



# Delivering Superior Concrete Handling: The Innovative Admixture Contractors Want

Concrete Innovation - Session 23

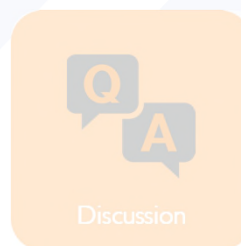
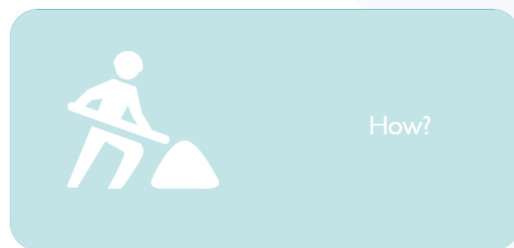
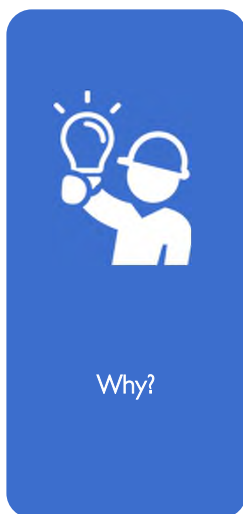
August 21, 2024

Serpil Boy Aral, Master Builders Solutions



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## Overview



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## What is a successful construction project?

### A project is successful when...

- It is completed on Time
- It is completed within budget
- It is completed to the agreed upon quality standards
- It is completed safely
- and soon sustainably



1. Schedule



2. Cost



3. Quality



4. Risk



5. Sustainability

Major Challenge Today: **Construct-ability** with concrete!

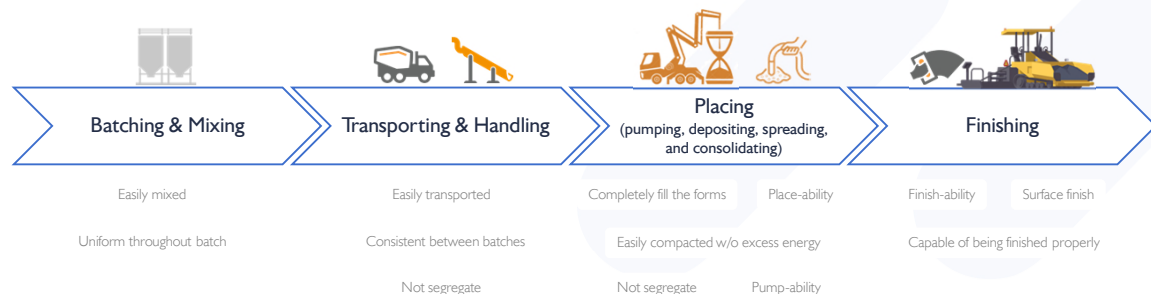


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## Constructability with concrete

### According to PCA..

- Fresh concrete must satisfy certain requirements

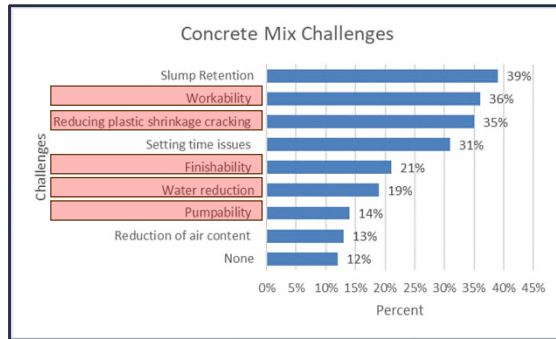


- All dependent on the **Concrete Rheology**



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In reality..



2024 WOC Survey – 113 respondents  
Workability #1 challenge for 43% of respondents

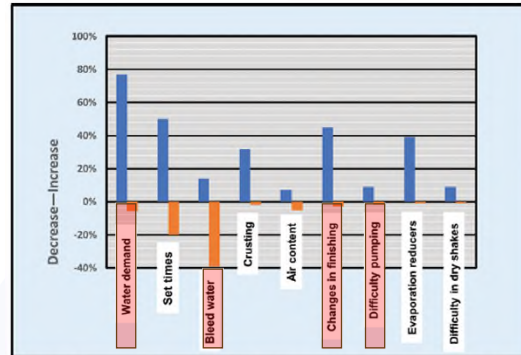


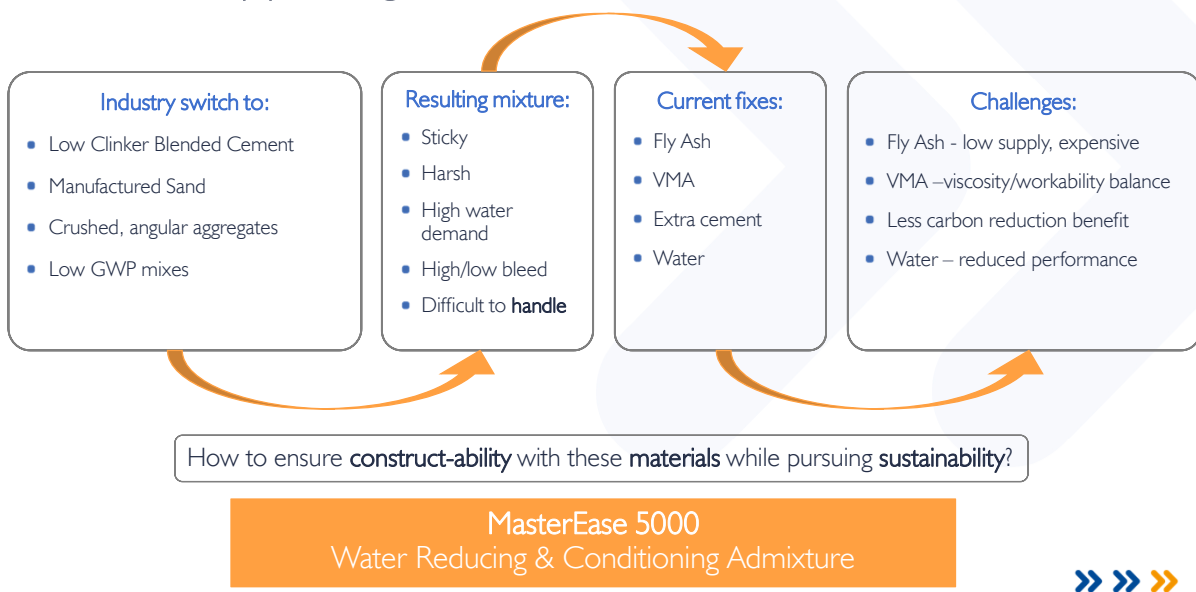
Fig. 5: Changes in characteristics observed by survey respondents when using PLC concrete versus OPC concrete. Positive (blue) bars indicate increased incidences, and negative (orange) bars indicate decreased incidences

2023 ACI-ASCC Survey on Portland-Limestone Cement Concrete, 173 respondents, >80% RMC producers



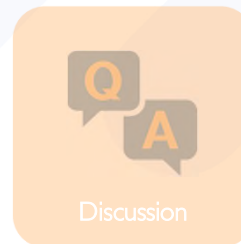
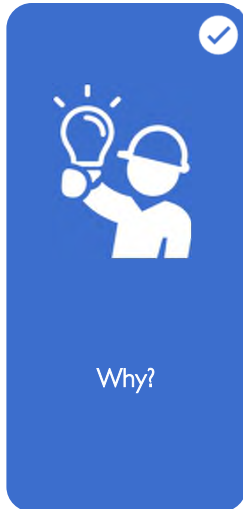
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What is happening?



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## Overview

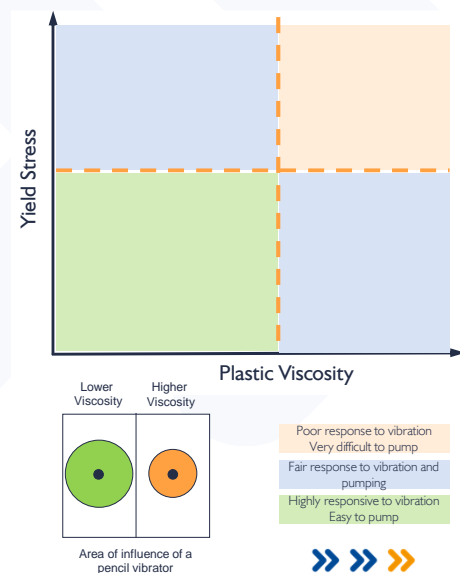


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## It's all about concrete rheology!

### How does rheology effect concrete handling

- **Rheology** is THE critical workability parameter of fresh concrete
- At the site, typically measured by **slump test**
- **Slump test** only relates to yield stress – not enough to understand full mix behavior
  - does not provide flow characteristics,
  - Does not indicate whether the mix is cohesive (sticky), likely to segregate or bleed
- Two fresh concrete mixes with the same slump may behave quite differently
- Currently no simple method to evaluate viscosity at site



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## It's all about concrete rheology!

### Response to energy input

- Two identical 4" slump, fiber reinforced concrete mixes
- Vibrated for 10 seconds



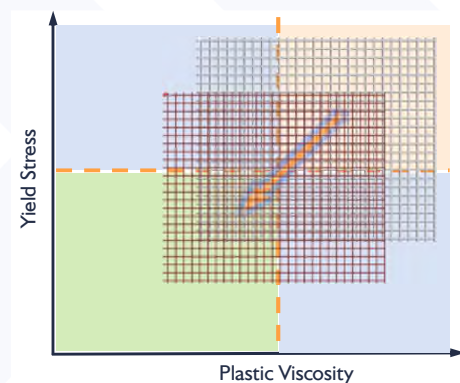
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## MasterEase 5000

### Effect on Concrete Rheology

- MasterEase 5000:
  - reduces the stickiness (viscosity) and
  - Stiffness (yield stress) of a mix
- Mixtures can be handled with significantly lower expenditure of energy and effort during:
  - Pumping
  - Placing
  - Consolidating
  - Finishing..

**MasterEase 5000 Water Reducing and Conditioning Admixture:**  
Enhances rheology performance & handling robustness



Poor response to vibration  
Very difficult to pump

Fair response to vibration and  
pumping

Highly responsive to vibration  
Easy to pump



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## MasterEase 5000

### Ease of placement & consolidation

- Master Ease 5000:
  - Improves **placement** and flow
  - Imparts faster compaction
  - Allows lower vibration setting



Concrete volume more than **doubled** with MasterEase 5000

1" slump concrete vibrated for 10 s

with Admixture 1

with MasterEase 5000

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## MasterEase 5000 – The Easy Mix

**MASTER®  
BUILDERS**  
SOLUTIONS

- MasterEase 5000  
Water-Reducing &  
Conditioning Admixture

The Easy Mix

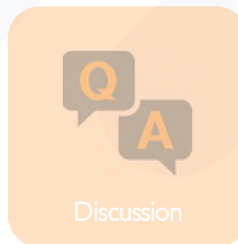
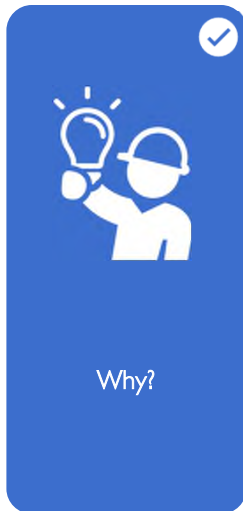
[Click to watch video  
on Youtube](#)



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## Overview



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## MasterEase 5000

### Water-Reducing and Conditioning Admixture

- Next Generation polymer
- Designed especially for **harsh** and **sticky** concrete mixes
- **Versatile use** in most concrete applications
- Enhances all fresh concrete **handling** characteristics:  
from batching at the plant to discharging, pumping, placing, consolidating and finishing on the site.



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## MasterEase 5000



**Paving, Curb & Gutter**  
Low slump concrete



**Versatile Use**



**Demanding Specs/Requirements**  
low w/c, low CO<sub>2</sub>



**Difficult Materials**  
High F.M., crushed, angular



**Difficulty Pumping, Discharging**  
“sticky” & “harsh” mixes



**Difficulty Finishing**  
slab-on-ground, flatwork

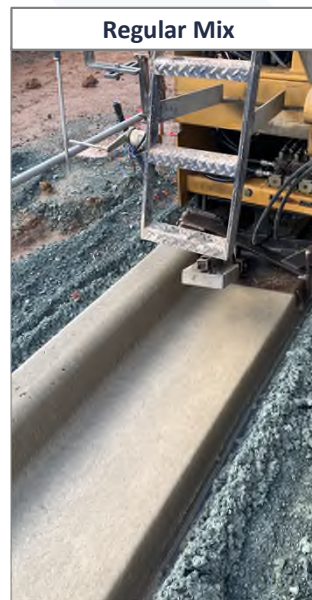


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## MasterEase 5000

### Curb & Gutter Applications

- “Sped up the machine, **reduced vibration**, and still had better performance.”
- “**Reduces the friction and drag** on the machine, almost lubricating it as it gets moving.”
- “**Smoother finish** with noticeably **fewer voids** and imperfections.”
- “1 in. slump moves and extrudes like 2-3 in. slump. Even when the mix looks on the drier side, **no need for retempering.**”
- “Mix is more robust and feels **creamier.**”



**Regular Mix**



**Mix with MasterEase 5000**

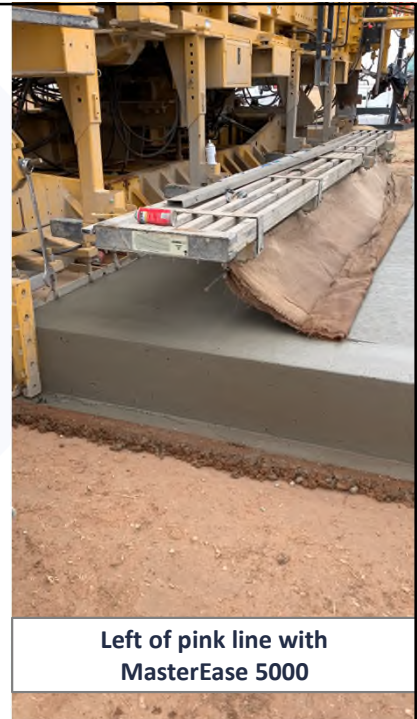
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## MasterEase 5000

### Paving Applications

- “Noticeable difference on the **edges – crispness and sharpness**; it held the edge very well.”
- “No issues with low slump concrete; **possible to consolidate zero slump concrete**.”
- “Noticeably **better aggregate distribution** in core sample.”
- “Anticipated benefit with the **use of difficult materials**.”
- “Our sand is very coarse for a 1.5” slump paving mix. Had a **workable mix without having to add more cement** and had much **better movement** under the paver.”



Left of pink line with  
MasterEase 5000

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## MasterEase 5000 – Pumped Applications



- MasterEase 5000  
Water-Reducing &  
Conditioning Admixture

Easier Pumping for Difficult  
Concrete Mixtures

[Click to watch video  
on YouTube](#)



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## MasterEase 5000 – Flatwork Applications



### MasterEase 5000 Water-Reducing & Conditioning Admixture

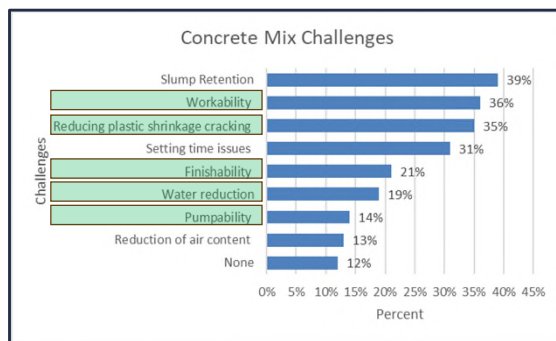
Finishing Ease

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on YouTube](#)



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## A Solution for the Industry



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Workability #1 challenge for 43% of respondents

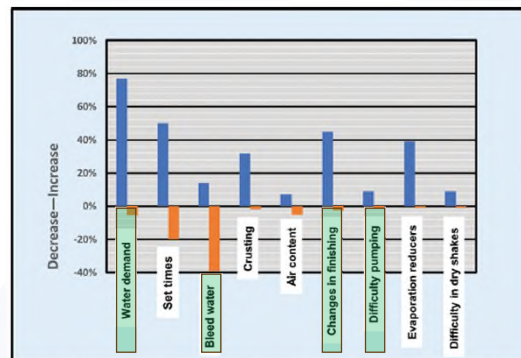


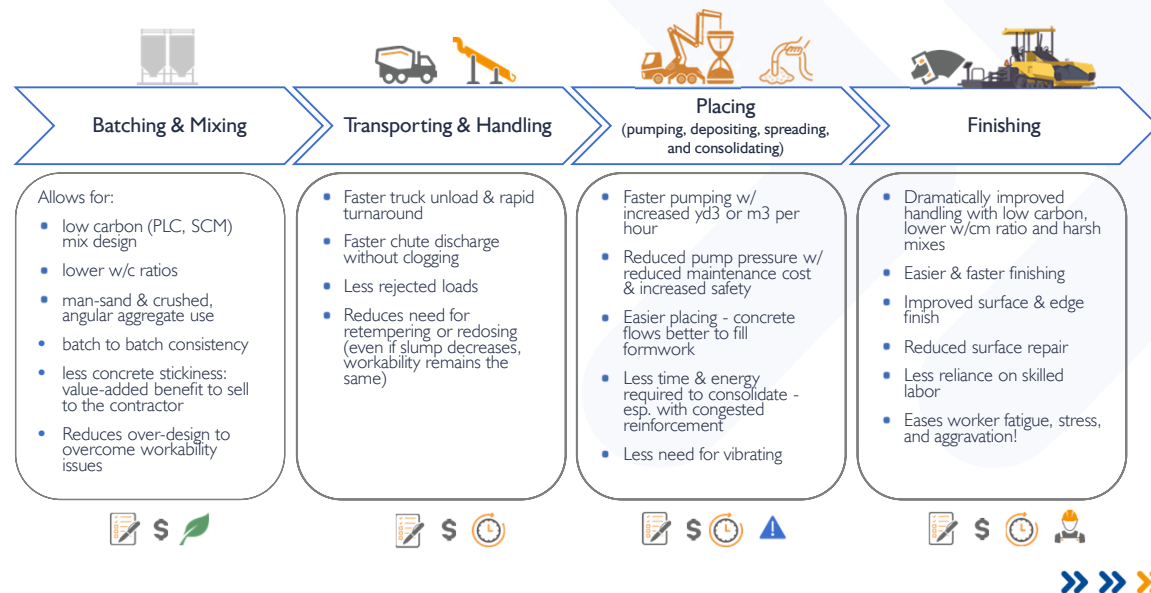
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## MasterEase 5000 Benefits



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## MasterEase 5000 – Summary

### Key takeaways

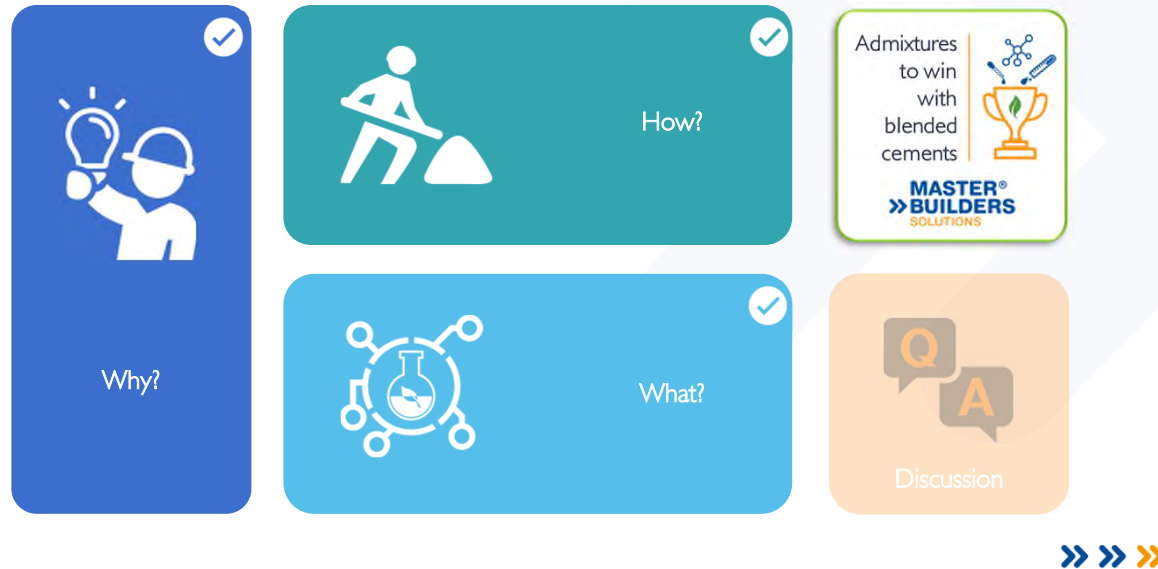
- Water-reducing and **conditioning admixture** – Type A
- Especially effective in harsh, sticky mixtures with man sand, angular aggregates, Type IL cement and high SCM content
- Enhances all fresh concrete handling characteristics providing:
  - Shorter **discharge** time (by 10-15 mins)
  - Reduced **pump pressure** (20-30%) than reference
  - Improved **placement and flow**
  - Easier **compaction**, allowing for lower **vibration** settings
  - Faster **extrusion** to lay more paving in the same timeframe
  - Improved surface and edge **finish**
- Increases productivity
- Peace of mind for all stakeholders



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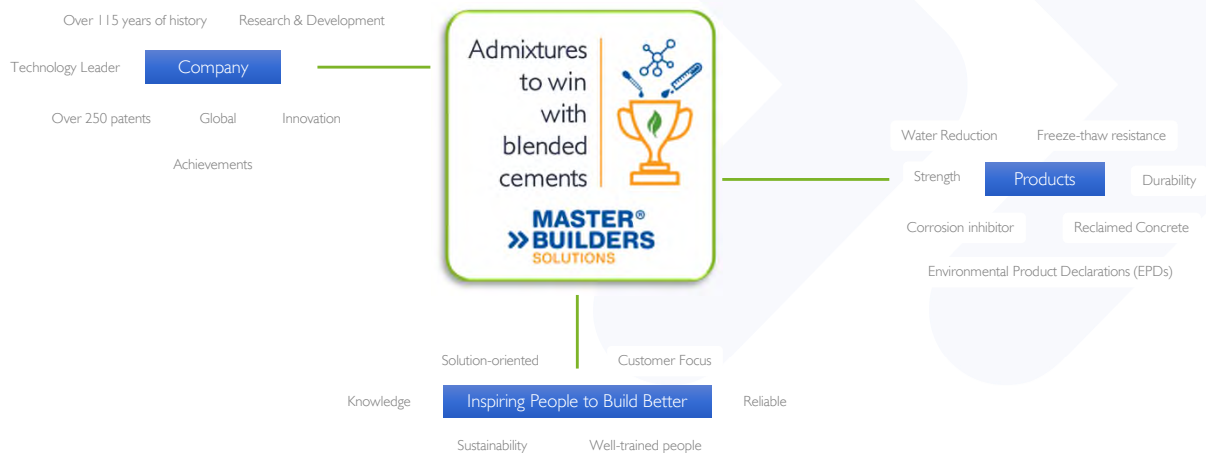
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## Overview



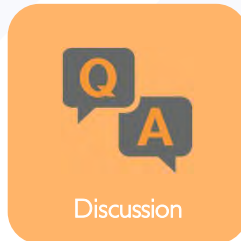
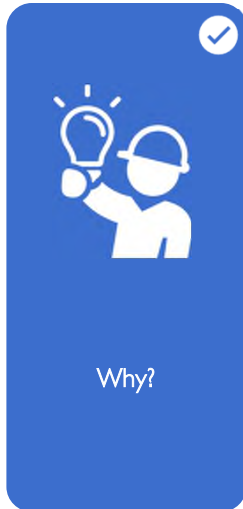
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## Master Builders Solutions' Promise



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## Overview



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Product Line Manager

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MasterEase 5000



Sustainability



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