



CLEAR-COAT ELIMINATION

PROJECT PRESENTATION

Clarissa Arriaga & Ashwini Khandelwal

Project Overview

About CMEP

Cummins Midrange Engine Plant

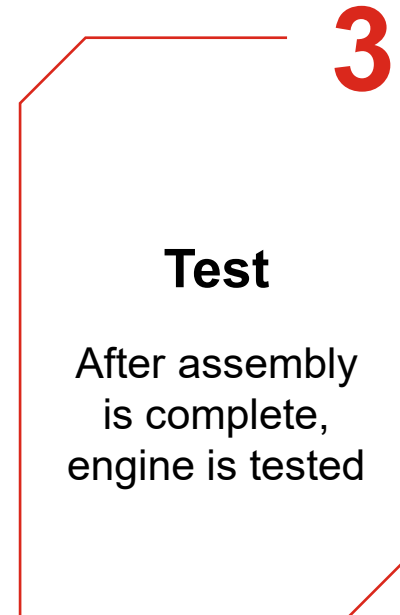
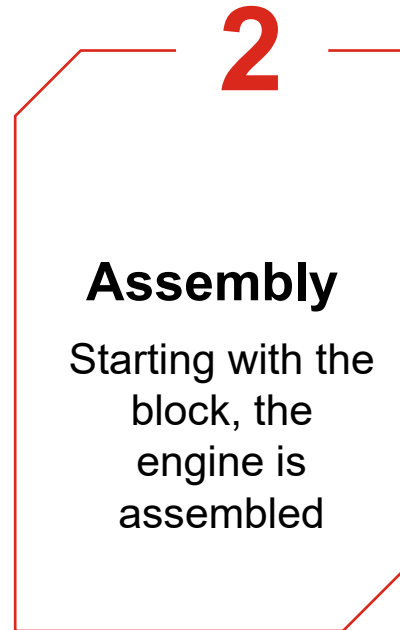
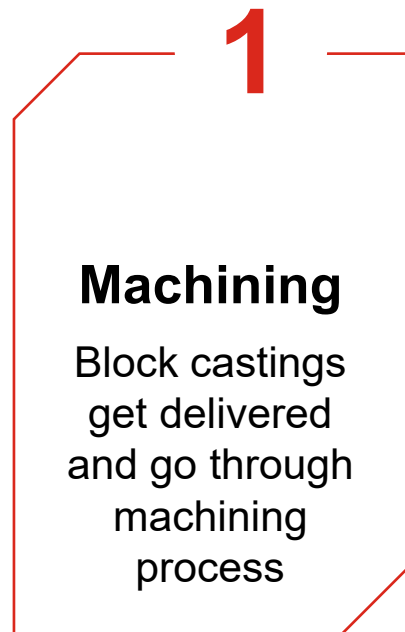
6.7L  Assembly of turbo diesel engines


1992
Operating for
30 years

 **400**
Acres located in
Columbus, IN

 **9000** Employees
across 3 shifts

Major Operations



Clearcoat Elimination

- Eliminated all the processes associated with “Paint” in **November 2021**:
 - **Masking:** protecting certain engine components with plastic caps from the water and paint
 - **Washing:** 5 stages of wash that involved 3 different chemicals and water
 - **Drying:** a chamber with warm air flowing through to dry the engine
 - **Painting (Clear-Coat):** application of paint by 4 industrial robots
 - **Cure Oven:** 8 minutes for each engine in a large oven to cure the clear coat
- By eliminating this process, there was a significant reduction of pollutants released to the environment
- Motivated by environmental goals, but also translated into financial savings, improved plant product quality and productivity



Keys to Success:

- ✓ Set Challenging Goals
- ✓ Challenge the Status Quo
- ✓ Benchmark Best Practices
- ✓ Hurdles
- ✓ Boots on The Ground

✓ Set Challenging Goals

What that meant for us - Cummins created an environmental sustainability strategy that sets specific targets to be met by 2050, with specific milestones for 2030. A plant/product specific goal of cost reduction aided the project, as well.

What does that mean for you? - Continue to set challenging goals to improve, grow and motivate.

- Reduce absolute greenhouse gas (GHG) emissions from facilities and operations by **50%**
- Reduce scope 3 absolute lifetime GHG emissions from newly sold products by **25%**
- **Partner with customers to reduce scope 3 GHG emissions from products in the field by 55 million metric tons**
- **Reduce volatile organic compounds emissions from paint and coating operations by 50%**
- Create a circular lifecycle plan for every part to use less, use better, use again
- **Generate 25% less waste in facilities and operations as percent of revenue**
- Reuse or responsibly recycle **100% of packaging plastics and eliminate single-use plastics** in dining facilities, employee amenities and events
- **Reduce absolute water consumption in facilities and operations by 30%**



✓ Challenge the Status Quo

What that meant for us – The engine had evolved enough that allowed us to question the need for paint

What does that mean for you? – Is it time to change with the advent of newer technologies?

Same engine, lowered emissions

Test done:

- 2 engines: 1 painted and 1 not painted
- Conditions:
 - Defined the scope of real-life conditions
 - Mimicked real life conditions for the engines
- Results: Paint added no value

Environmental Impact

9 MILLION GALLONS

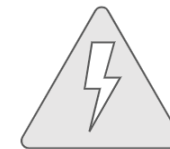
Monthly Natural Gas Usage Saved



The equivalent to:
**Power an average
US home for 20
years**

1.8 MILLION kWh

Annual Electricity Savings



The equivalent to:
**Running a
refrigerator for
2,700 years**

4.3 MILLION GALLONS

Annual Waste-Water Prevented



The equivalent to:
**7 Olympic sized
pools**

✓ Benchmark Best Practices

What that meant for us – Learned from other Cummins product that was not painted since pre-production, utilized the plants current technologies to complement the solution

What does that mean for you? – Communicate, don't "reinvent the wheel"



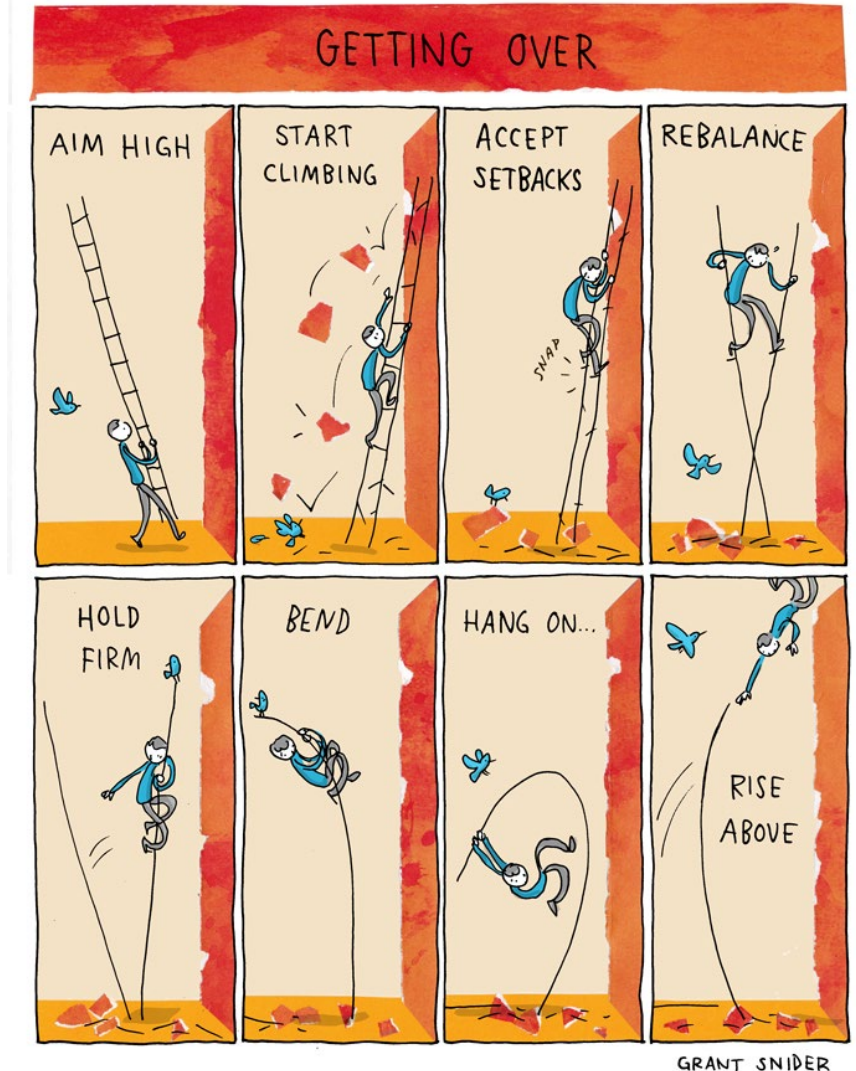
✓ Hurdles - Biases

What does that mean for you?

- What's important to the people you're talking to – highlight the benefits to them

What that meant for us:

- Convincing people at every level – most importantly, the customer but also Cummins marketing, operators, etc.
- Ensure to highlight to the customer that the engine would be the *same*, but the cost would be *decreased*
- The effort contributes to reductions of environmental footprint, supporting sustainability vs just good ideas that contribute to the bottom line



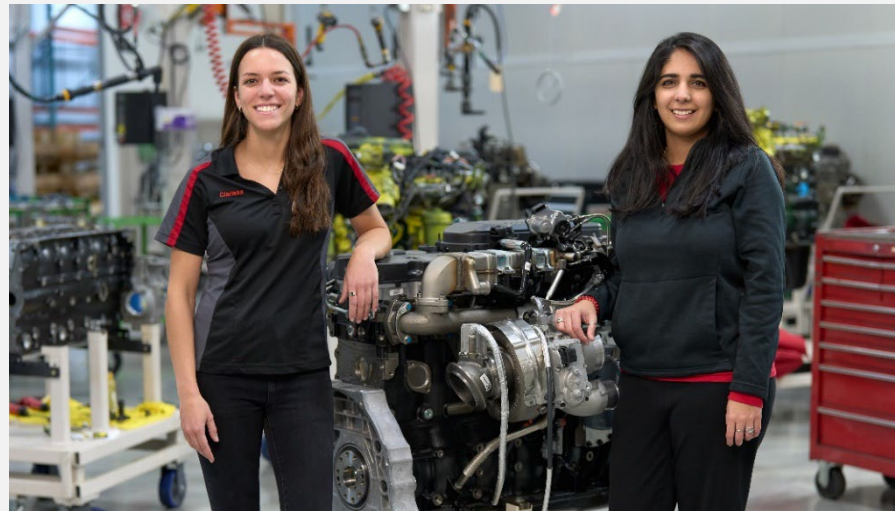
✓ Boots on the ground

What that meant for us – The right mix of people, who we are

What does that mean for you? – The cross functional team/people that are closest to the process are going to have the best ideas

Clarissa Arriaga Senior Industrial Engineer

- Industrial Engineering is all about process design and optimization
- Previous experience in LDD (not painted engine) and “Paint Manufacturing Engineer”



Ashwini Khandelwal Senior Product Engineer

- Product Engineering is all about the engine performance and reliability for the life of the product
- Customer facing

Team: Bonny Booth (Customer Satisfaction), Dayne Causey (Paint Eng.), Al Hornek (Controls Eng.), Robert Markle (Product Quality Leader), Nicole Wheeldon (Plant Manager)

THANK YOU!

Q+A



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