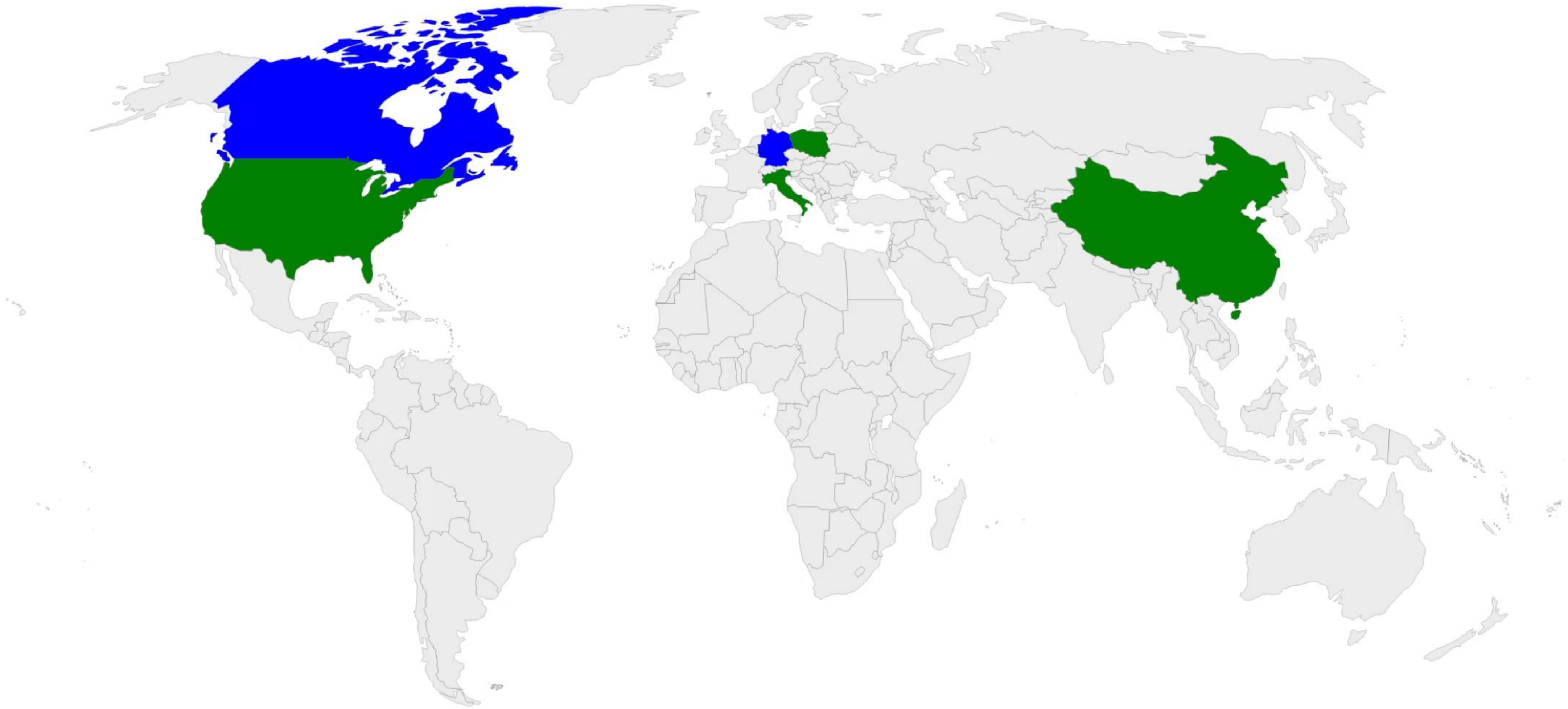
Engineering is:

a. ~~physical~~
b. ~~consequential~~
c. licensed

c. "Engineering is licensed."





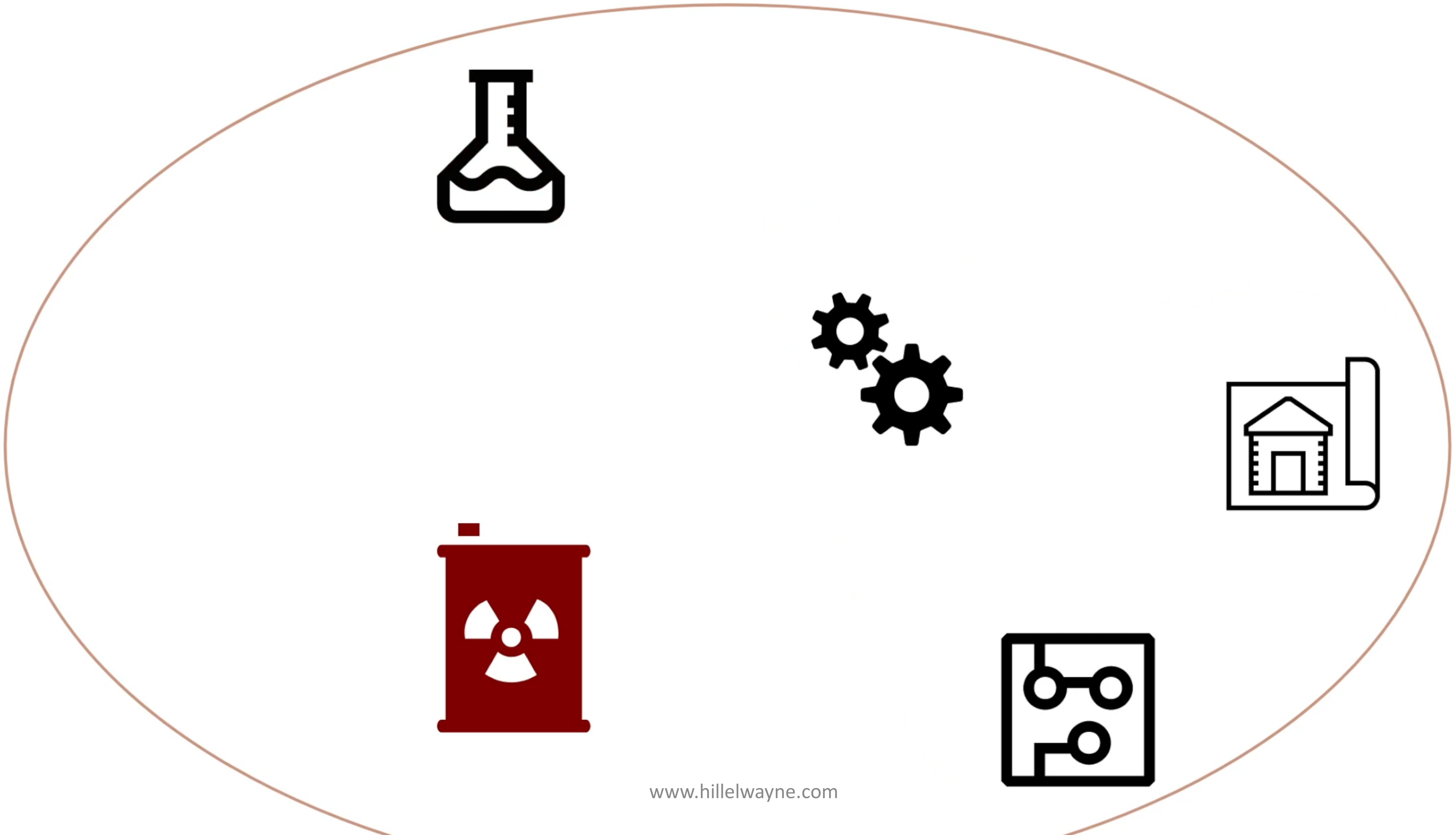


Engineering is:

~~a. physical~~

~~b. consequential~~

~~c. licensed~~



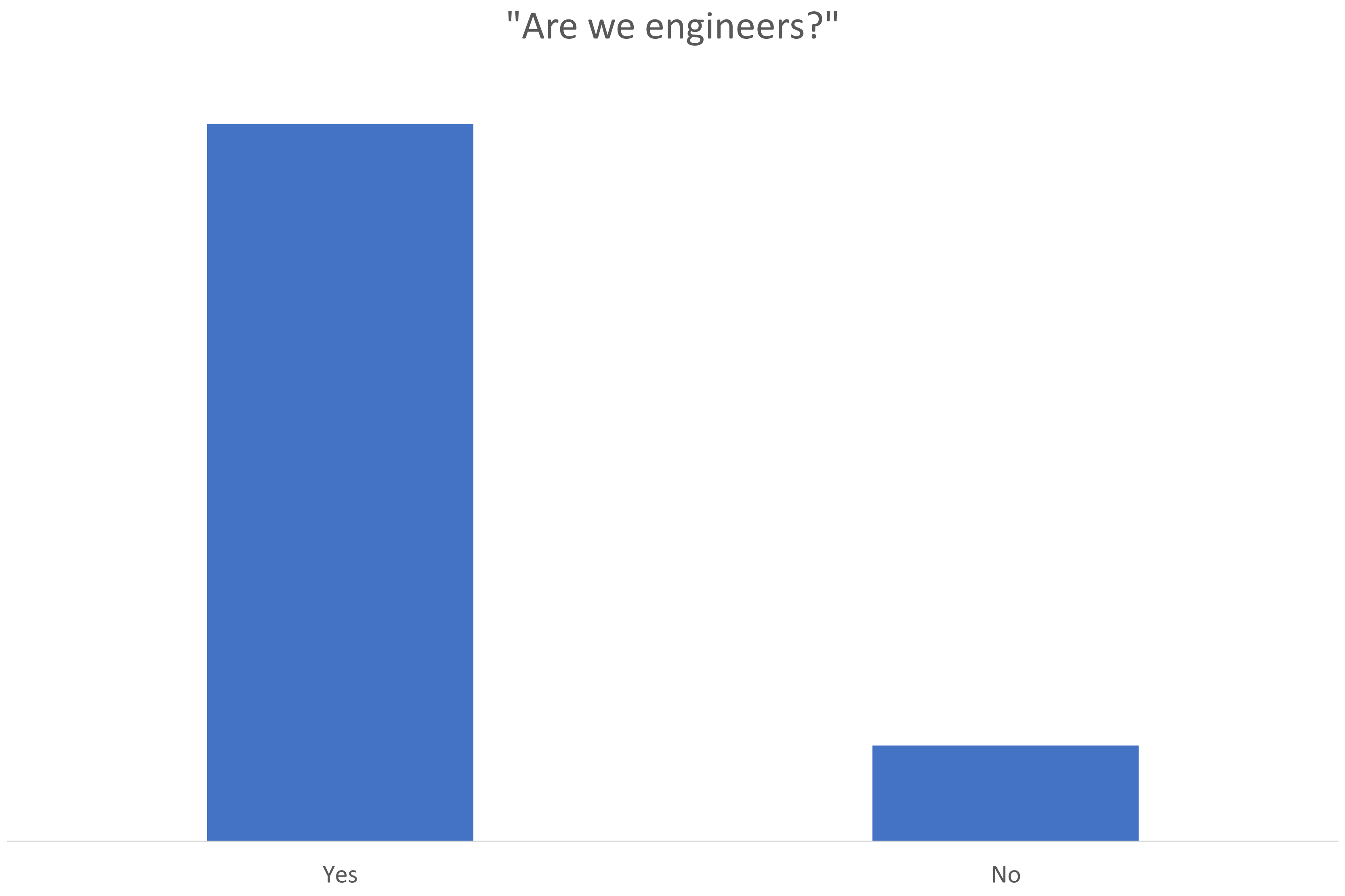
Engineering is:

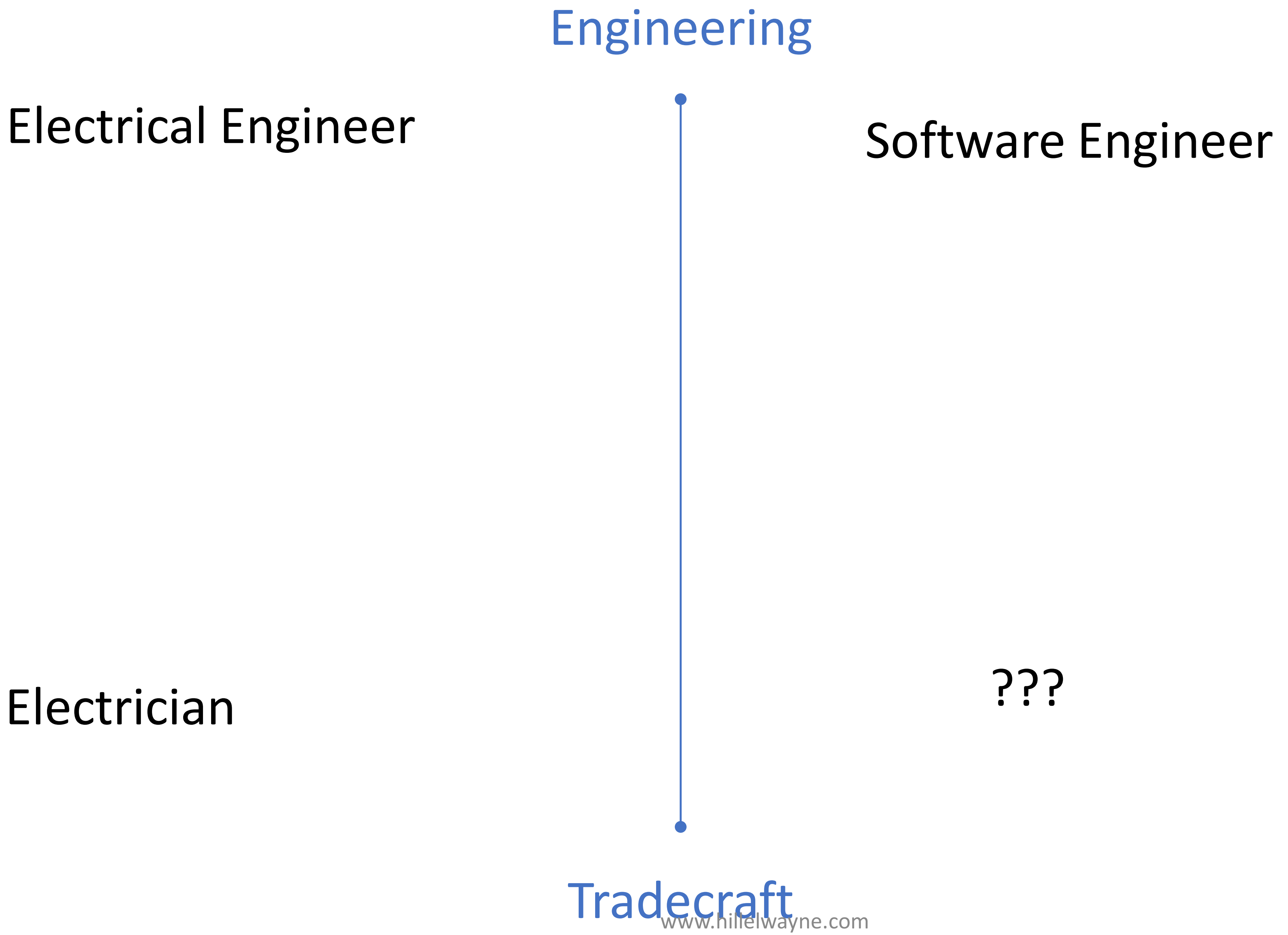
~~a. physical~~

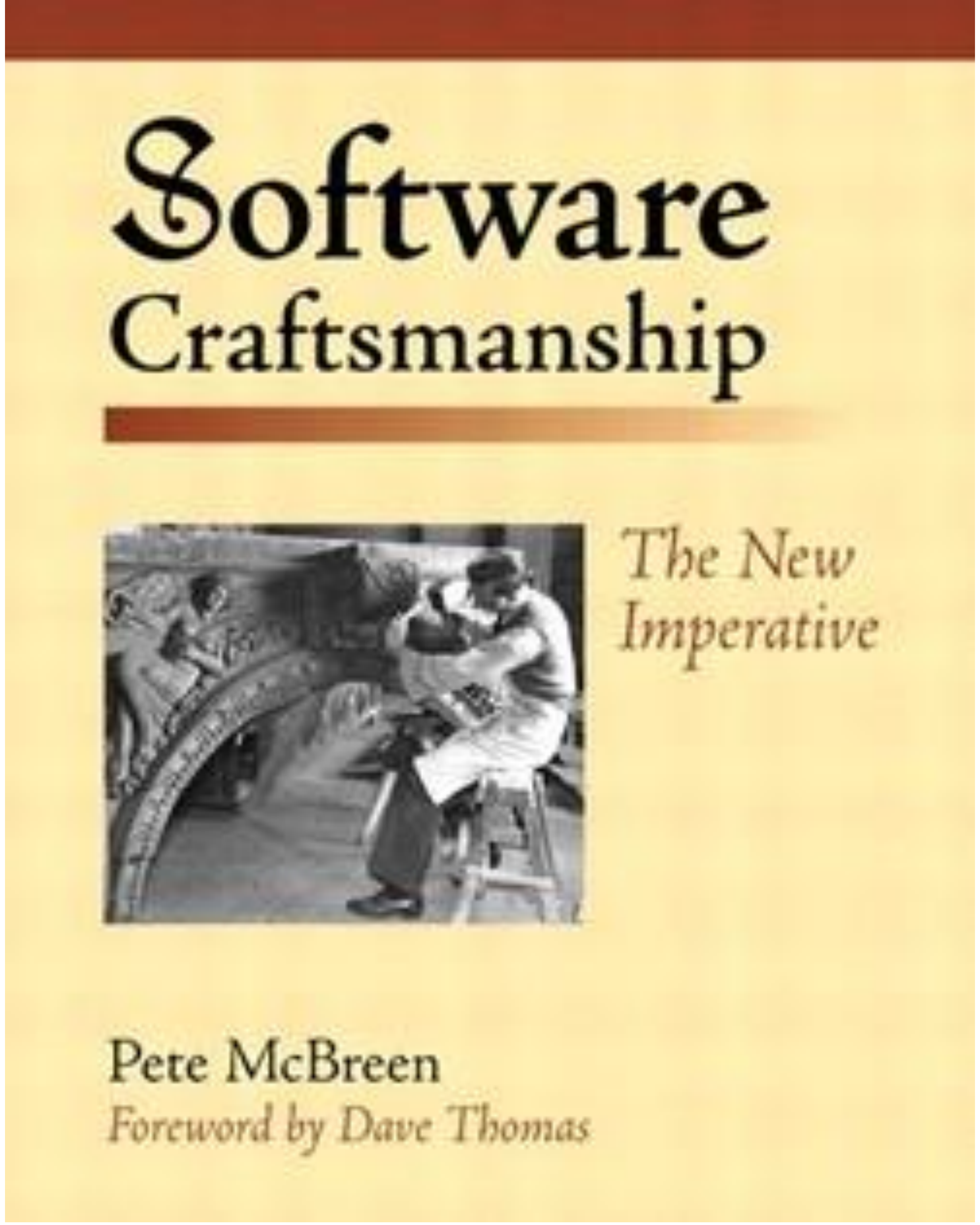
~~b. consequential~~

~~c. licensed~~

d. what engineers do.


"Are we engineers?"
Yes
No


Engineering
Electrical Engineer
Software Engineer
Electrician
???
Tradecraft



Software Craftsmanship

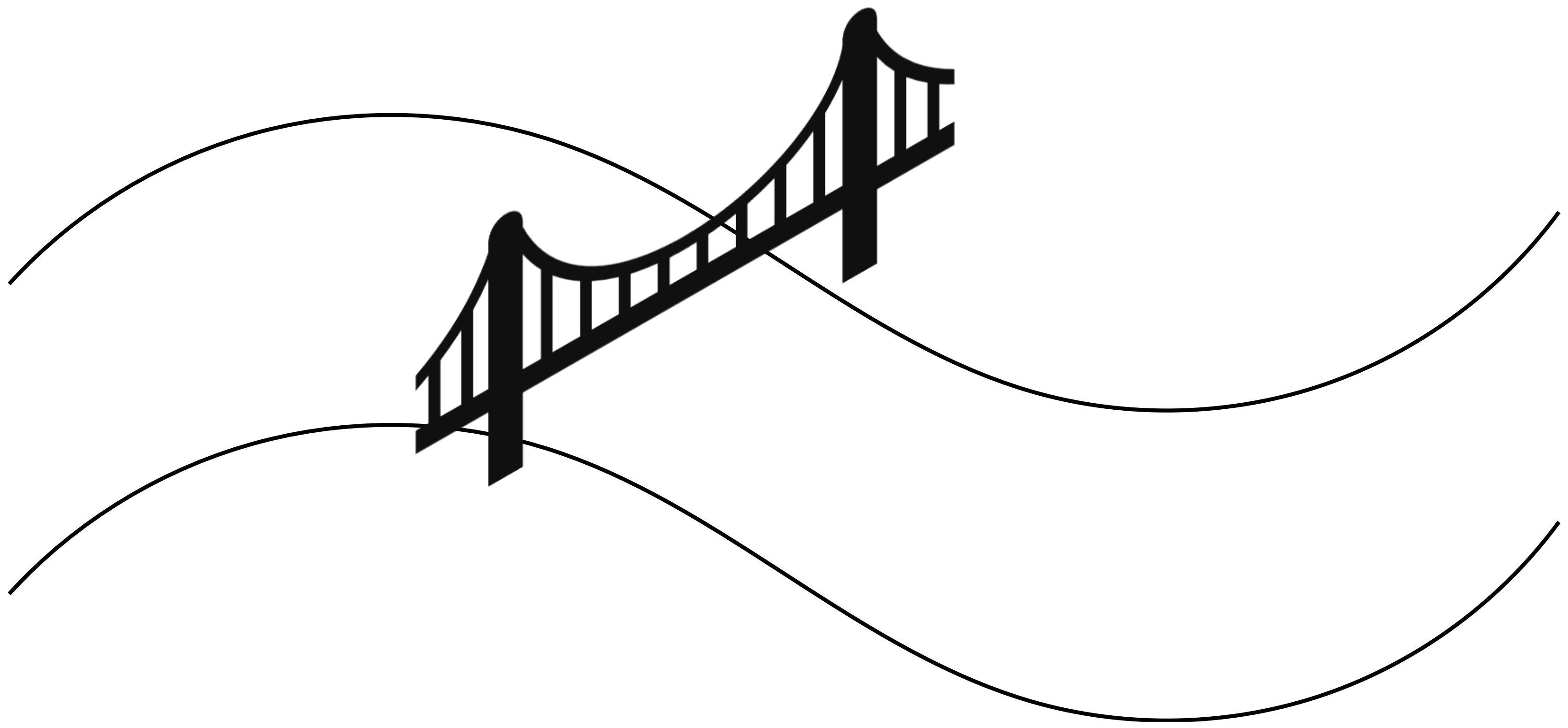
The New Imperative

Pete McBreen

Foreword by Dave Thomas

II. How is Software Different from Trad?

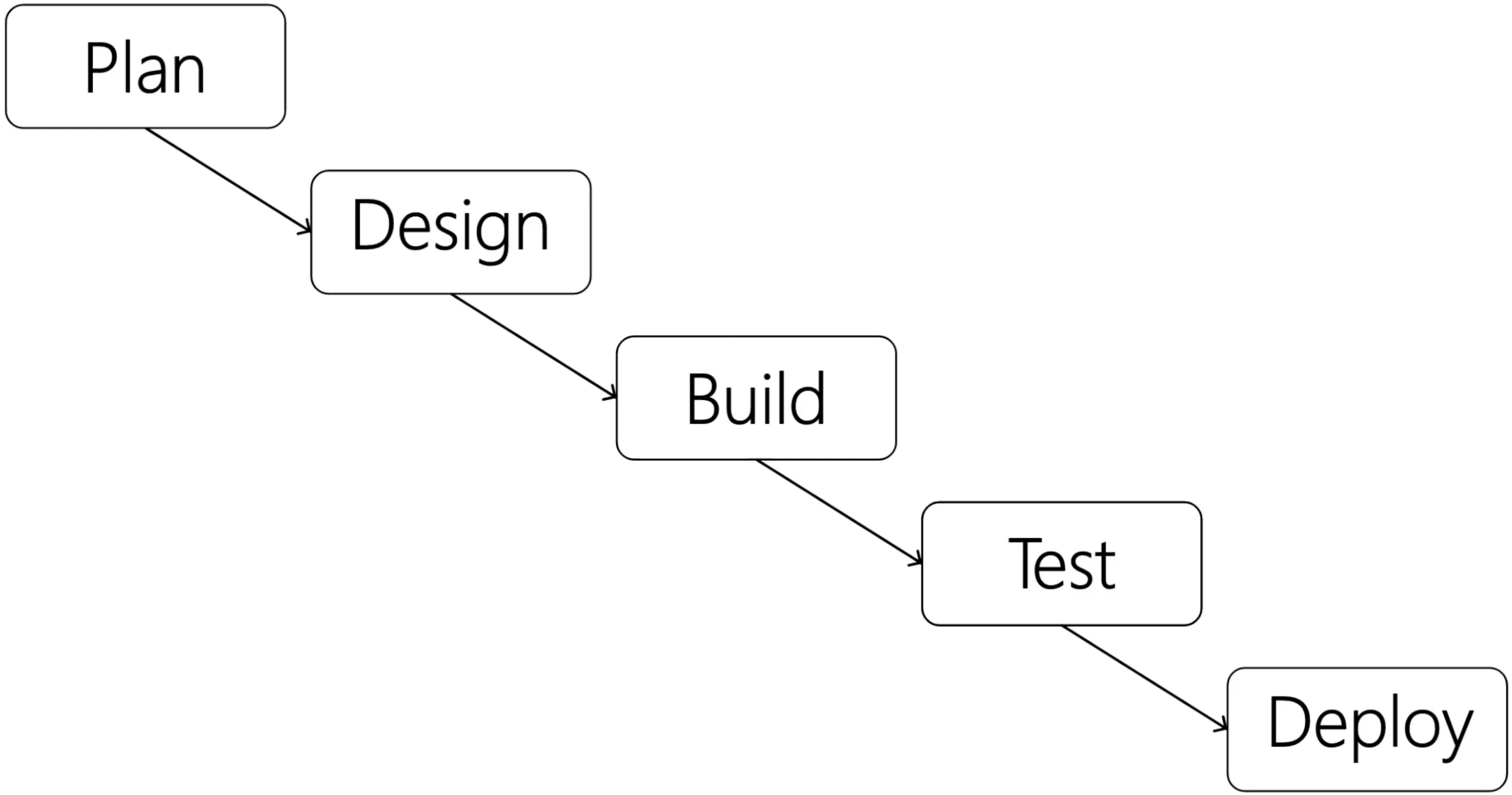
Are We Special?



Software	Traditional
Agile	Waterfall
Unpredictable	Predictable
Informal	Rigorous

1. Software is agile

❑


Plan
Design
Build
Test
Deploy

Waterfall

¯_(ツ)_/¯

Agile

2. Engineering is predictable

MOVING HISTORIC BRIDGES

MOVING A BRIDGE CAN BE A COMPLEX PROSPECT. BELOW ARE THE MAJOR STEPS IN THE PROCESS:

1. TxDOT and/or local government identifies Historic Bridge in project ▼
2. TxDOT conducts engineering studies, needs at crossing ▼
   - The next stages for adopting a bridge can take up to one year or more. ▼

Steps

03 TxDOT puts availability of bridge online, social media, newspapers

04 Potential new owner prepares Reuse Proposal Checklist

05 TxDOT reviews and approves new owner

06 Agreement is signed to transfer liability/ responsibility to new owner.

07 Contractor bids on project

08 TxDOT accepts bids

09 New owner works with contractor to get bridge off the roadway

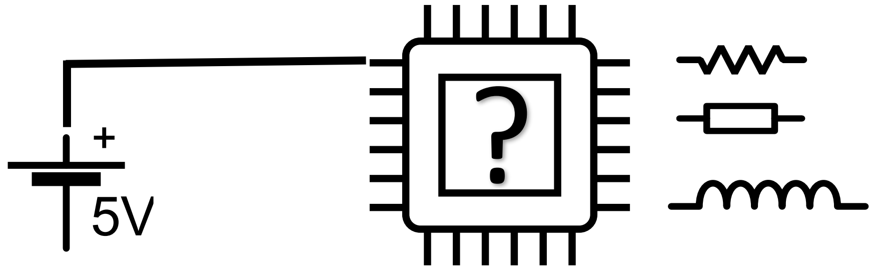
10 TxDOT demolition funds MAY help pay to move bridge to new location

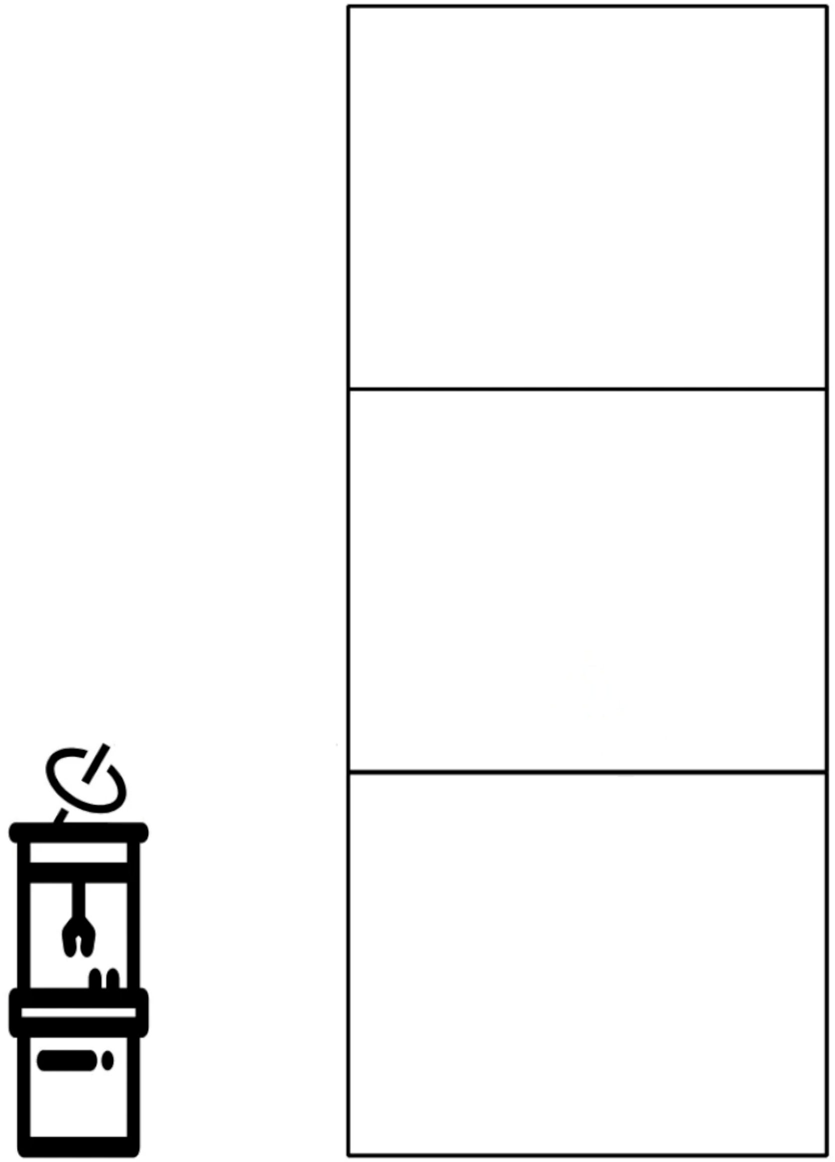
11 Bridge set at new location

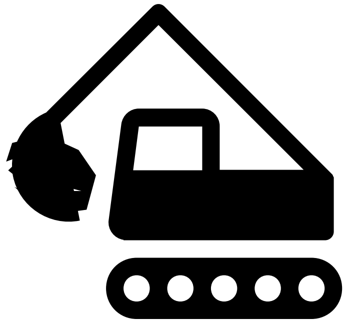
12 New owner rehabilitates the bridge

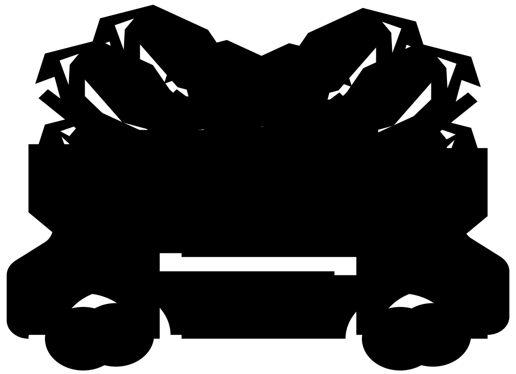
13 Project opens to the public

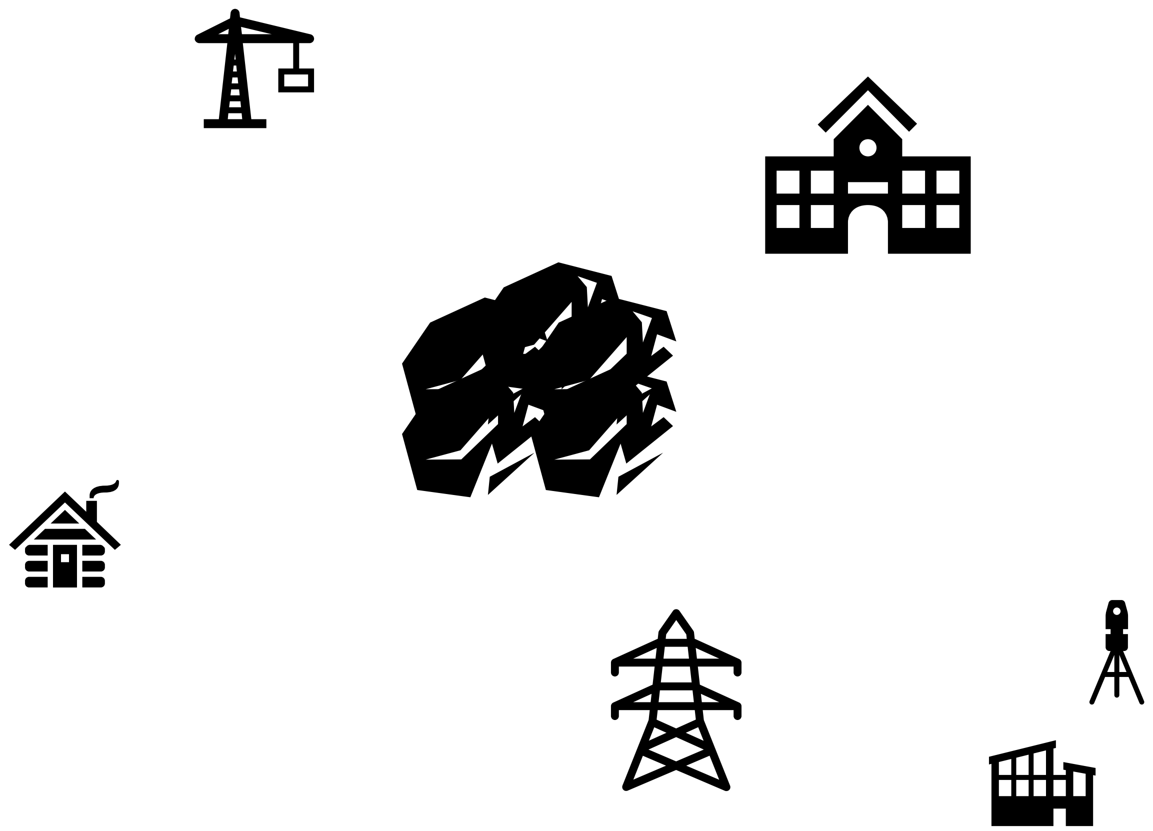
1058



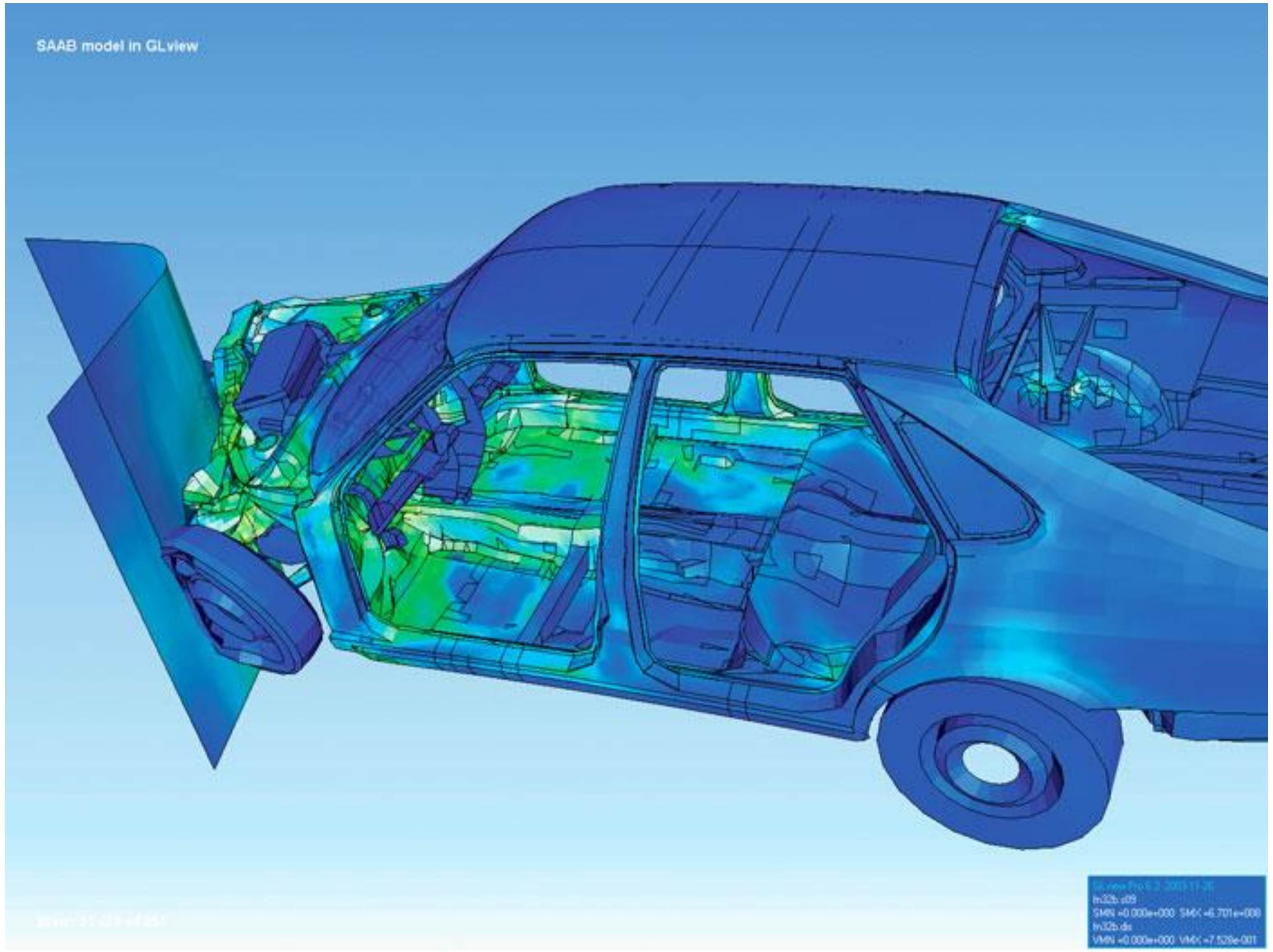






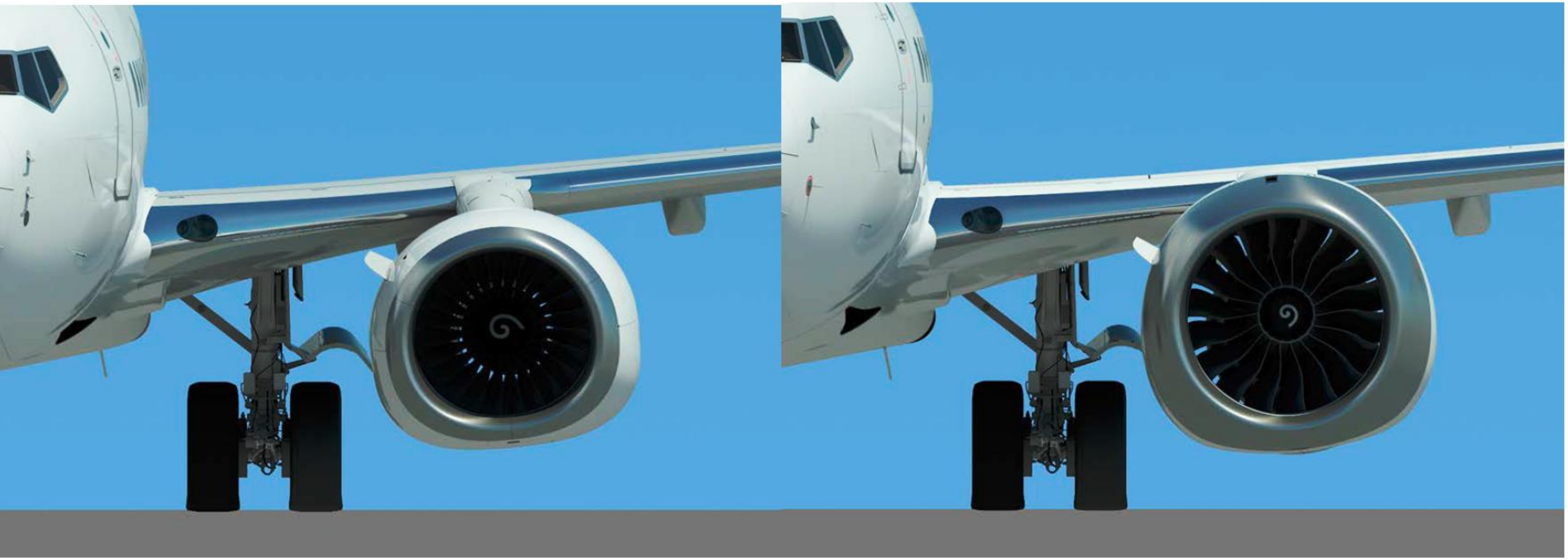


New Austrian Tunneling Method


SAAB model in GLview
GLview Pro 6.3 2003-11-26
hn32b.s09
SMN +0.000e+000 SMX +6.701e+008
hn32b.dis
VMN +0.000e+000 VMX +7.528e-001

3. Engineering is more rigorous

Project?	Software Fix?
P01	✓
P02	✓
P03	✓
P04	✓
…	
P760	✓



Software	Traditional
Agile	Waterfall
Unpredictable	Predictable
Informal	Rigorous

Software	Traditional
Iterative	Iterative
Unpredictable	Unpredictable
Informal	(sometimes) Informal

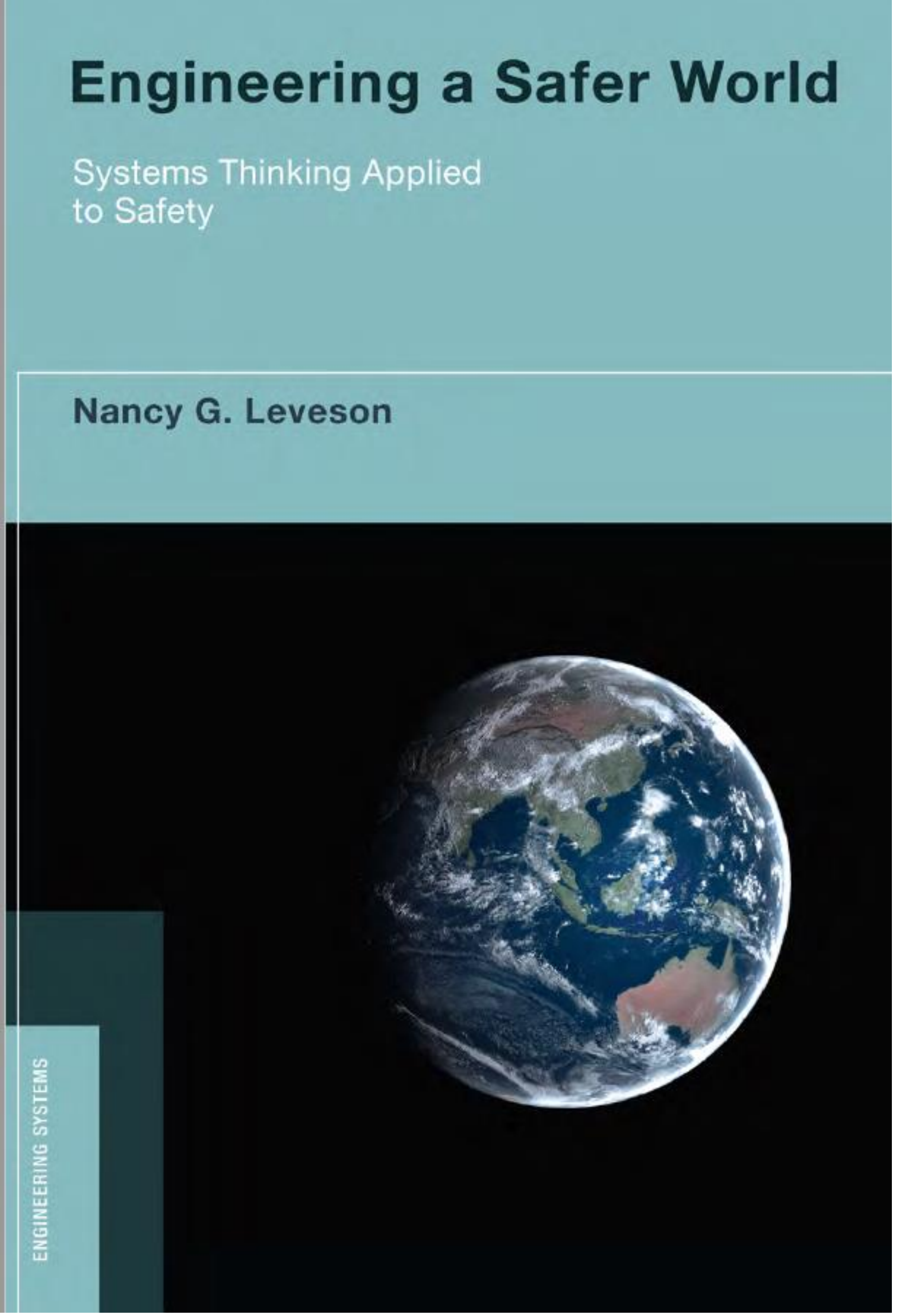
What's Different?

What's Different?

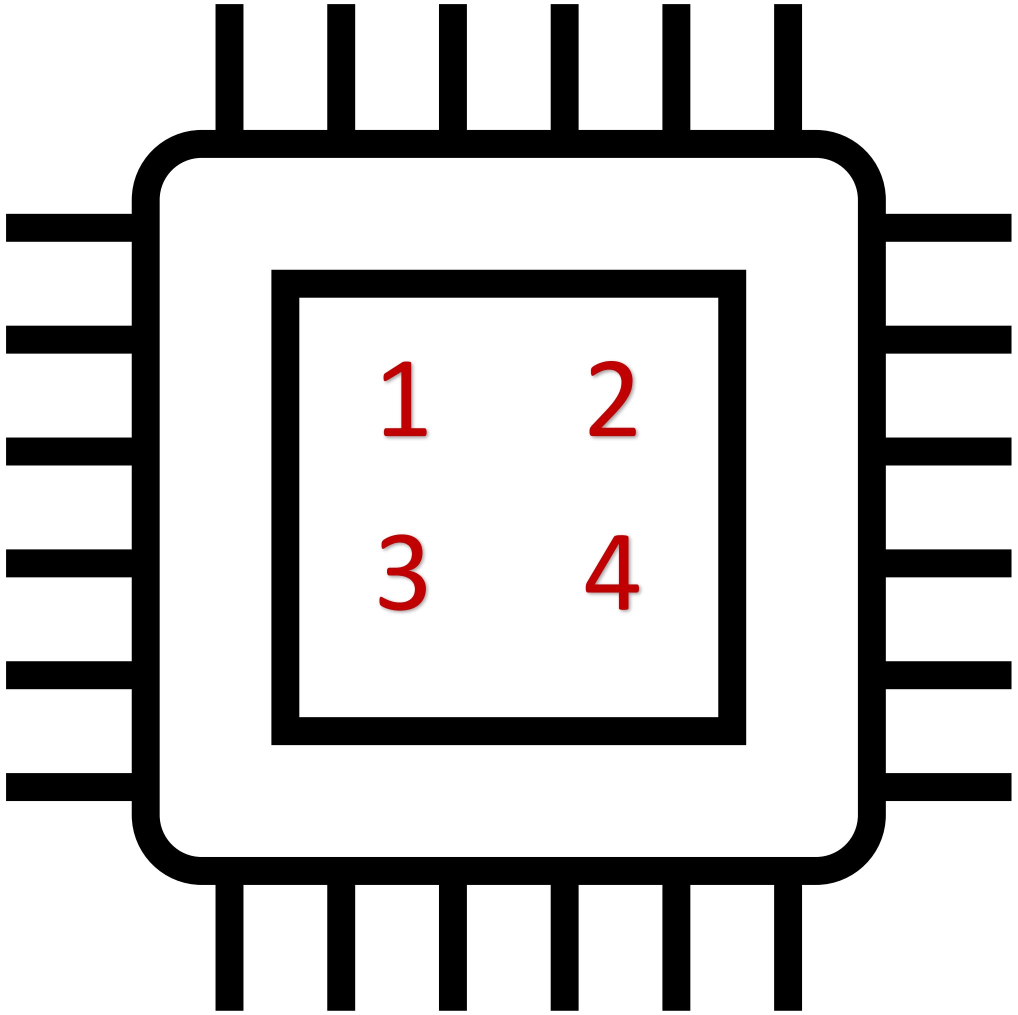
1. Velocity

What's Different?

1. Velocity
2. Constraints



Many software requirements problems arise from what could be called the *curse of flexibility*. The computer is so powerful and so useful because it has eliminated many of the physical constraints of previous machines. This is both its blessing and its curse: We no longer have to worry about the physical realization of our designs, but we also no longer have physical laws that limit the complexity of our designs. Physical constraints enforce discipline on the design, construction, and modification of our design artifacts. Physical constraints also control the complexity of what we build. With software, the limits of what is *possible* to accomplish are different than the limits of what can be accomplished *successfully* and *safely*—the limiting factors change from the structural integrity and physical constraints of our materials to limits on our intellectual capabilities.


1
2
3
4

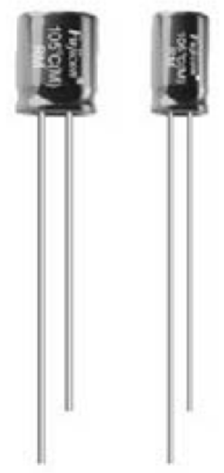
What's Different?

1. Velocity
2. Constraints
3. Consistency

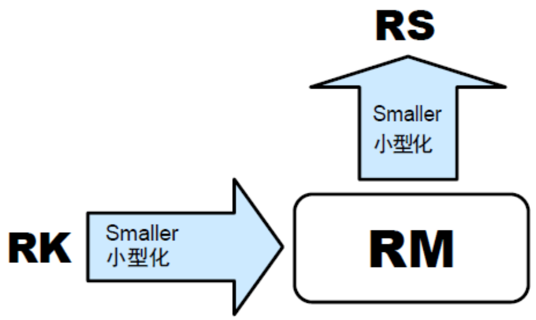
```
def sort(l):
    if l == []:
        return l
    lo = [x for x in l if x < l[0]]
    fs = [x for x in l if x == l[0]]
    hi = [x for x in l if x > l[0]]
    return sort(lo) + fs + sort(hi)
```

RM Series

WIDE TEMPERATURE RANGE, HEIGHT 7(9)MM
7(9)MM 高，寬溫品

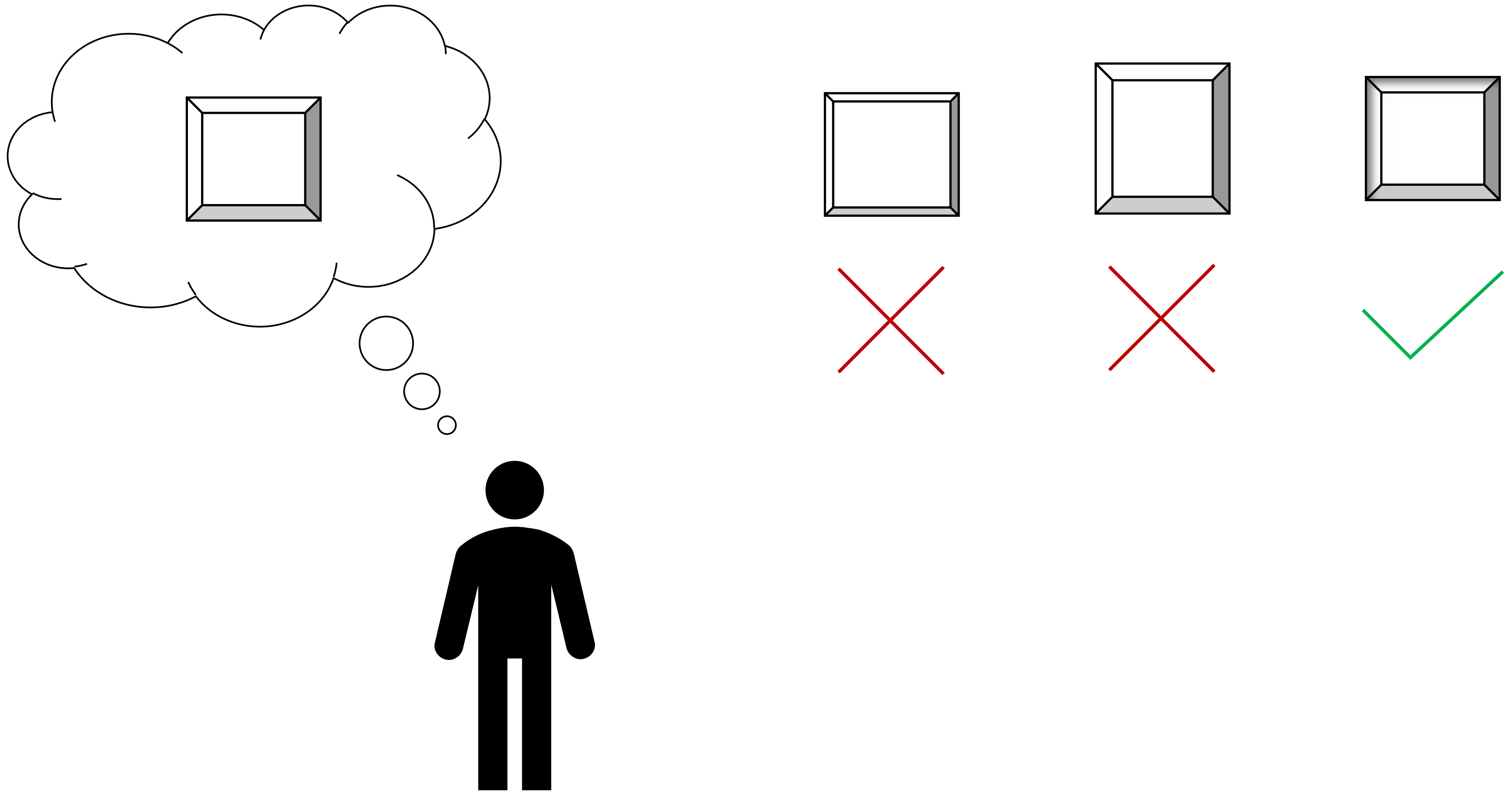


- Super miniature series with 7(9)mm height
  7(9)mm 高，超小型系列
- High performance and excellent temperature characteristics
  高性能和卓越的溫度特性
- Load life of 1000 hours at 105°C
  在 105°C 環境中負荷壽命 1000 小時
- Comply with the RoHS & REACH
  符合 RoHS 與 REACH



☐ SPECIFICATIONS 特性表

Items 項目	Characteristics 主要特性
Operation Temperature Range 使用溫度範圍	-40 ~ +105°C
Voltage Range 額定工作電壓範圍	4 ~ 63V
Capacitance Range 靜電容量範圍	0.1 ~ 1000μF
Capacitance Tolerance 靜電容量允許偏差	±20% at 120Hz, 20°C



Software	Traditional
Iterative	Iterative
Unpredictable	Unpredictable
Informal	(sometimes) Informal
Rapid	Slower
Consistent	Inconsistent
Unconstrained	Constrained

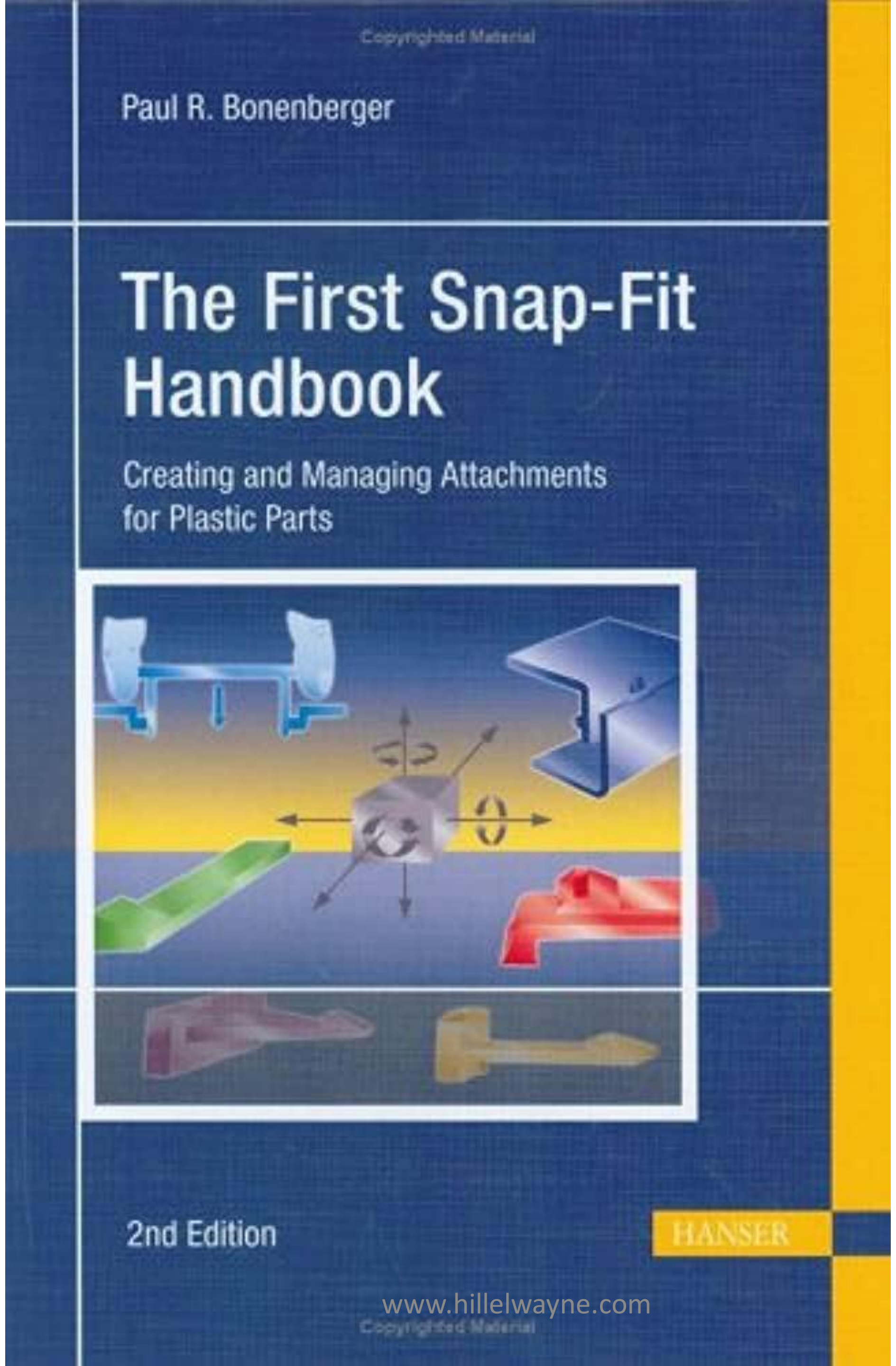
So are we special?

No.

III. What can we learn from each other?

What we can learn

- Up-front planning time
- Responsibility



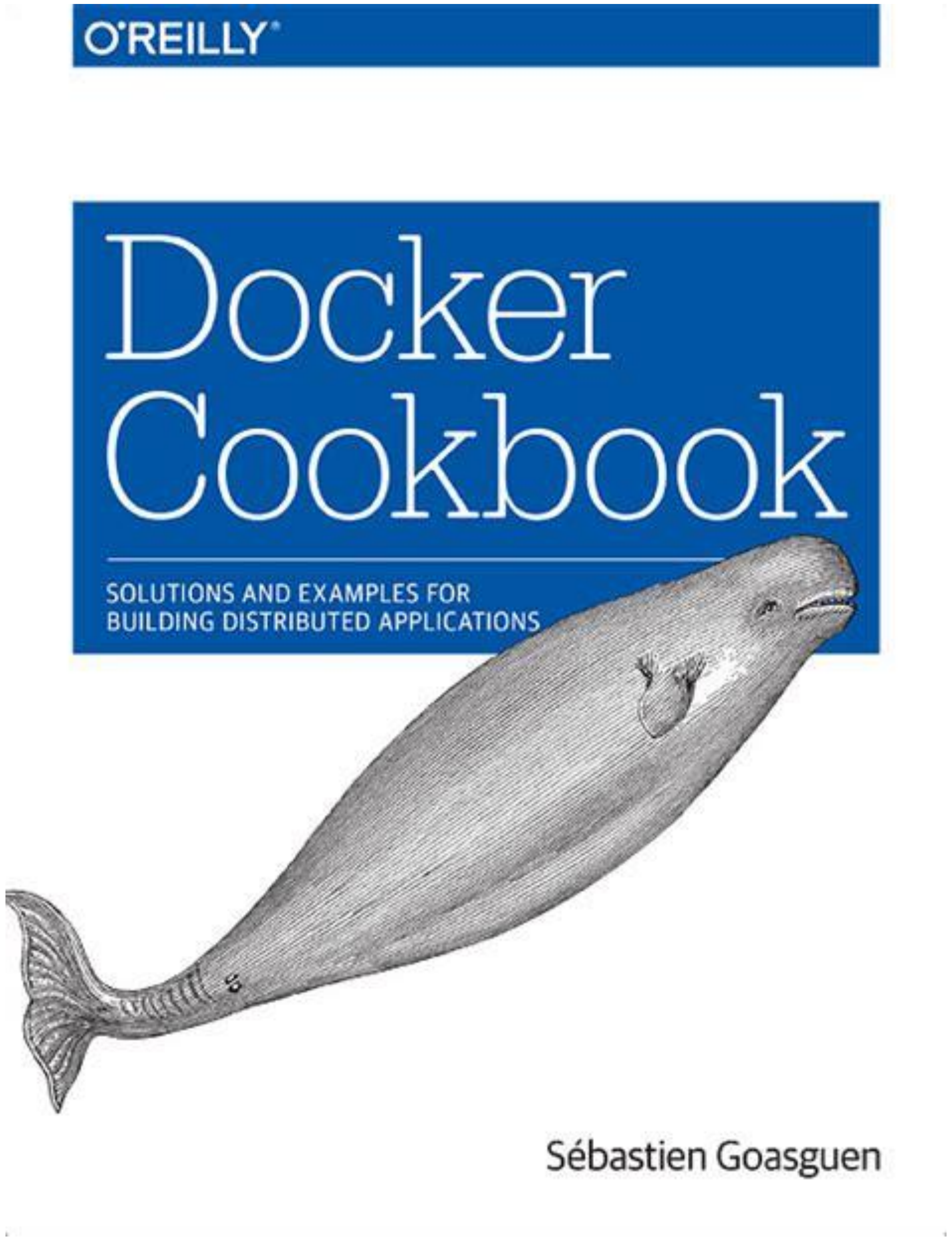
Paul R. Bonenberger

The First Snap-Fit Handbook

Creating and Managing Attachments for Plastic Parts

2nd Edition

HANSER


O'REILLY

Docker Cookbook

SOLUTIONS AND EXAMPLES FOR BUILDING DISTRIBUTED APPLICATIONS

Sébastien Goasguen

- Tag Systems
- API Versioning
- Supporting plugins
- Coupons
- etc

What we can teach

goto;

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Version Control

In Conclusion

1. We're engineers
2. We're not special
3. There's a lot we can teach and learn

Learn more!

https://www.hillelwayne.com/tags/crossover-project/ (All new examples!)

https://www.hillelwayne.com/talks/crossover-project/ (Not up yet)

This was really easy!

Things I didn't ask about

- Actual techniques (tagout/lockout)
- Meetings
- Certification Process
- Software → Trad Crossovers
- Engineering in the Global South
- Nuclear Engineering

goto;

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Shilling

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