



# Fundamentals of FMEA

Fred Schenkelberg

Failure  
Happens









Use FMEA  
early and  
often





How many ways can  
your product fail?

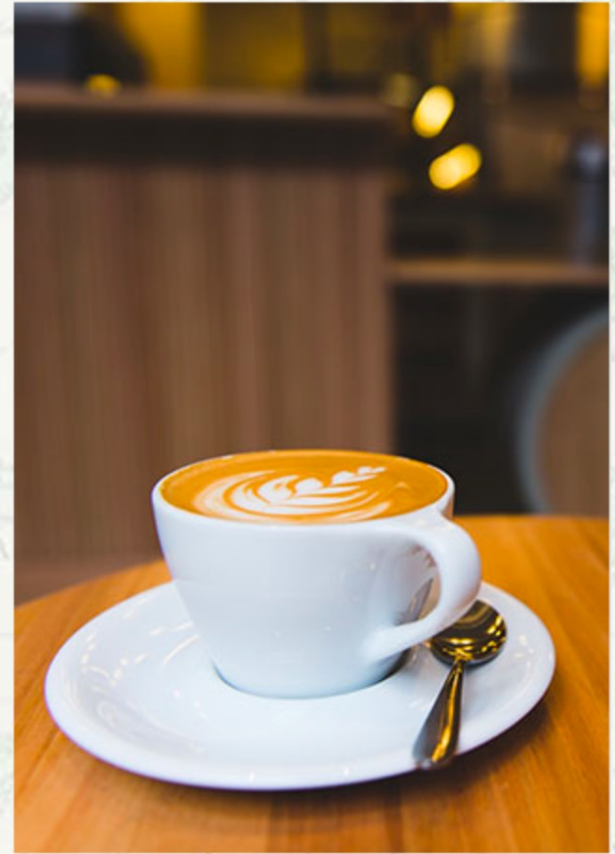
# Value of FMEA



Setting Priorities



Team Alignment



Leverage Testing



# Setting Priorities



Alignment, punch list, to do list, risk mitigation

There is a lot to design and fix

Where is your best investment of time

Fix the issues that:

- have serious consequences
- happen often
- occur without warning

A close-up photograph of a person's hands holding a white ceramic cup filled with coffee. The coffee has a golden-brown surface with intricate white latte art. A finger is pointing at the center of the latte art, holding a small metal tool that is touching the surface. The background is dark and out of focus.

What could  
fail  
interrupting  
this  
webinar's  
audio?



# Failure Mode or Failure Mechanism

# Team Alignment



Alignment, common  
enemy, common goal

Ask 3 people in your organization,  
'what is likely to fail in this product?'

Get three different answers

Your problem may not be the team's  
problem



# Competing for Resources



Is there competition for  
resources in your org?



# Leverage Testing



Insights, forethought,  
planning, awareness

FMEA provides awareness of what could go wrong

Test permits us to check

FMEA sensitizes us to recognize failures

FMEA helps us know where to look

FMEA results  
may include  
unknowns





Besides testing what else  
benefits from a FMEA?

# 10 Steps to Accomplish a FMEA



Preparation



Team Sessions



Follow up



# FMEA Preparation



Before, prior, plan,  
prepare, anticipate

Define scope and purpose of study  
system, product, process,...

Create a team with team leader

team size notes

team composition

FMEA training for the team

Organize FMEA meetings

How will  
you use  
the FMEA  
results?





# FMEA Team Sessions



10 step process (from The Basics of FMEA, 2nd Ed.)

Follow the agenda

Be flexible with the agenda

Use a range to tools and approaches

Everyone participates



The background of the right half of the image is a faint, light-colored world map. The map shows continents and oceans in a muted green and blue color scheme. Overlaid on this map is the text '1. Review the process or product' in a large, bold, black sans-serif font. The text is positioned in the upper right quadrant of the image.

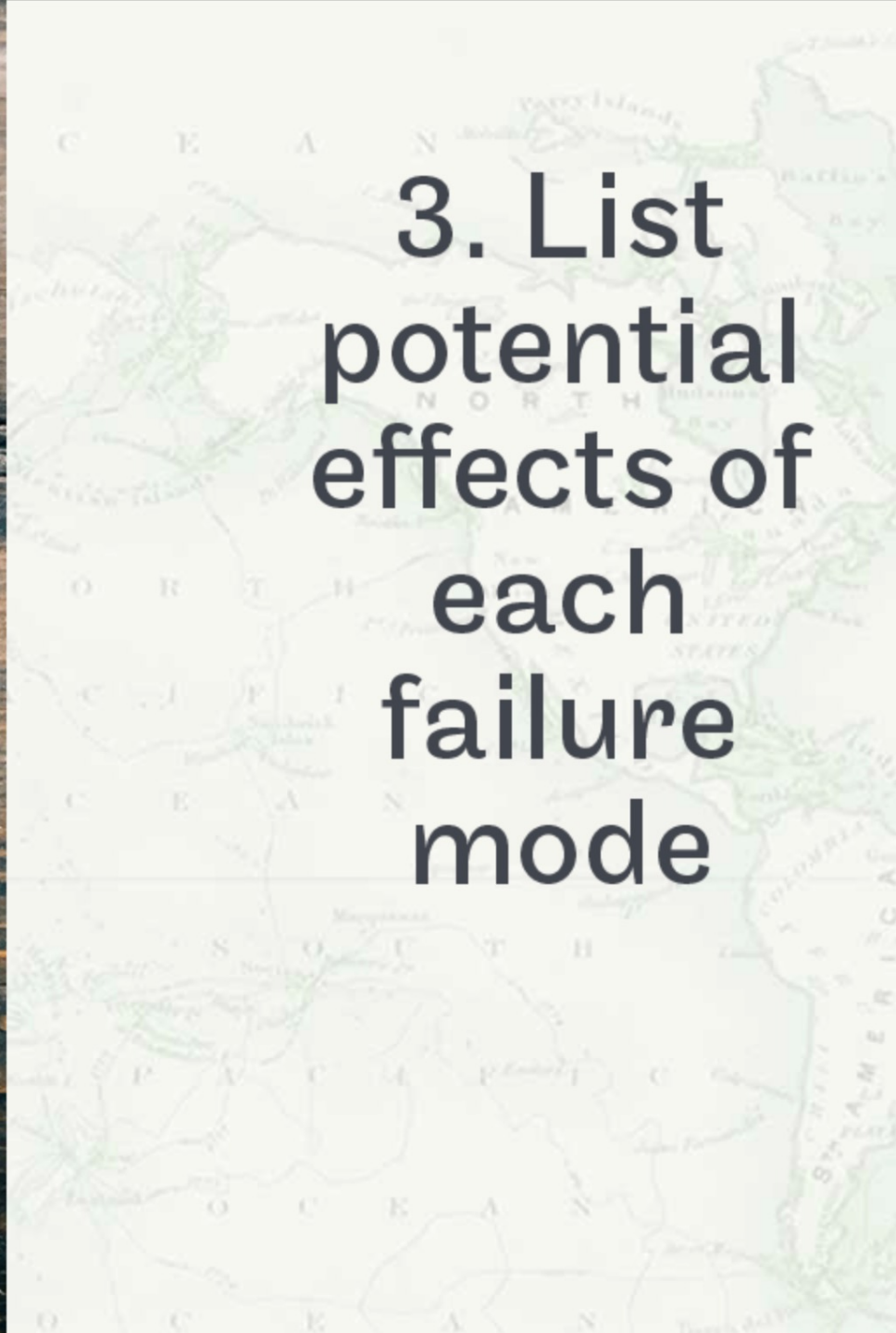
# 1. Review the process or product



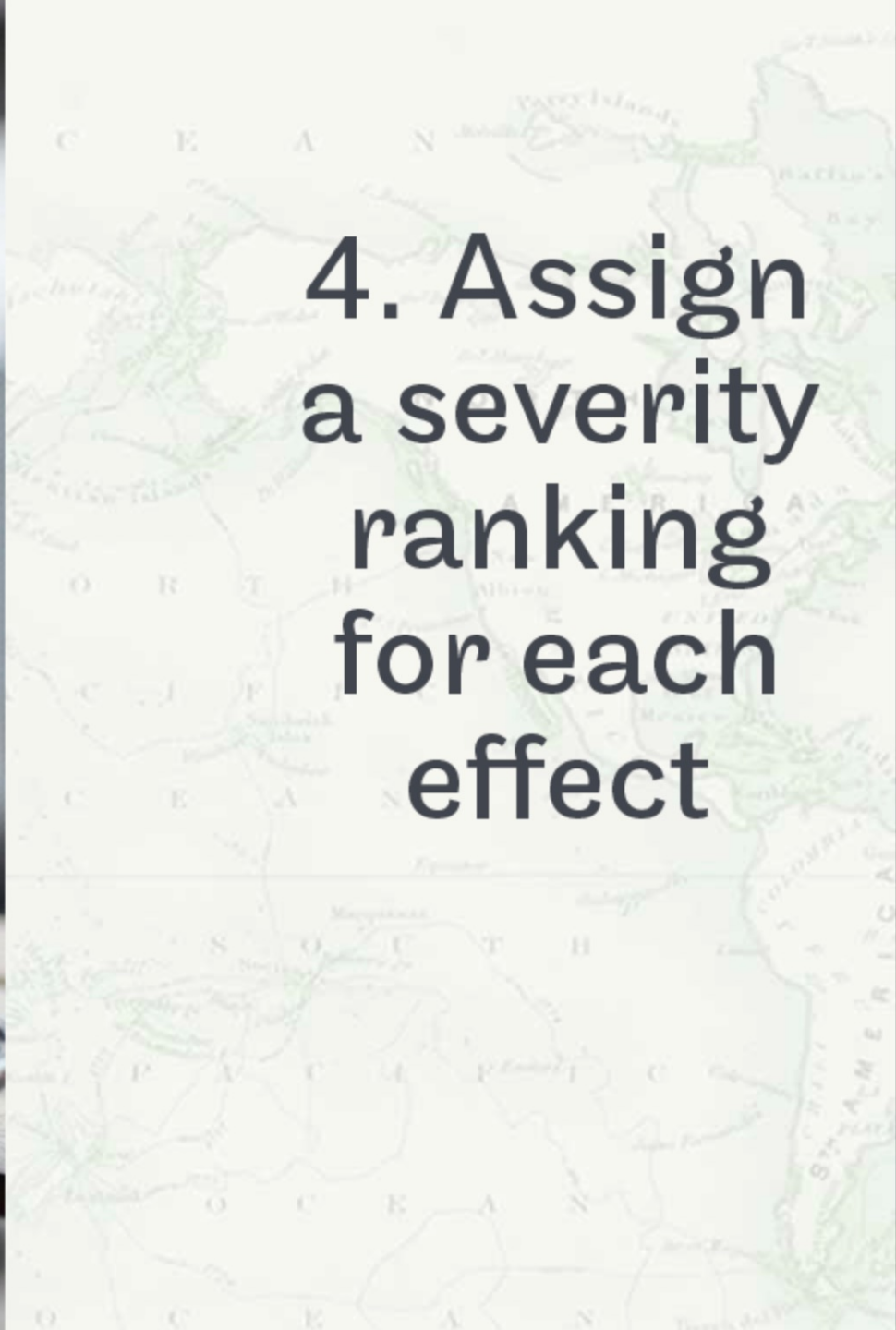
## 2. Brainstorm potential failure modes



### 3. List potential effects of each failure mode





A faint, stylized world map serves as the background for the text. It shows major landmasses and bodies of water in a light green and beige color scheme.

**4. Assign  
a severity  
ranking  
for each  
effect**



**5. Assign  
an  
occurrence  
ranking for  
each failure  
mode**



**6. Assign  
a  
detection  
ranking  
for each  
failure  
mode  
and/or  
effect**





7.  
**Calculate  
the risk  
priority  
number  
for each  
effect**



# 8. Prioritize the failure modes for action

# FMEA Follow Up



No

The discussion and report will only go so far

Follow up, add to project plan

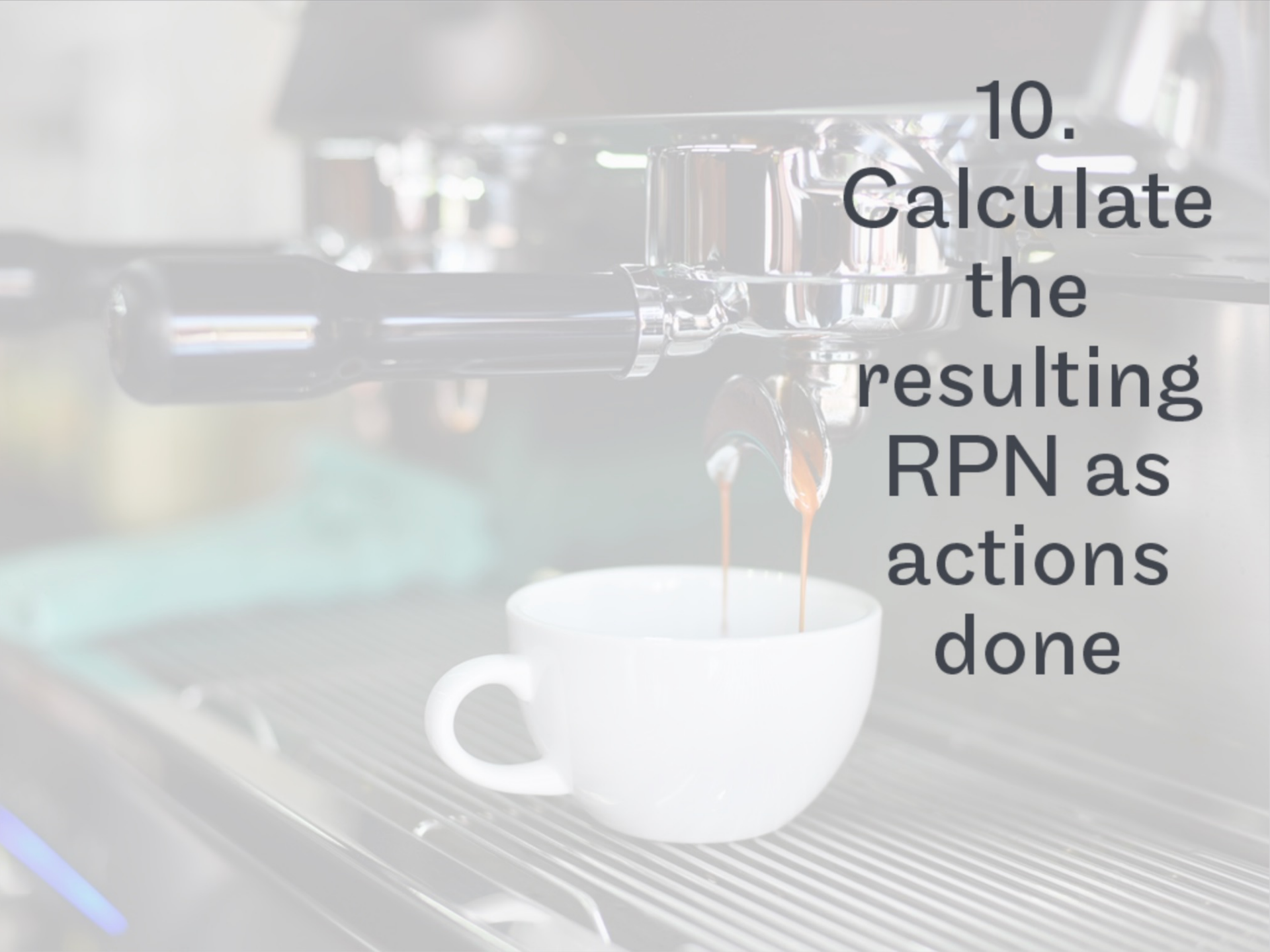
Assign resources

Check, check, and support




9. Take  
action to  
eliminate  
or reduce  
the  
high-risk  
failure  
modes



A close-up photograph of an espresso machine's spout pouring a stream of dark coffee into a white ceramic cup. The machine has a polished metal body and a black handle. The background is blurred, showing a kitchen setting with a green cloth and a blue object. The text is overlaid on the right side of the image.

10.  
Calculate  
the  
resulting  
RPN as  
actions  
done



A close-up, slightly blurred photograph of an espresso machine's spout pouring a stream of dark coffee into two white ceramic cups. The cups are placed on a metal drip tray with horizontal ridges. The background is out of focus, showing more of the machine and some ambient light. The overall tone is warm and professional.

**Rinse and  
repeat**

How well are your  
FMEAs working?



# What Could Go Wrong?



Lone Contributor



Tedious Detail



No Follow Up

# Lone Contributor



team, synergy, alignment

One person – alone with their thoughts  
Outsource the study and not participate  
One person prefills out the template

# Tedious Detail



Not everything can or will  
be resolved

Starting with a bill of materials

Dwelling on insignificant failure modes

Same part/item over, and over again

Attempting to solve every issue  
mentioned



# No Follow Up



Action, improvement,  
resolution, mitigation

No follow up or action on top priorities

Filling out the template or filing a report is  
not the goal here

How else have you  
seen a FMEA go

# The listing and discussion to set priorities creates FMEA value

Prepare and build your team



Follow the 10 step process



Follow up on resolving top issues



# More Information

Visit [AccendoReliability.com](https://AccendoReliability.com)

Let me know if you have any questions.

Check out the reliability engineering podcast network at [Reliability.FM](https://Reliability.FM)

Continue to explore your testing and make improvements.