Prevent legacy to sink your software vessel

Ard Willems

Bits & Chips Smart Systems Conference, 1 October 2015

Origin of this presentation:

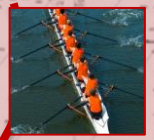
"This organization is like a **container ship**. Changing its course takes a lot of time and effort."

Content

- This quote is from the software project manager of one of my first projects
- During my software engineering and architecting projects I found that software organizations made the same mistakes when growing in size; three phases can be distinguished
- Also during software quality assessments we do for companies I find a lot of similarities between organizations
- I have found that three advices help in preventing or overcoming these mistakes
- When adhering to these advices, the company will become more efficient, and legacy code will no longer be an issue

Today's Journey

3 phases

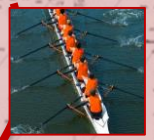


3 advices

end goal

Today's Journey

3 phases



The Rowing Boat

aka The Startup

Phase 1

Business idea →
Find investors.

Business plan

Mockup

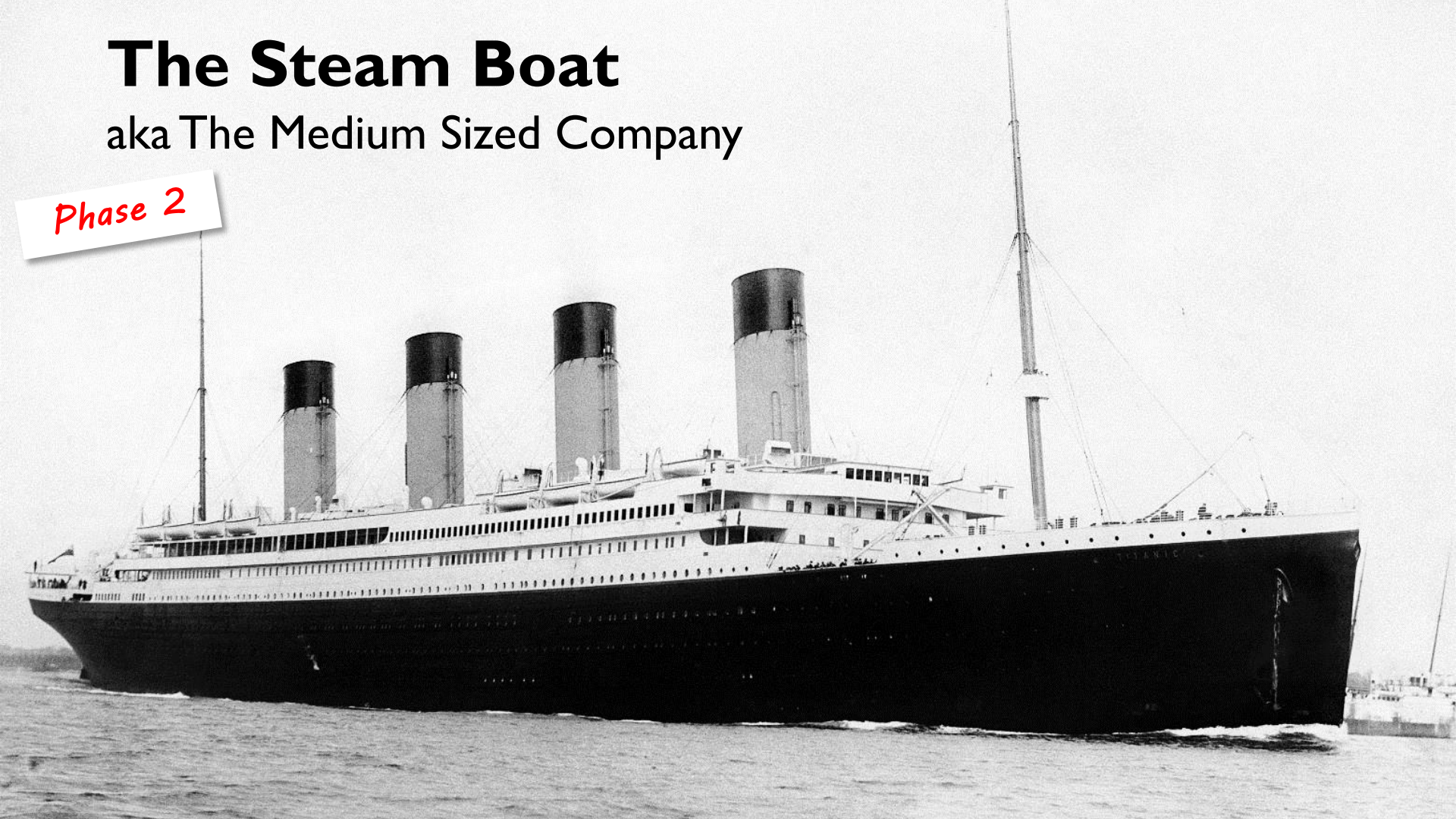
Build results

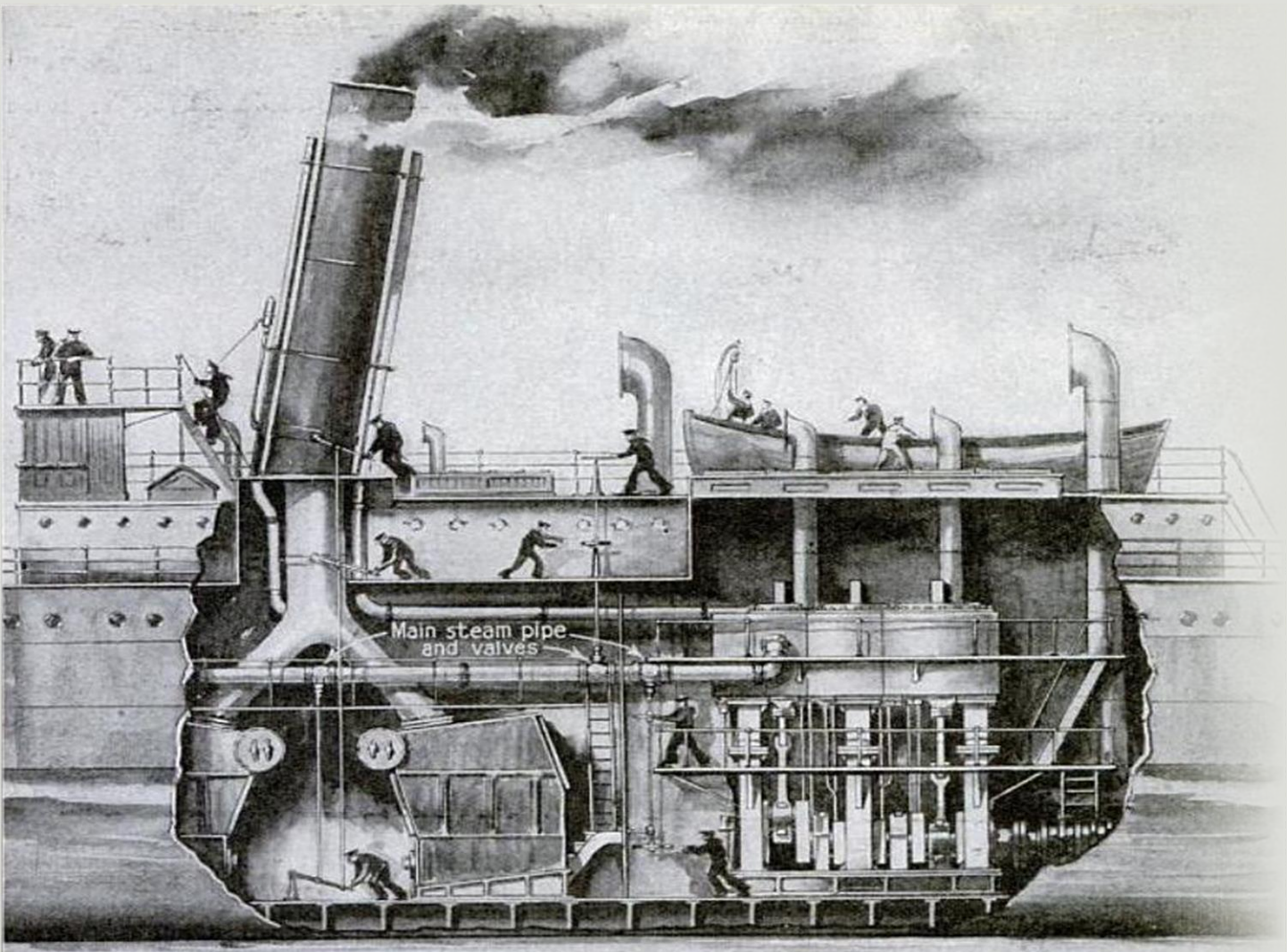

Future cost of a (possibly) wrong design decision
Technical Debt
Code inherited from someone else
Legacy

The Steam Boat

aka The Medium Sized Company

Phase 2





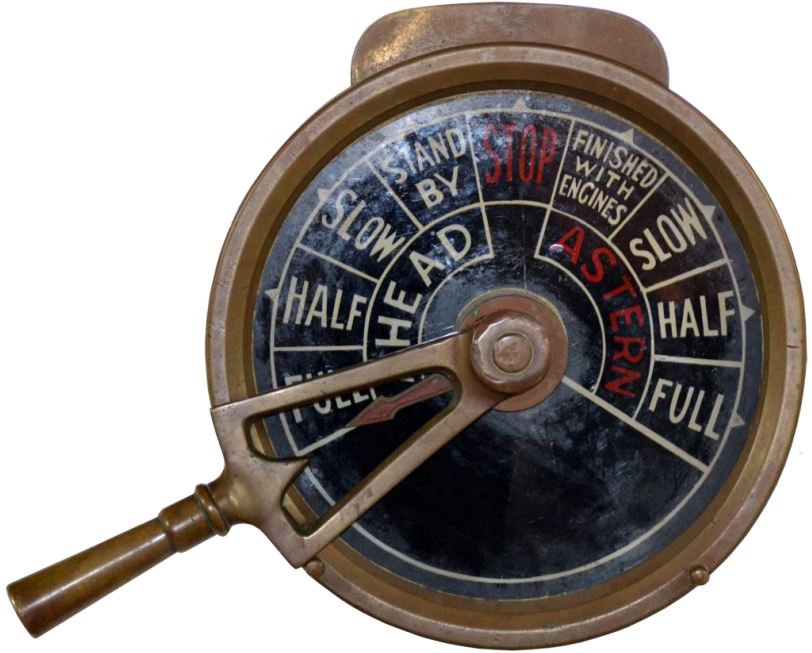
Growing software archive

Growing software team

Need for processes

Don’t rush!

- Important decisions should not be made at the coffee machine
- The most experienced software engineer is often not the best software architect
- Take your time to create suitable processes



Competent managers

aim for efficiency and continuous improvement


Phase 3
The Container Ship
aka The Multinational

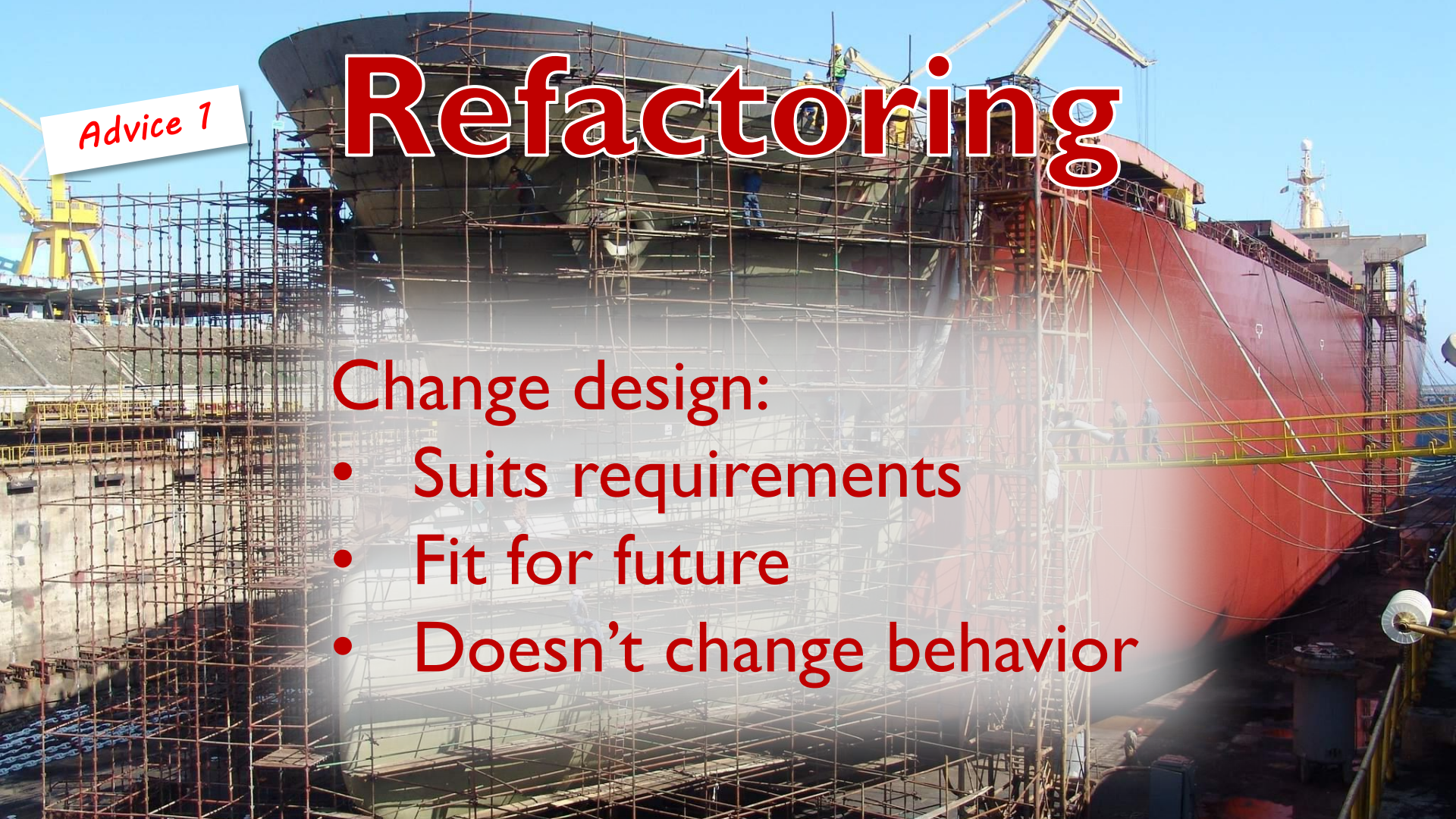
Code complexity

- 8x more defects
- 0.5x productivity
- 10x staff turnover

Source: **Technical Debt in Large Systems: Understanding the Cost of Software Complexity,** Dan Sturtevant PhD, MIT

Today's Journey

3 advices


Advice 1
Refactoring
Change design:
• Suits requirements
• Fit for future
• Doesn’t change behavior

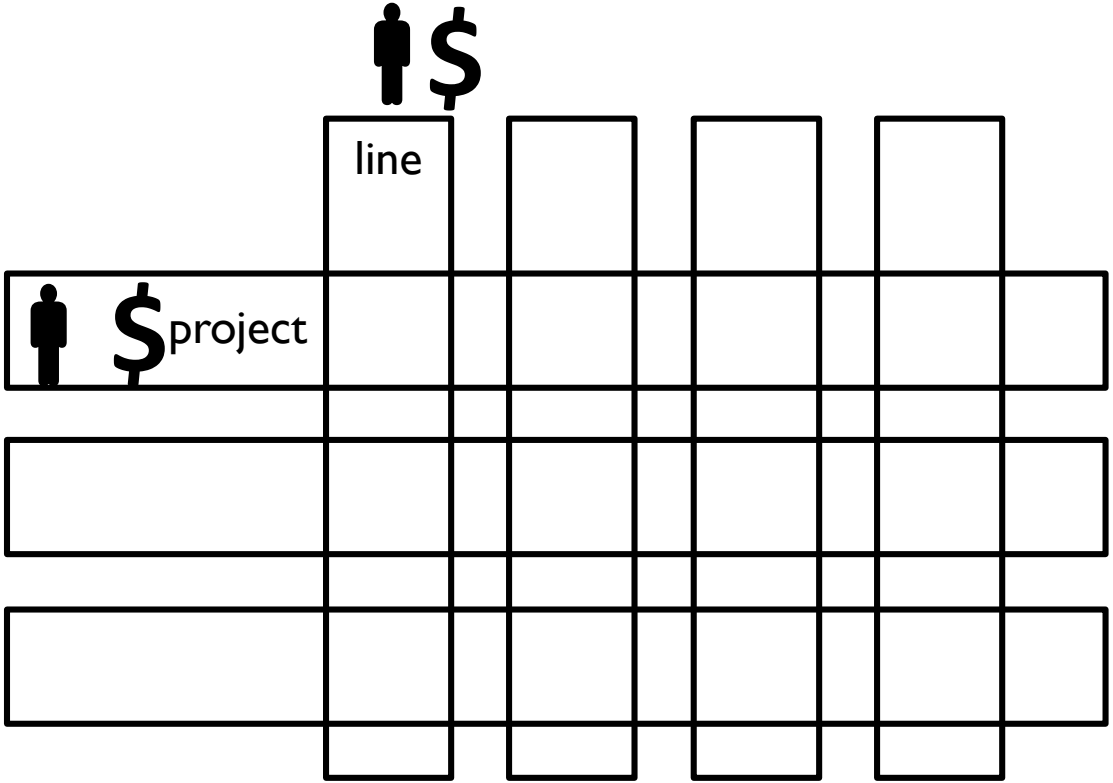
Doesn't change behavior... :

 + $ = 0 ?

- Refactoring costs time and money, but does not add new features
- A project leader will therefore not benefit from refactoring for his project

Responsibility for refactoring

- A budget needs to be assigned to enable refactoring
- A line manager can be made responsible
- In an agile environment, it can be an explicit responsibility of the teams




Advice 2
Continuous Integration

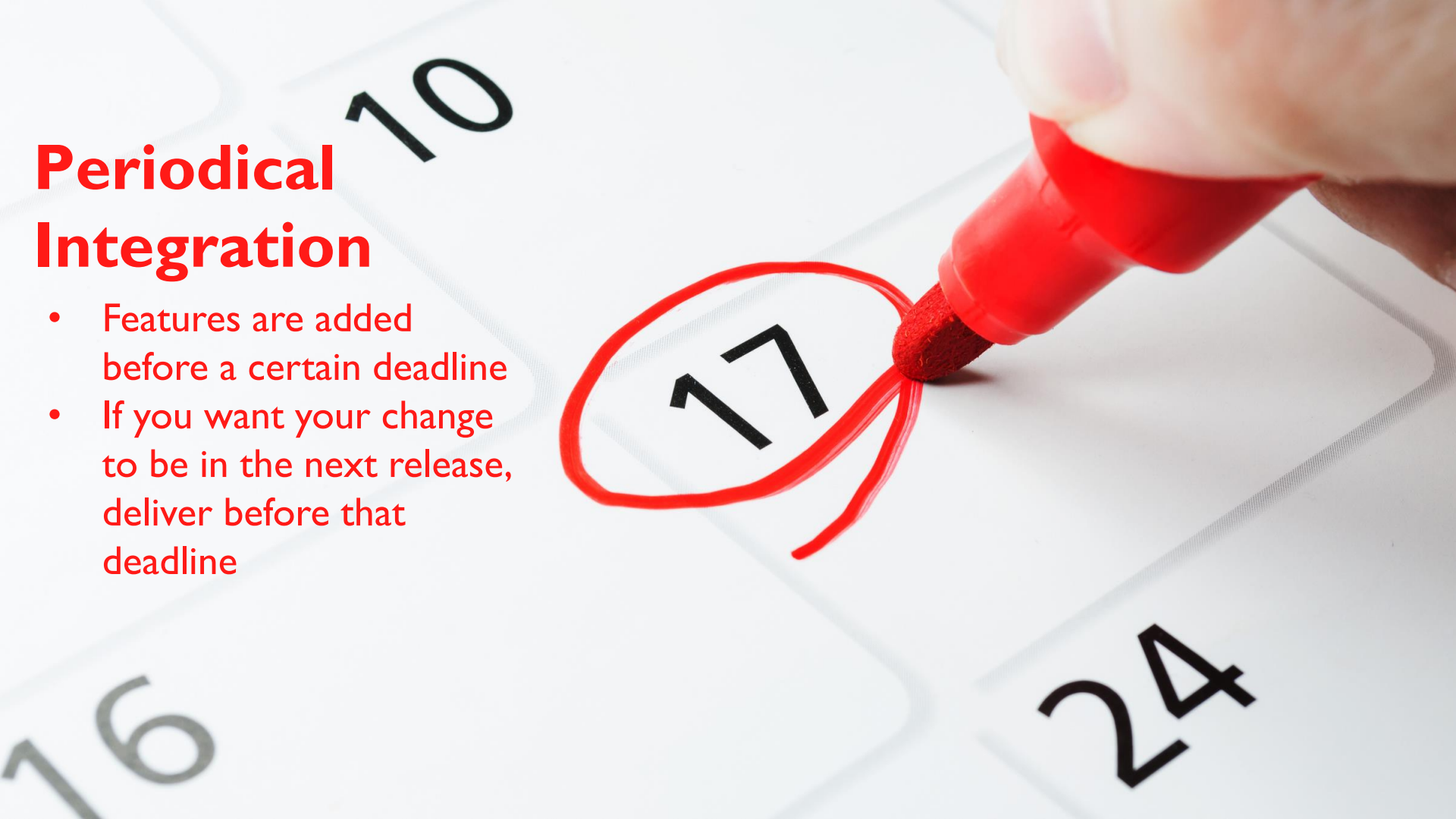
An example of a refactoring project

- Software engineer proposes a changed design
- Estimated effort is three weeks
- One year later, the project is still not finished, and is canceled

There are three causes for this setback...

Periodical Integration

- Features are added before a certain deadline
- If you want your change to be in the next release, deliver before that deadline



Long Integration Times

- After the deadline: merging, compiling, testing starts
- Test plan includes long manual testing

The polluter-pays-principle

Whoever is responsible for the failing integration, has to fix it, or withdraw his delivery

This could have been avoided with

Continuous Integration

Because of the following three aspects of CI

Merge continuously

Test quickly

Discoverer pays

Challenges of refactoring

periodical integration

long integration times

polluter pays principle

Benefits of continuous integration

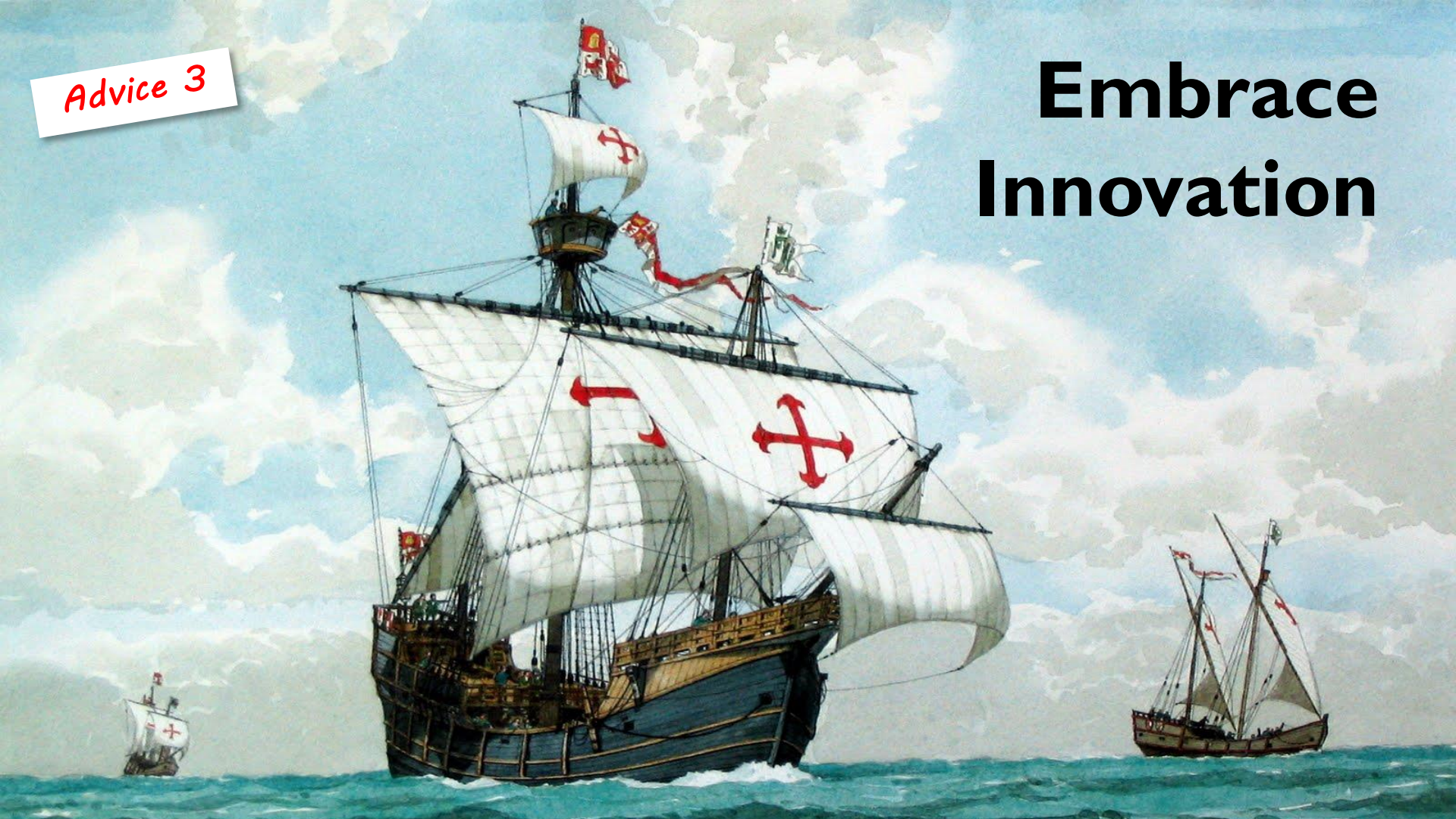
merge continuously

test quickly

discoverer pays

Advice 3

Embrace Innovation

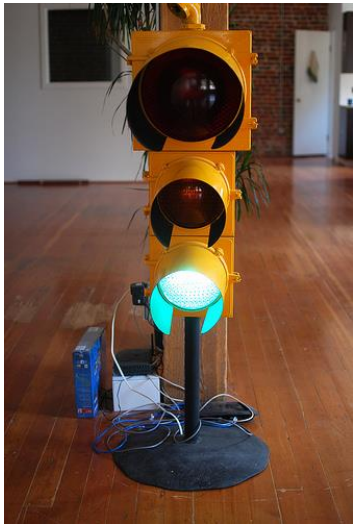



Software engineers are passionate people

If a software engineer asks why a certain technology or process is used, the worst possible answer is:

“Because we’ve *always* done it *this* way.”

Let software engineers do pilots with new technology



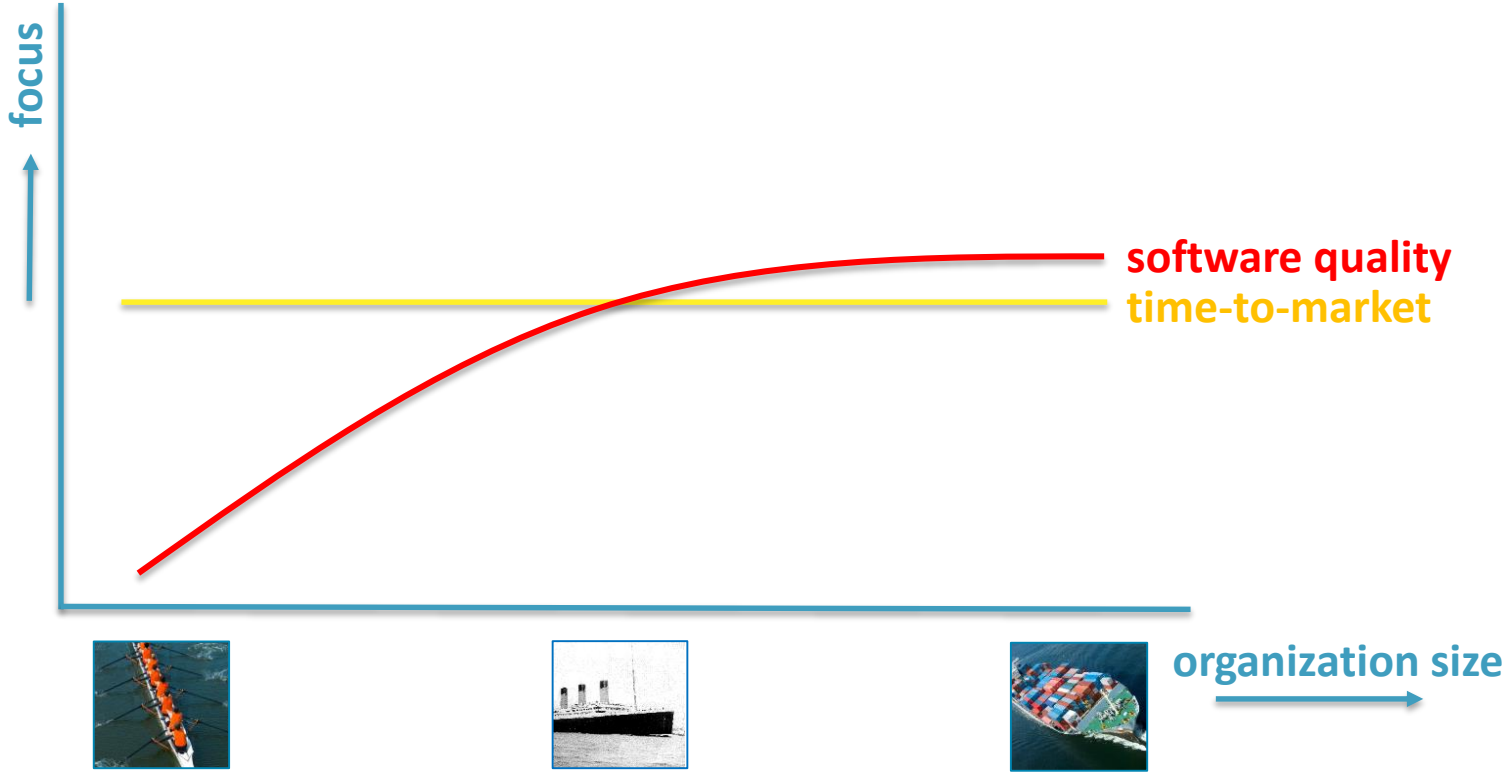
Additional benefit:

```
if (Developers.Happy())
    return OnInvestment;
```

Today's Journey

end goal

Desired focus



The end goal:

Small, flexible teams, that continuously add value to your products, with the freedom to change their course when they see fit.

Thank you
Have a safe journey