



# ASQ CRE Prep course

Lesson II. A. 7. g.

SPC and Process Capability

Process Capability



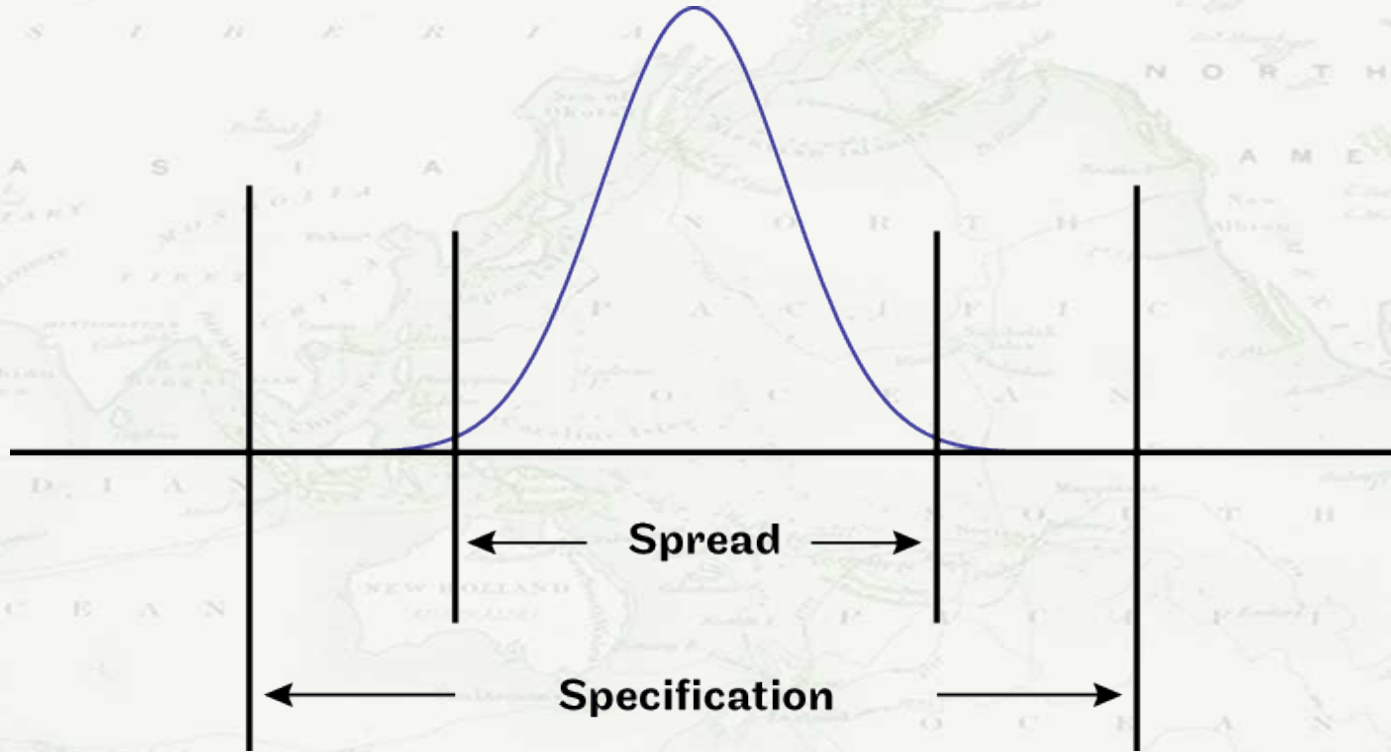
An aerial photograph of a rugged coastline. The foreground shows dark, rocky cliffs meeting the ocean, with white foam from the waves visible. The middle ground features a small town with colorful buildings nestled in a valley, with a winding road leading up to it. The background consists of rolling hills and mountains under a clear blue sky.

So what, your stable, is that good enough?

# PROCESS CAPABILITY INDICES



# Spread vs Tolerance



# Comparison & Actions

- 1. Do nothing – everything is in spec**
- 2. Change the specifications**
- 3. Center the process**
- 4. Reduce Variability**
- 5. Accept the losses**

$C_p$

## The Capability Index

$$C_p = \frac{USL - LSL}{6\sigma}$$

$C_p > 1.33$  – Capable

$C_p = 1$  to  $1.33$  – Capable with tight Control

$C_p < 1$  – Incapable

$C_R$

## The Capability Index

$$C_r = \frac{6\sigma}{USL - LSL}$$

$C_R > 1.00$  – Incapable

$C_R = 0.75$  to 1 – Capable with tight Control

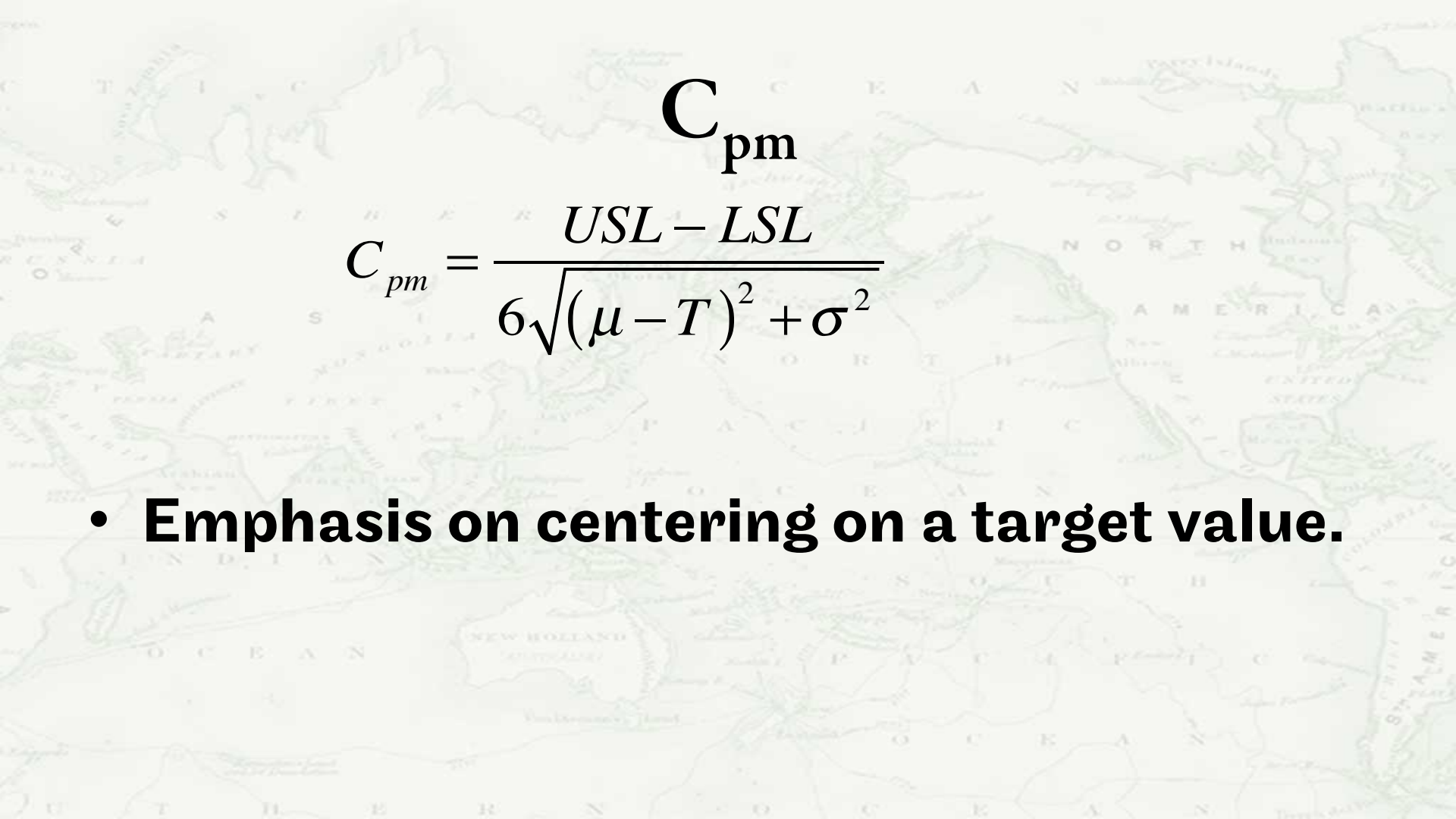
$C_R < 0.75$  - Capable

The background of the slide is a faded, light green map of the Pacific Ocean. It shows the outlines of North and South America on the right, and Asia and Australia on the left. Various geographical names like 'PACIFIC OCEAN', 'NORTH AMERICA', 'SOUTH AMERICA', 'ASIA', and 'AUSTRALIA' are visible in a serif font. The map is oriented with North at the top.

$C_{pk}$

$$C_{pk} = \min \left[ \frac{USL - \bar{X}}{3\sigma}, \frac{\bar{X} - LSL}{3\sigma} \right]$$

- **Takes into account centering (distance from specifications)**


$$C_{pm} = \frac{USL - LSL}{6\sqrt{(\mu - T)^2 + \sigma^2}}$$

- **Emphasis on centering on a target value.**



Stable and  
Capable?



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Standard Normal and z-values