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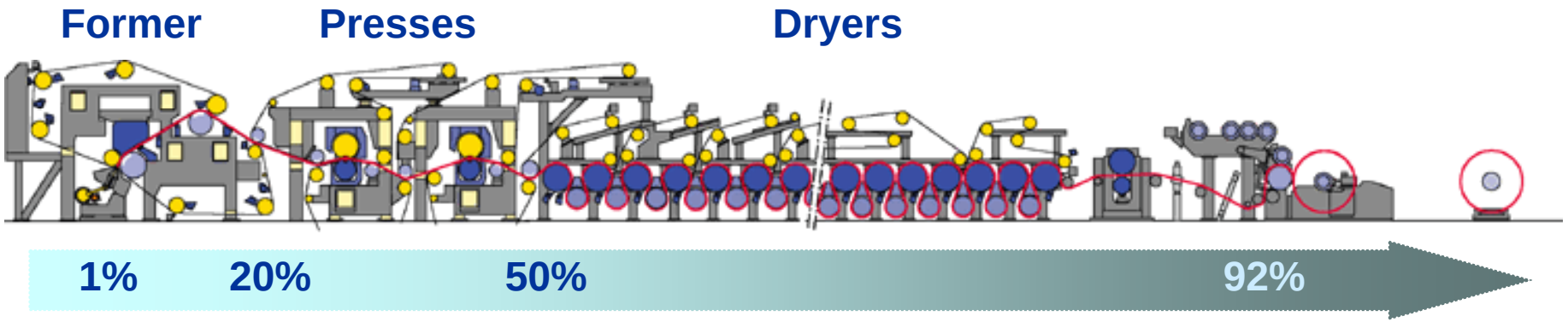
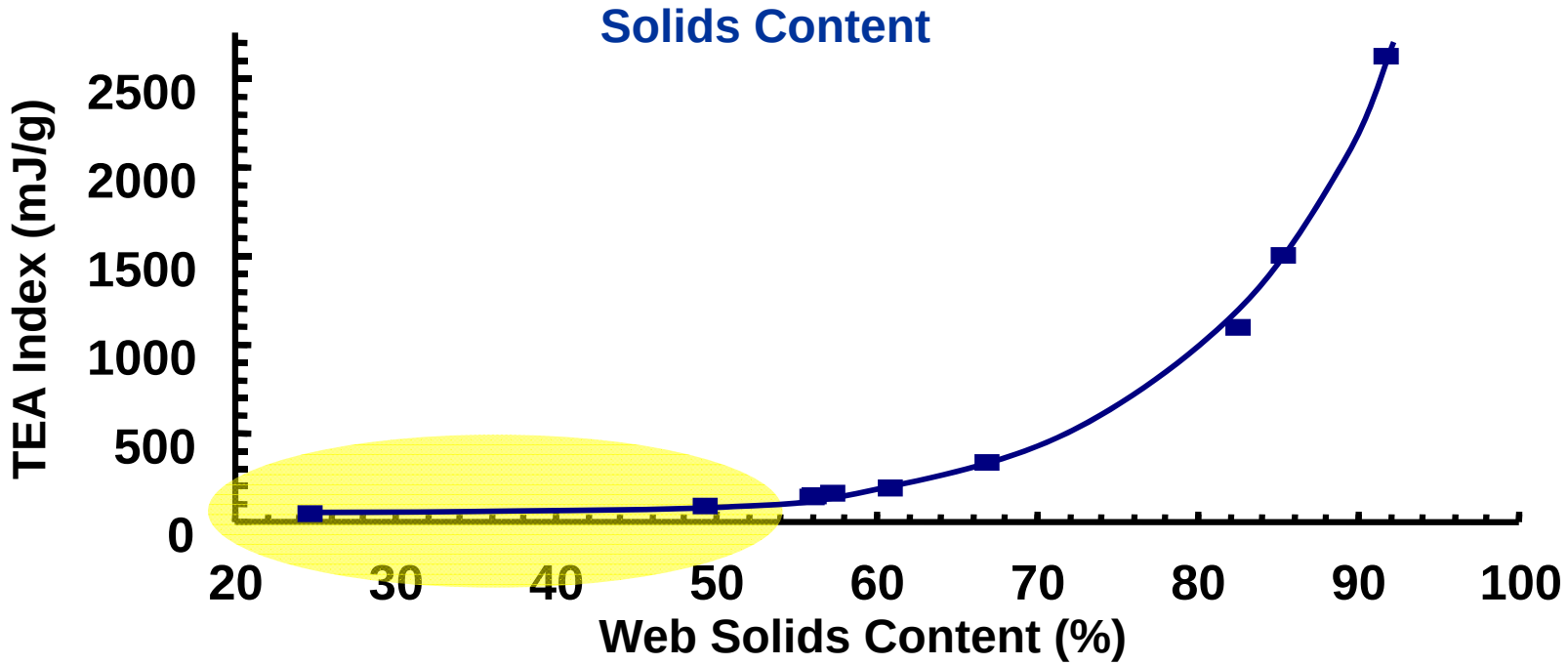
Wet-web Strength and Pressability of Highly Filled Sheets

Xujun Hua, Tom Owston and Makhlouf Laleg

PaperCon 2011

Solids Content and Strength Development

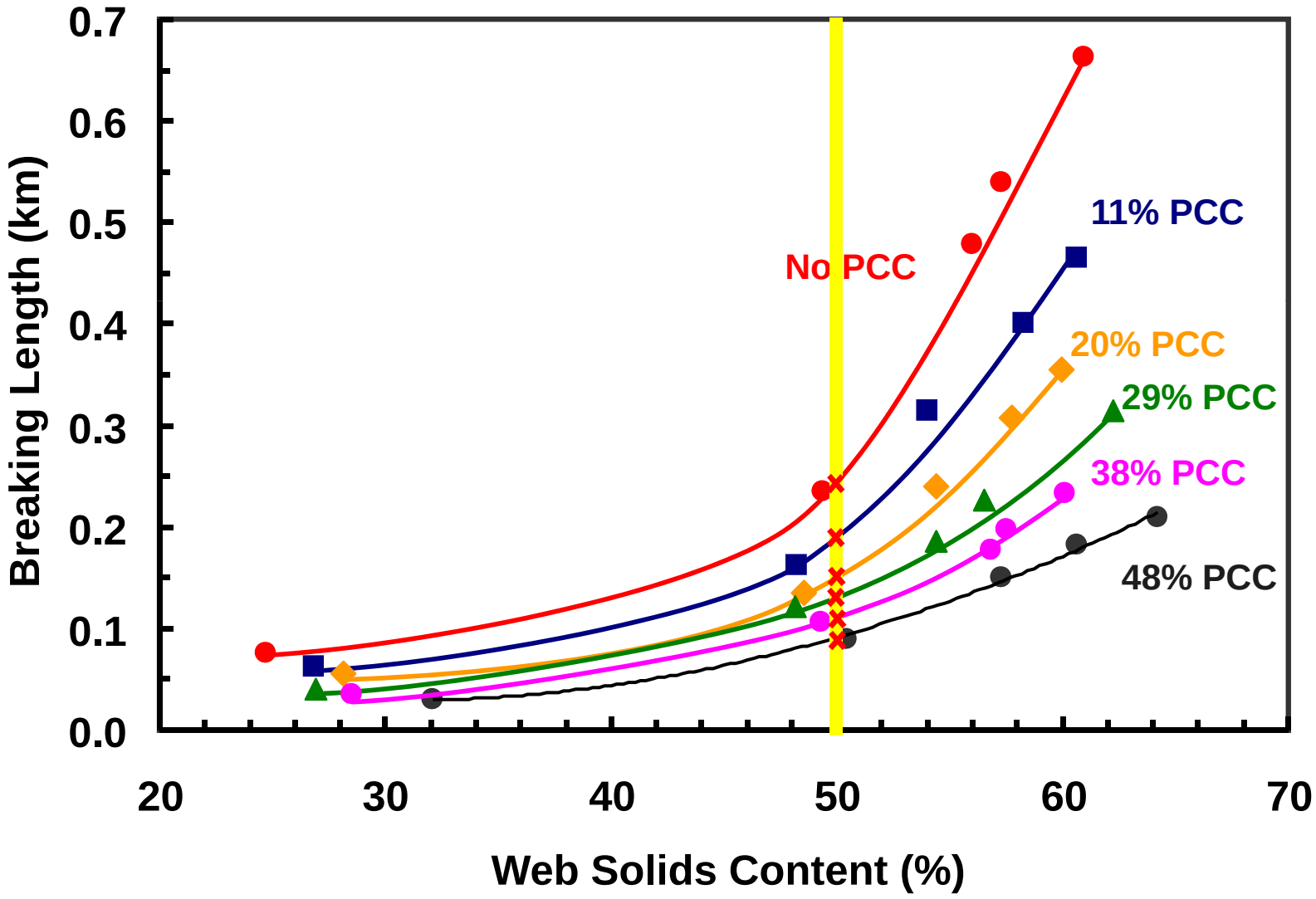




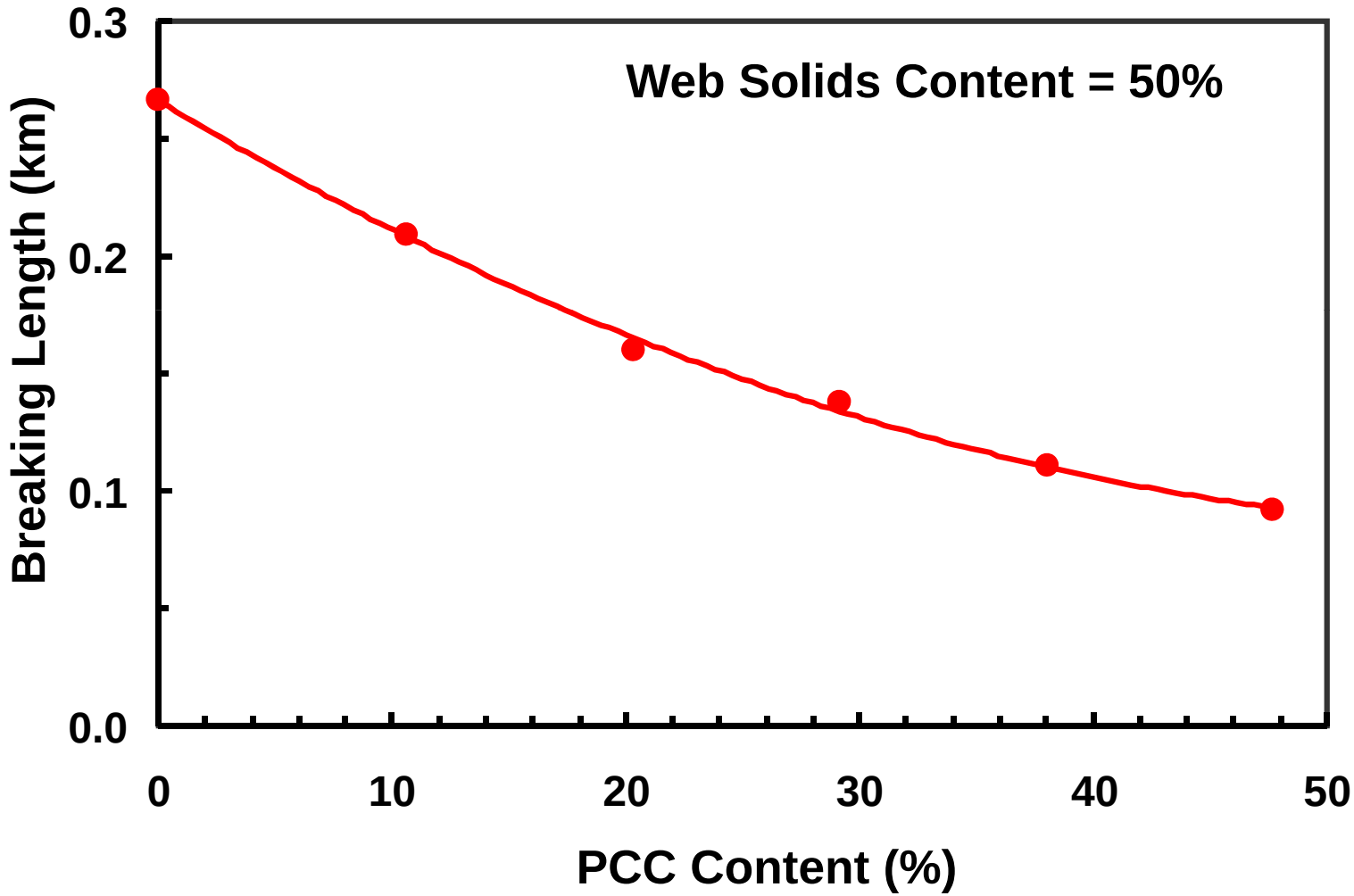
Topics

- **Wet-web strength of PCC filled chemical pulp sheets at constant web solids**
- **Effect of filler type on wet-web strength**
- **Pressability of PCC filled sheets**
- **Wet-web strength under constant dewatering**
- **Effect of strengthening agents on wet web strength**

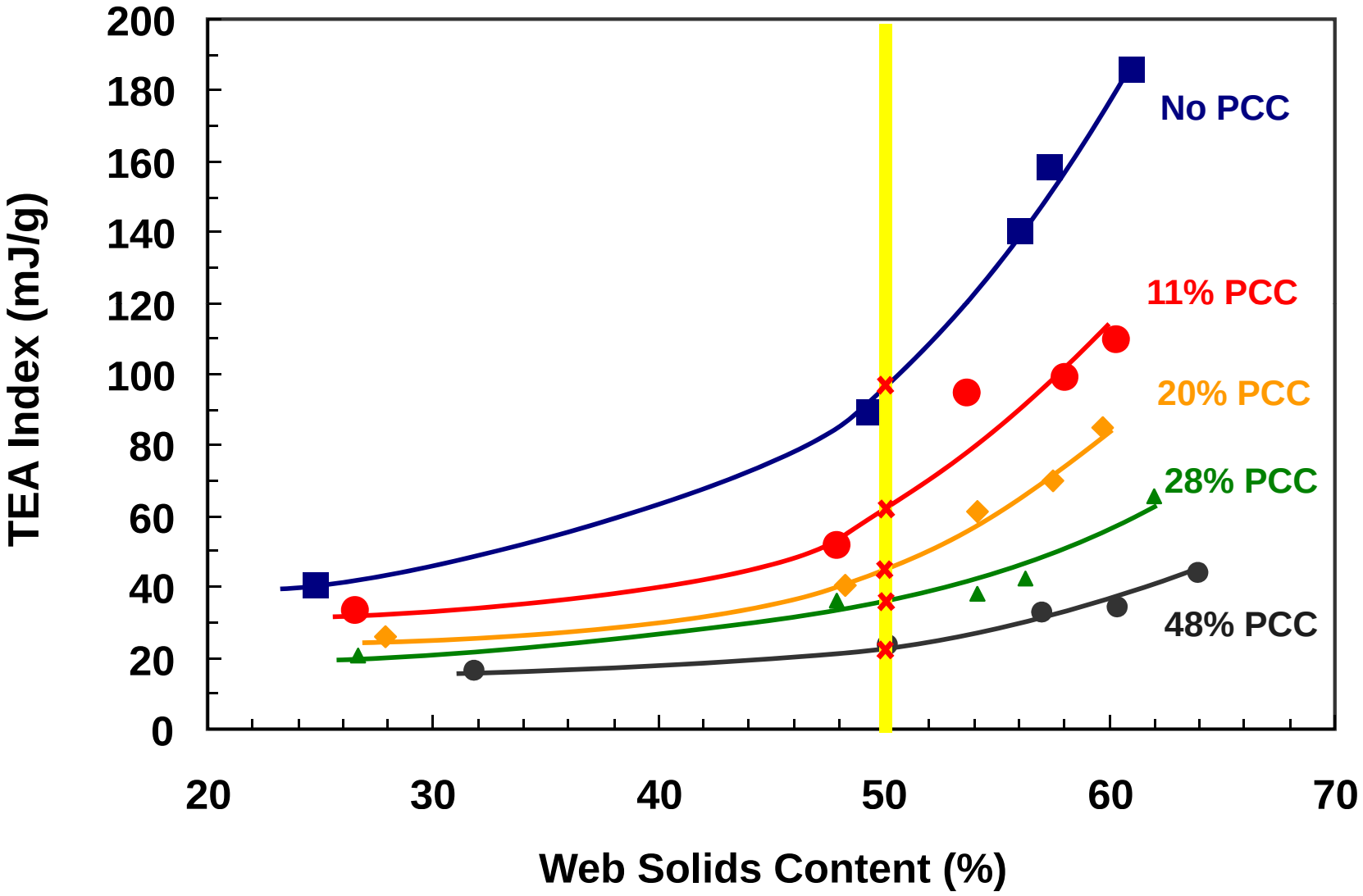
Effect of Filler Content on Breaking Length



Tensile Strength at Constant Web Solids



Effect of Filler Content on Wet-Web TEA



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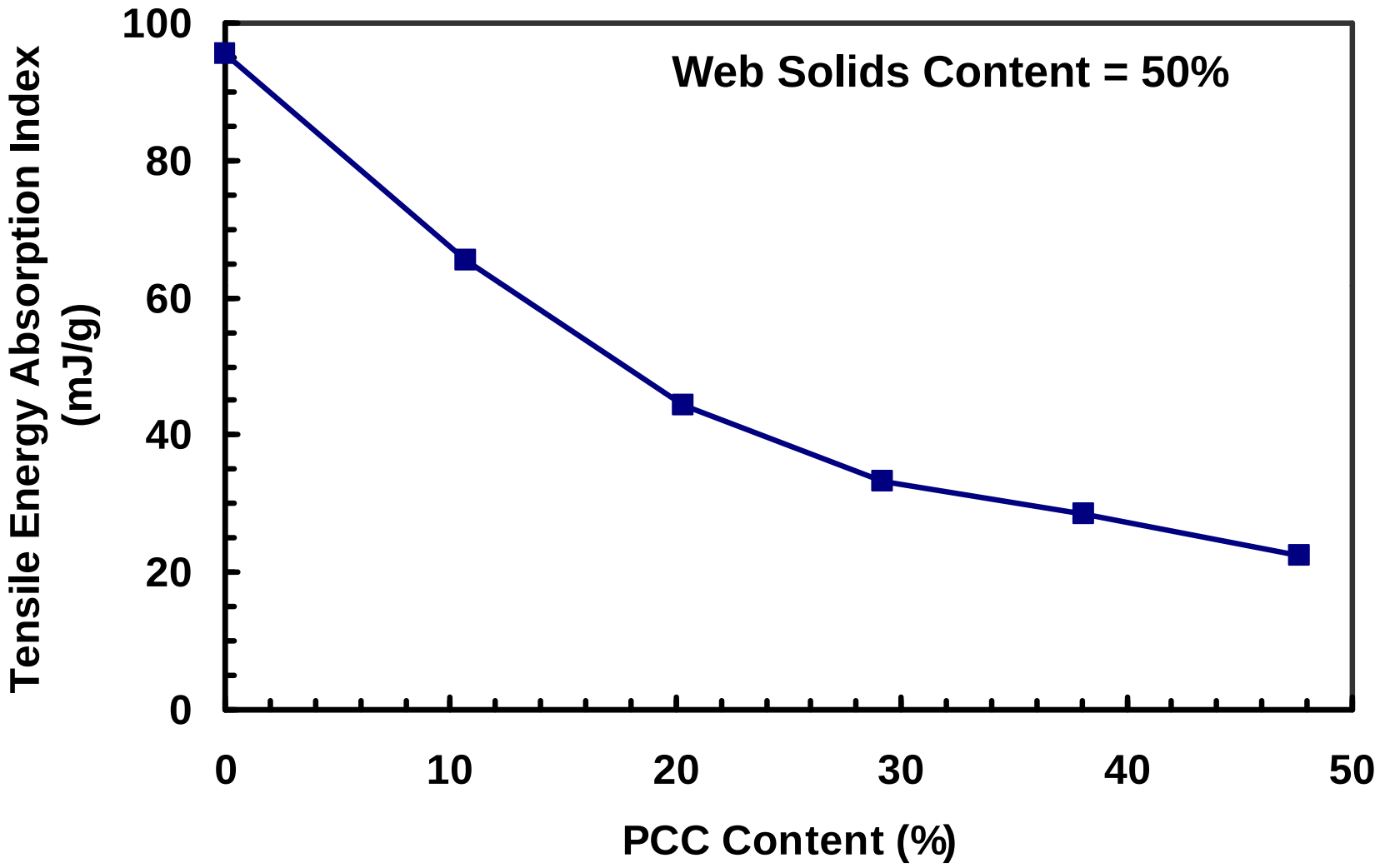

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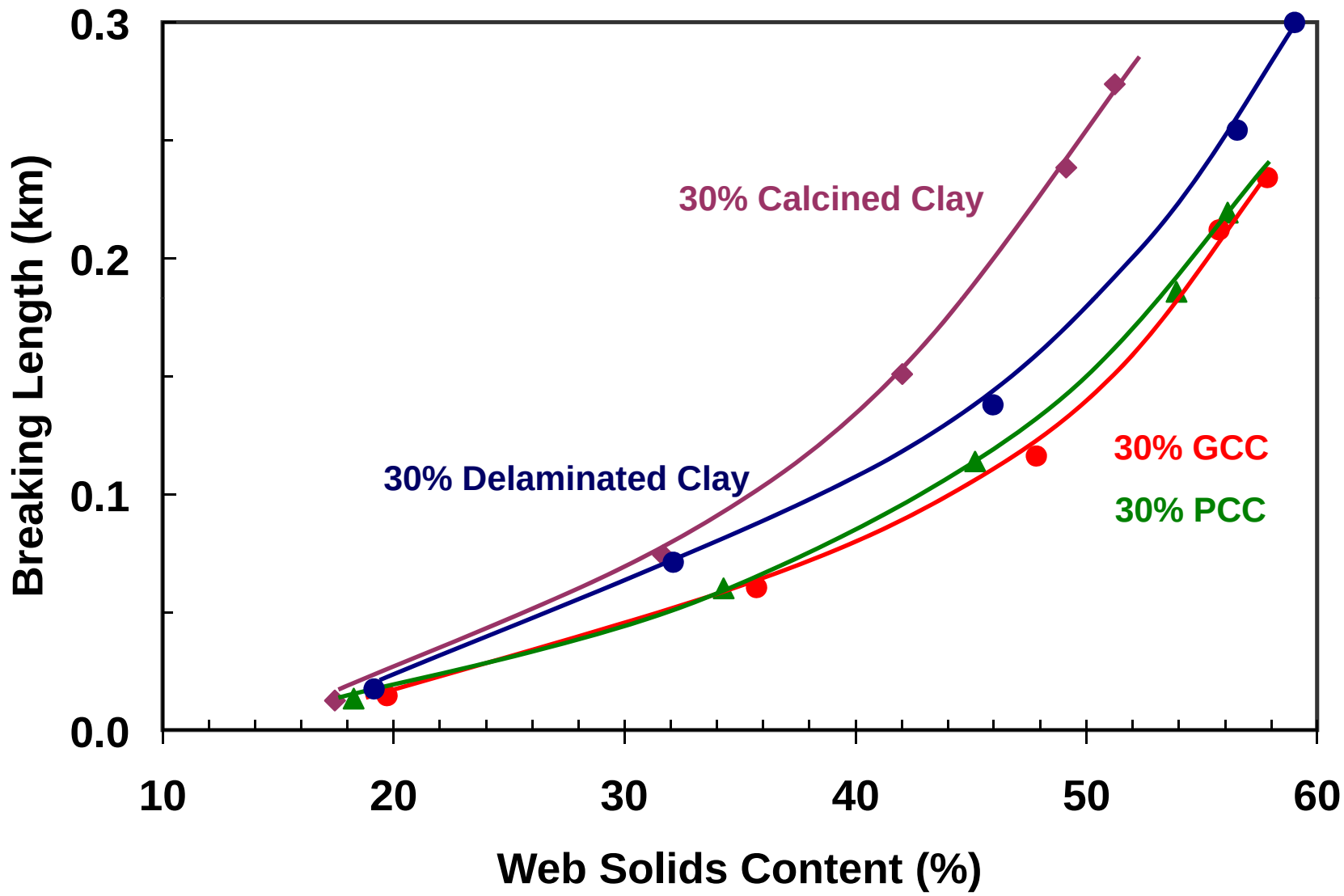
Tensile Strength with Different Fillers



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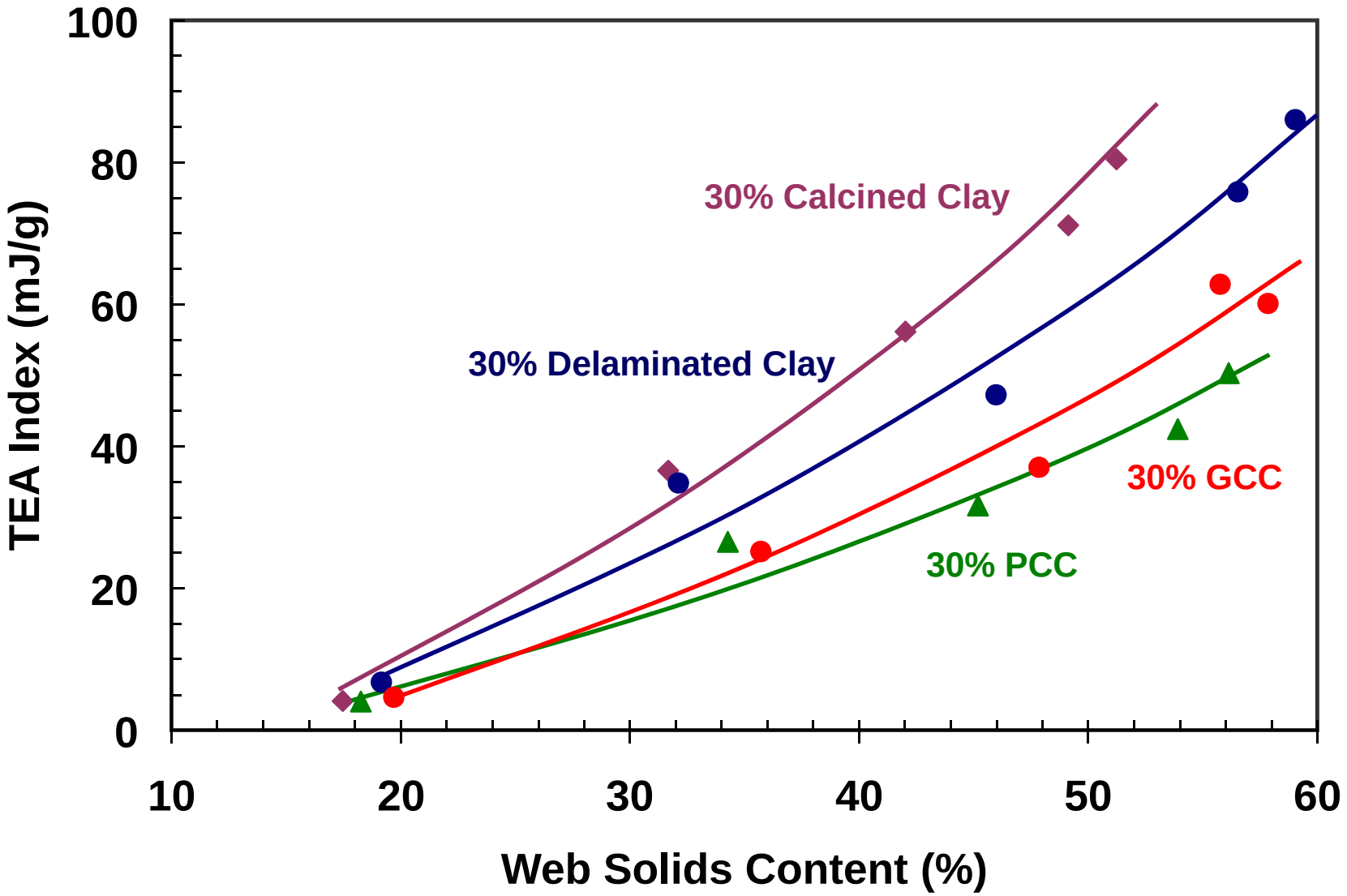

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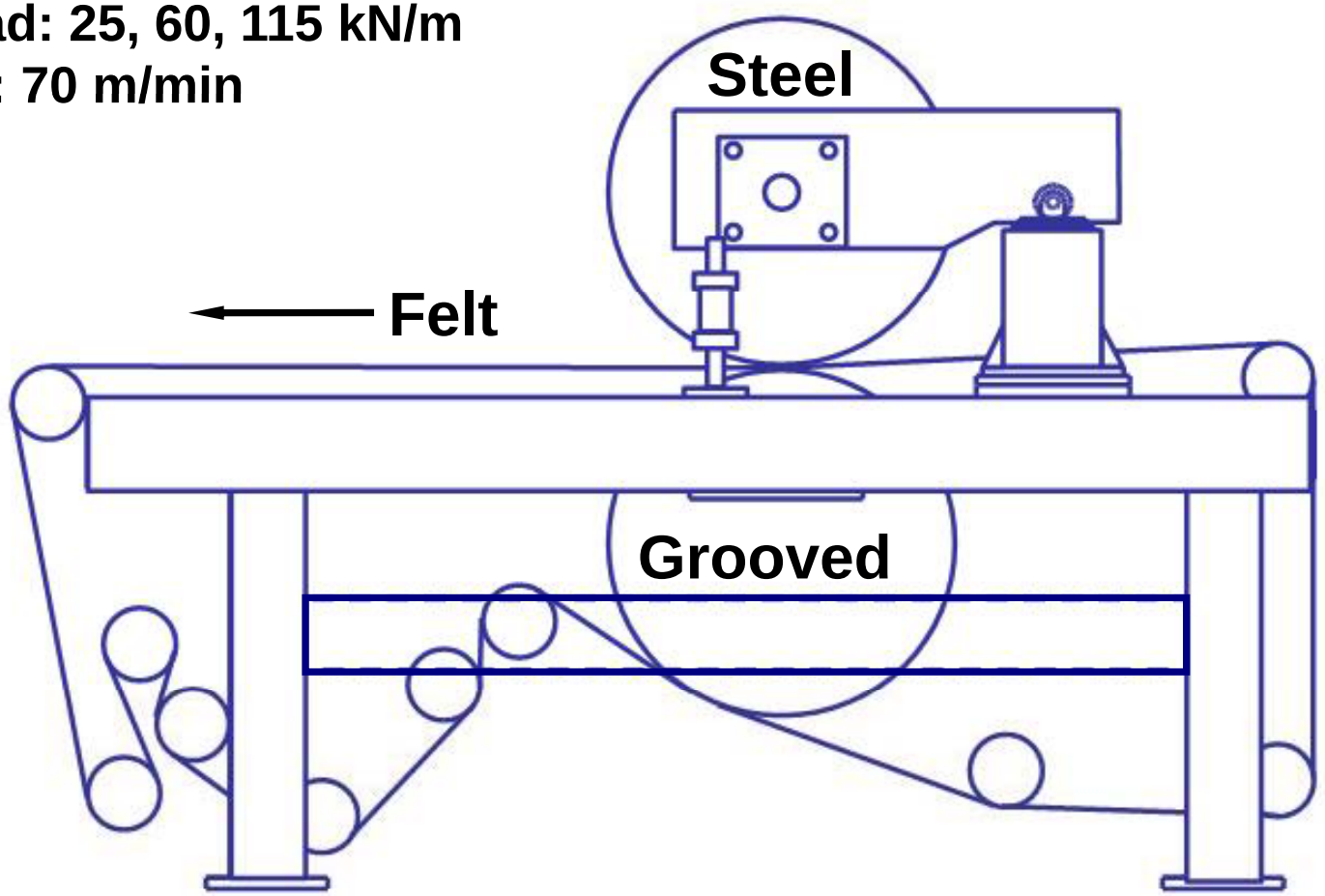
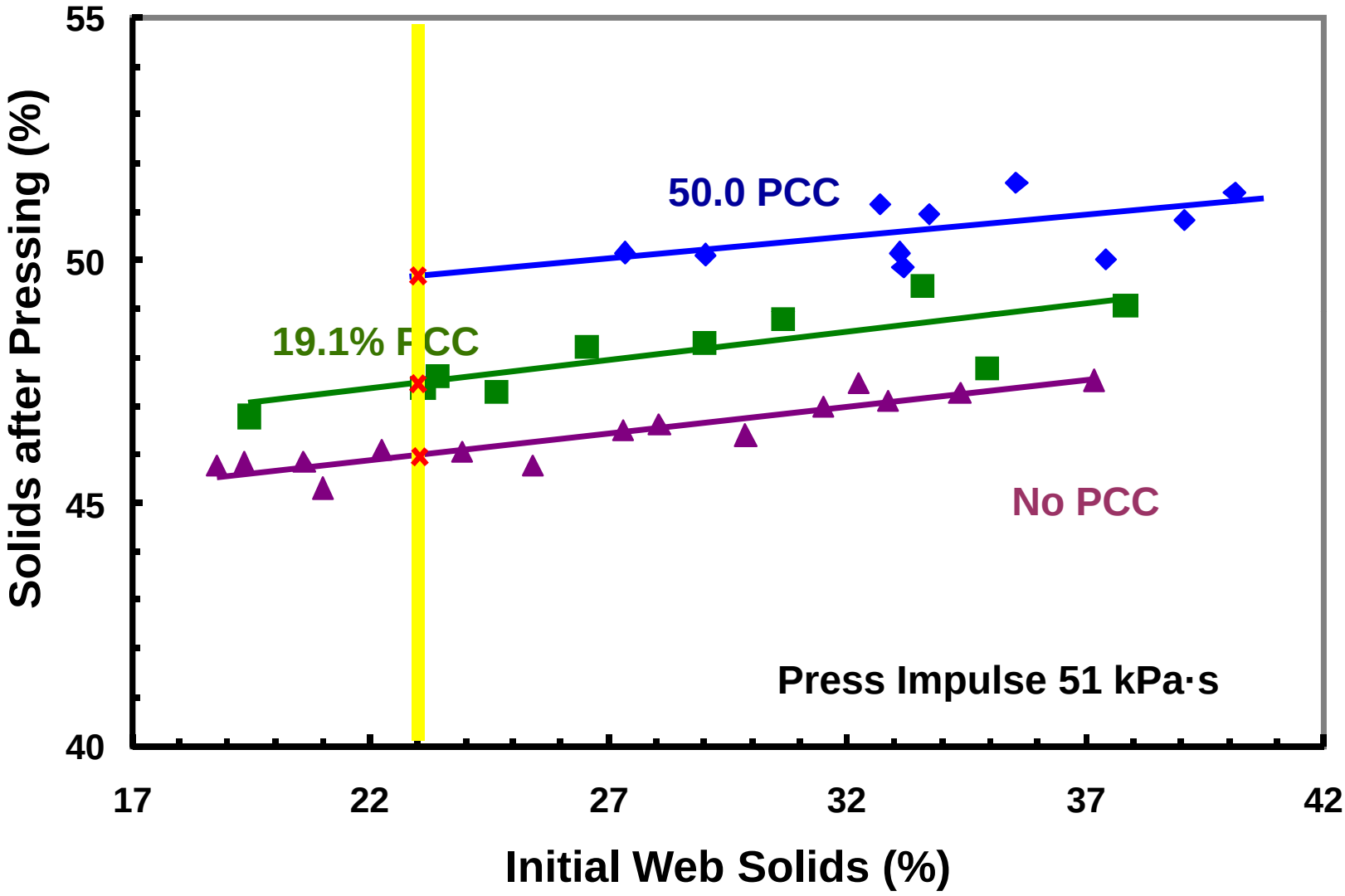
Pilot Two-Roll Press

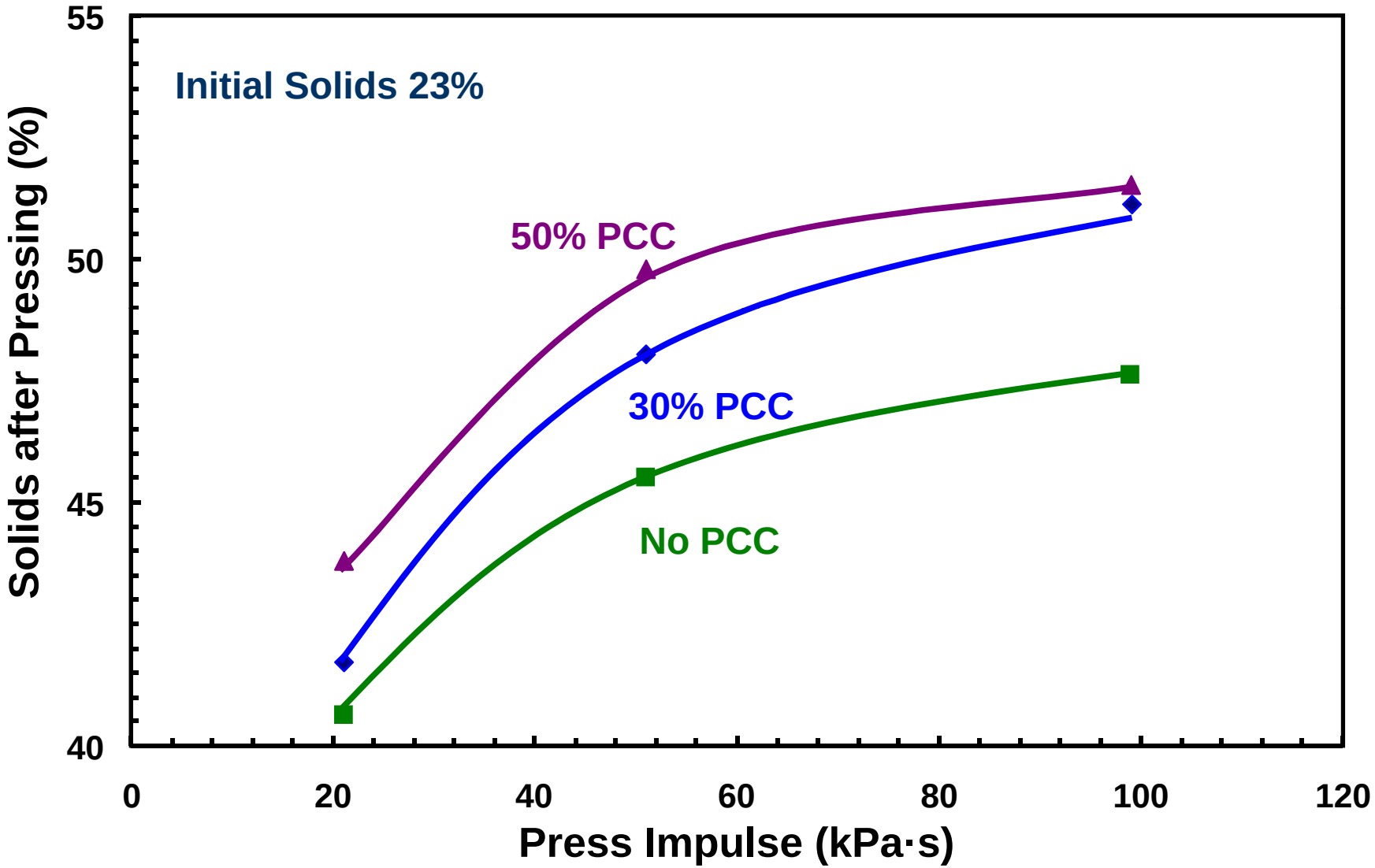
Roll diameter: 0.75m
Nip load: 25, 60, 115 kN/m
Speed: 70 m/min



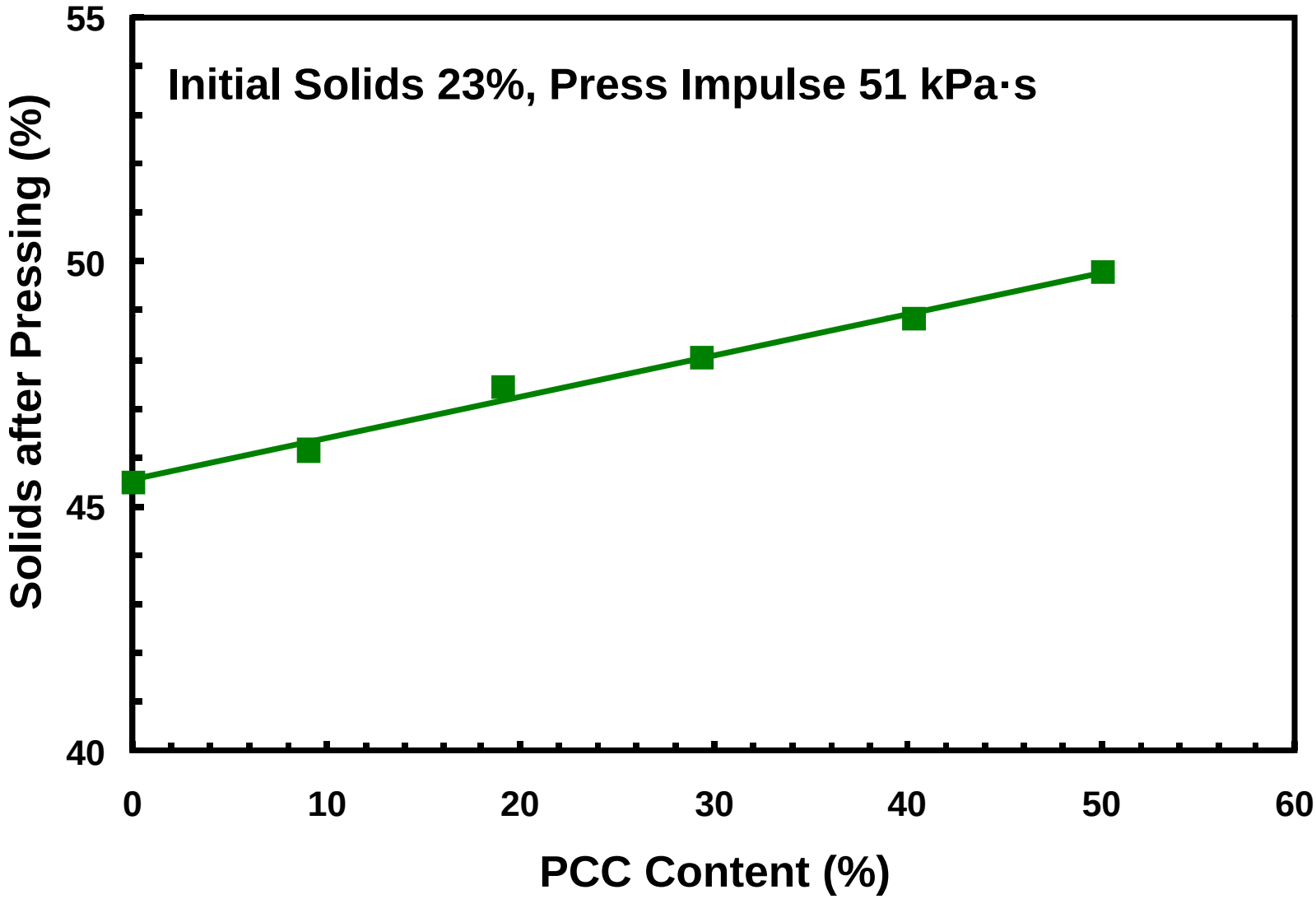
Press Solids versus Initial Couch Solids



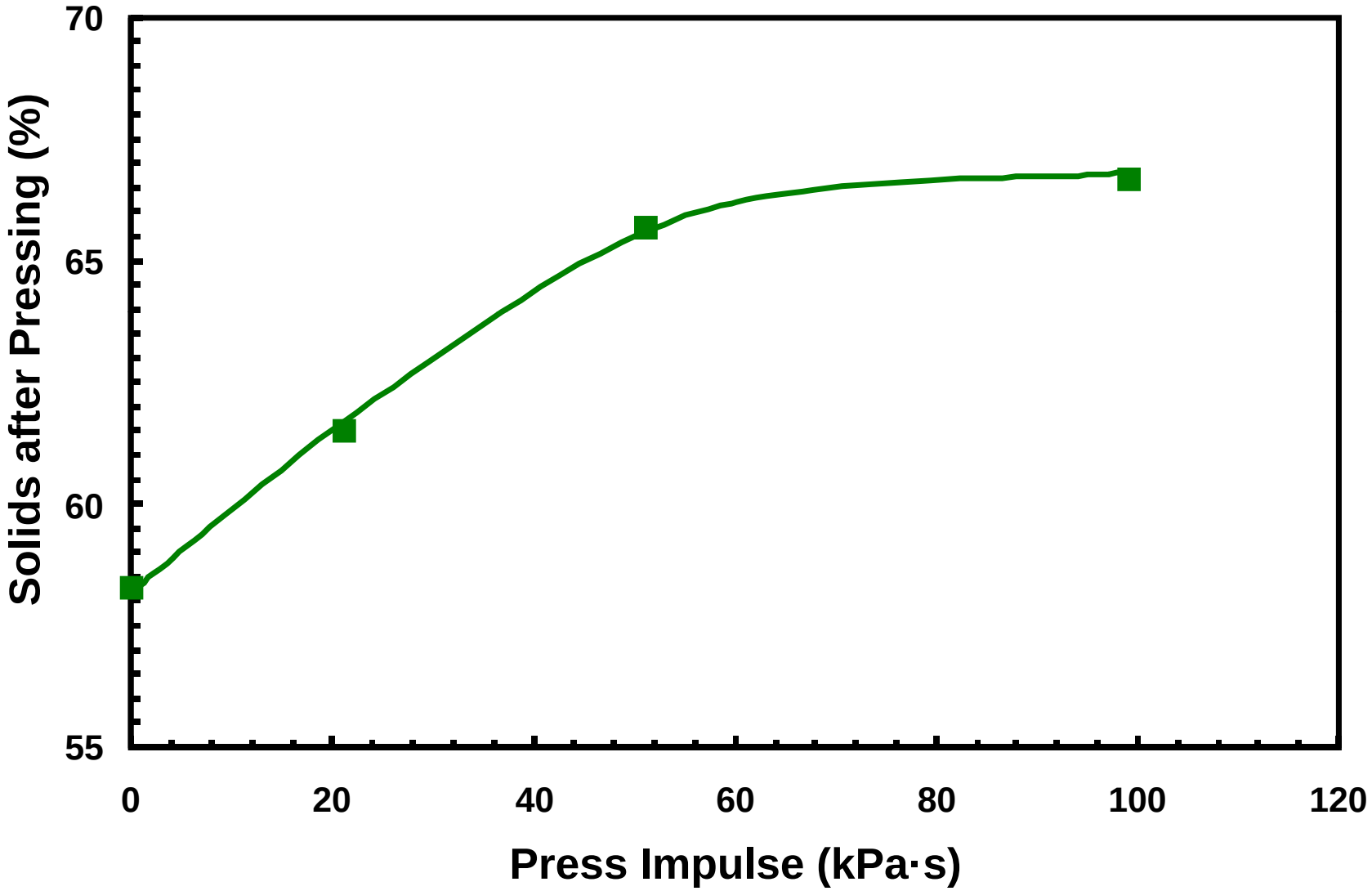
Effect of Press Impulse



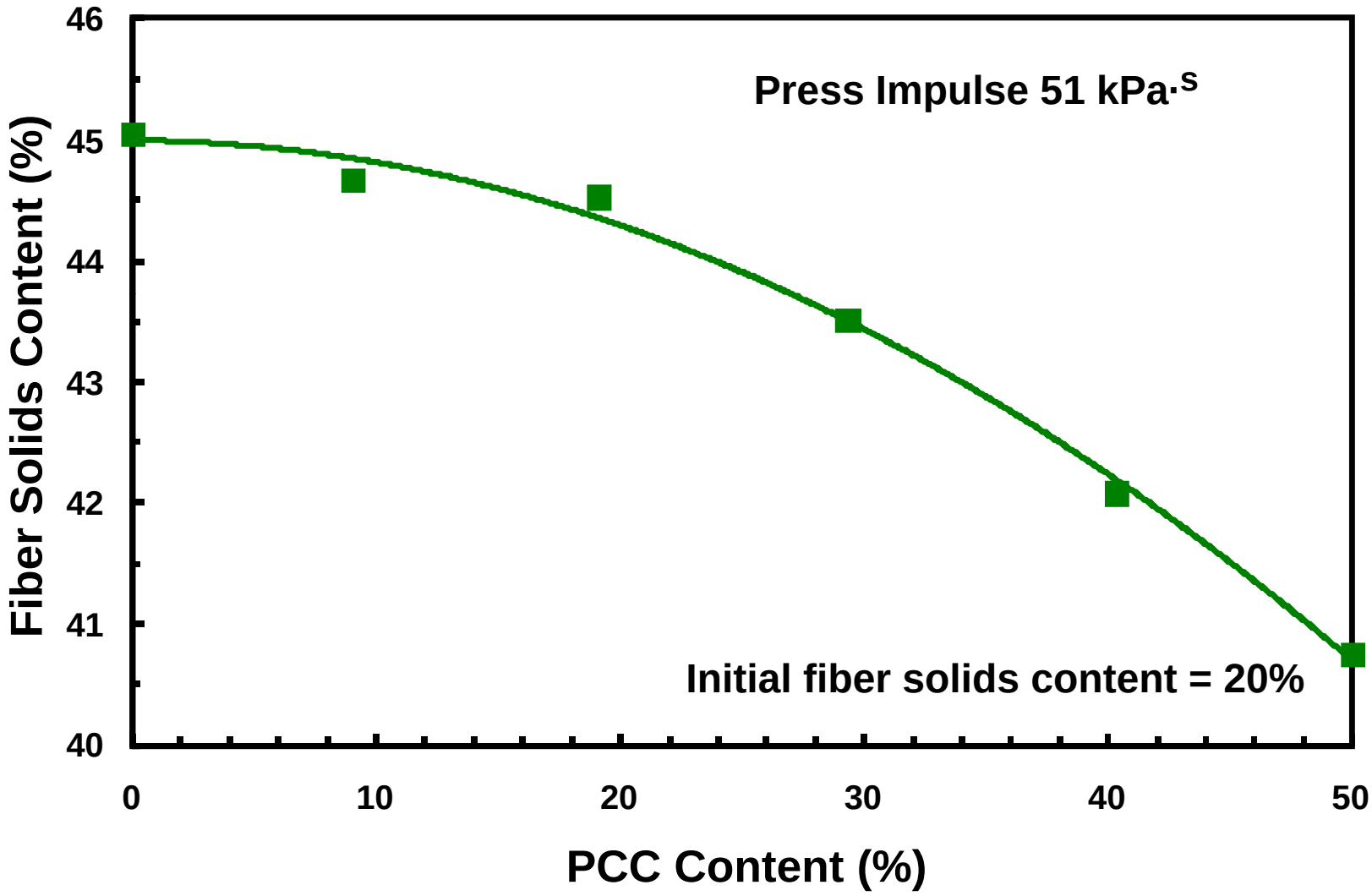
Effect of PCC Level on Pressing



PCC Solids Content After Pressing



Fiber Solids Content After Pressing



Calcium Carbonate Filler

- Reduces web pressability

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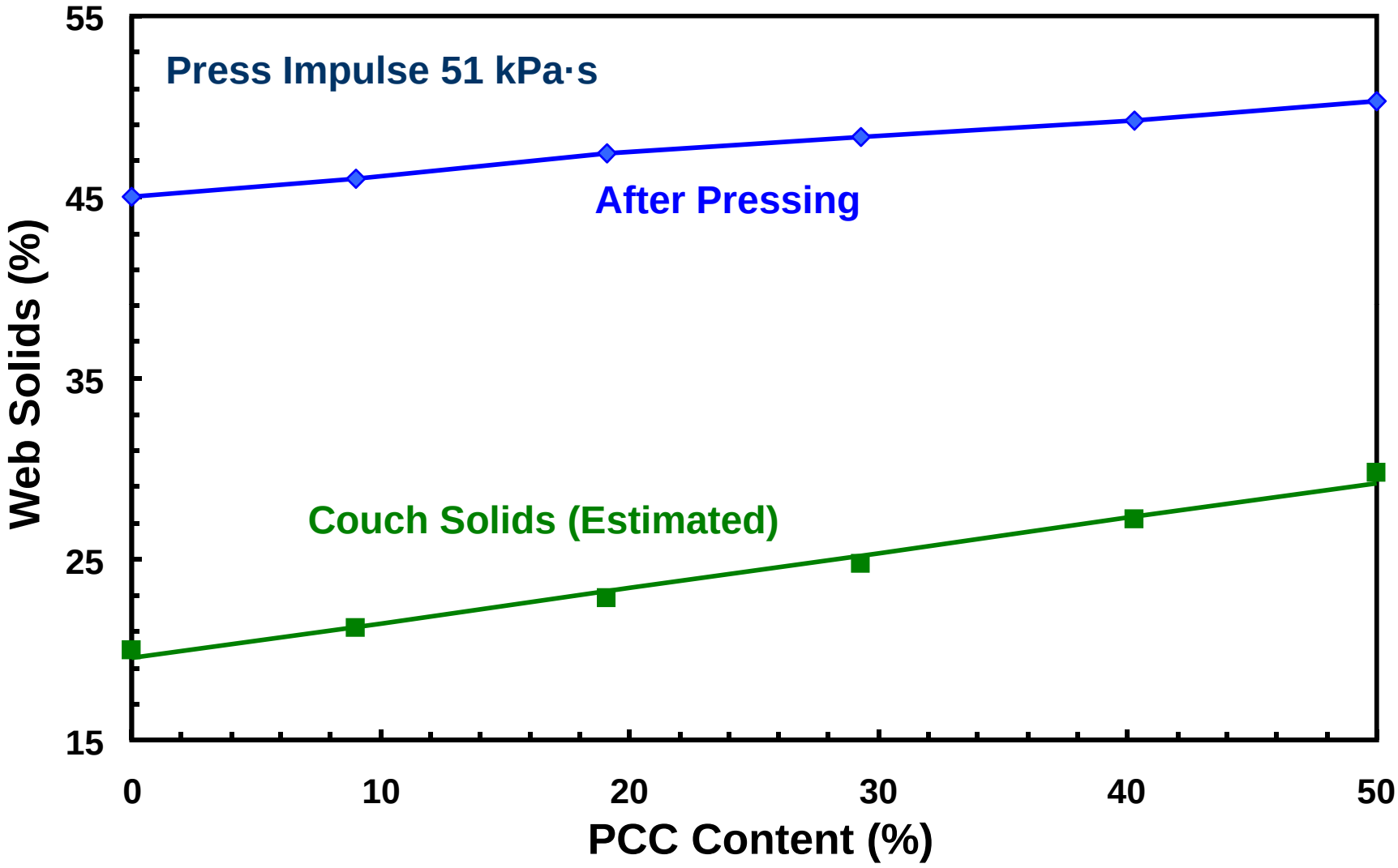
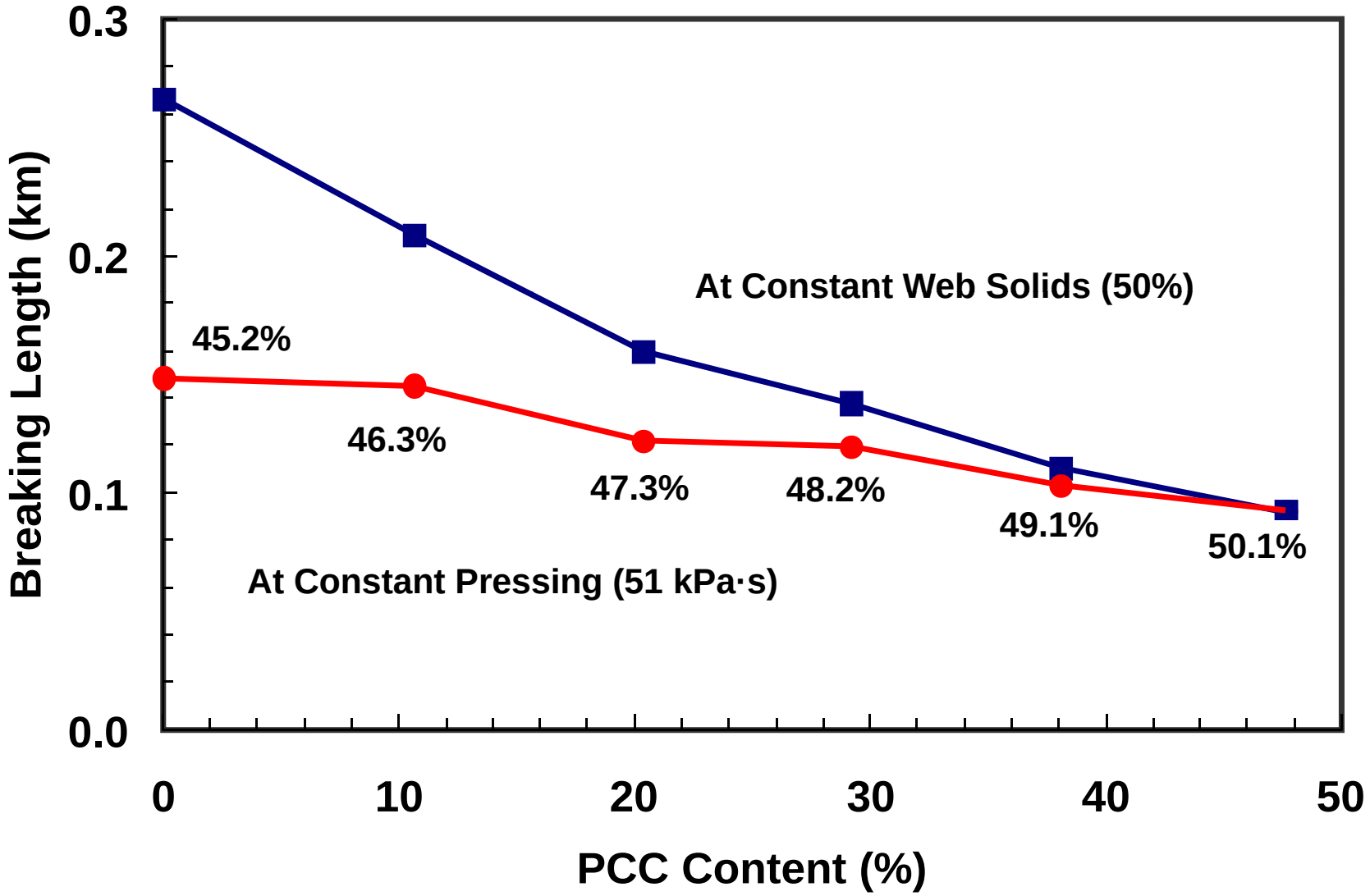
- **Wet-web strength under constant dewatering**
- Effect of strengthening agents on wet web strength

Press Solids as Increasing Couch Solids due to PCC



Tensile Strength at Constant Web Solids and Constant Pressing



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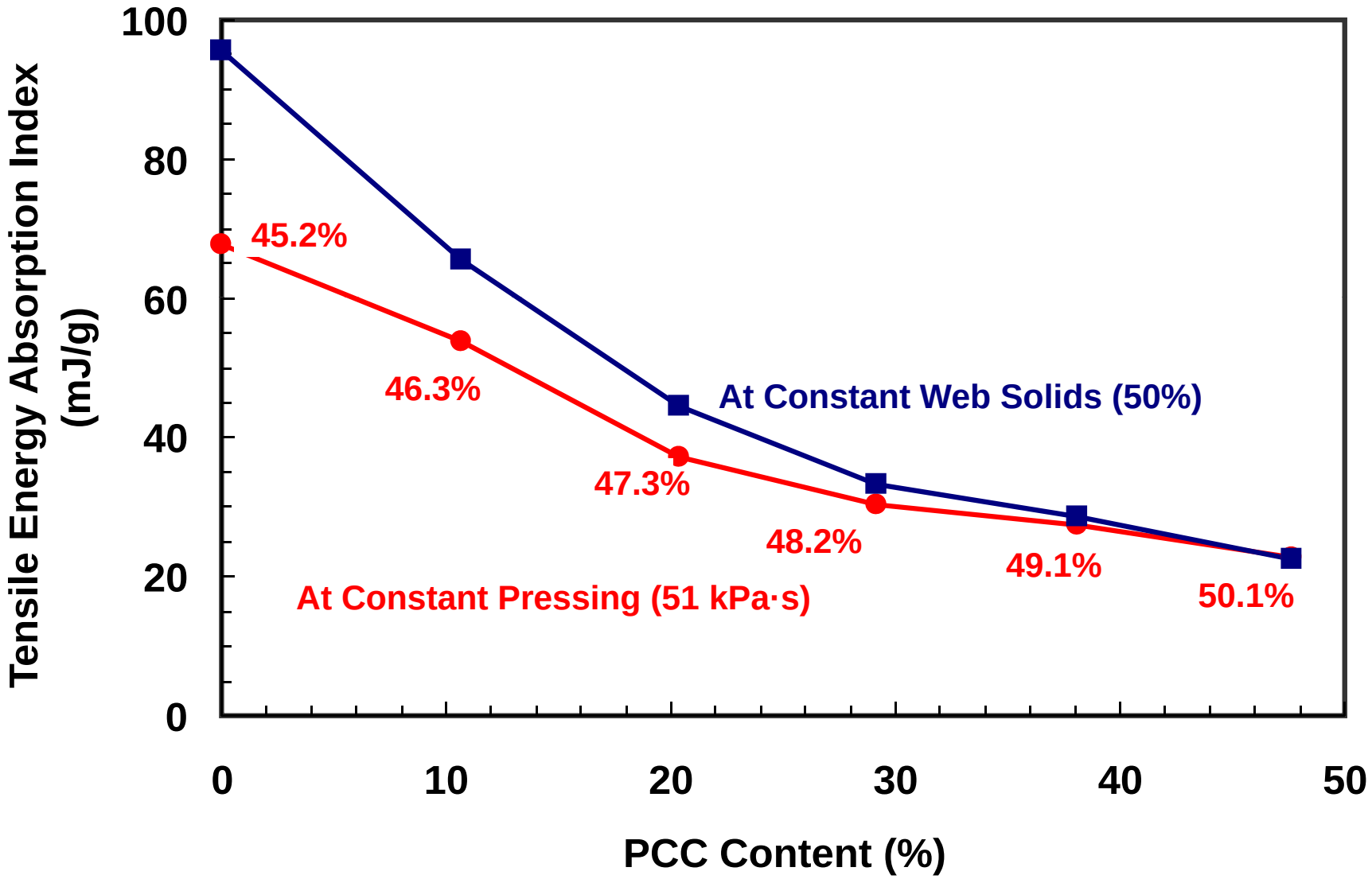

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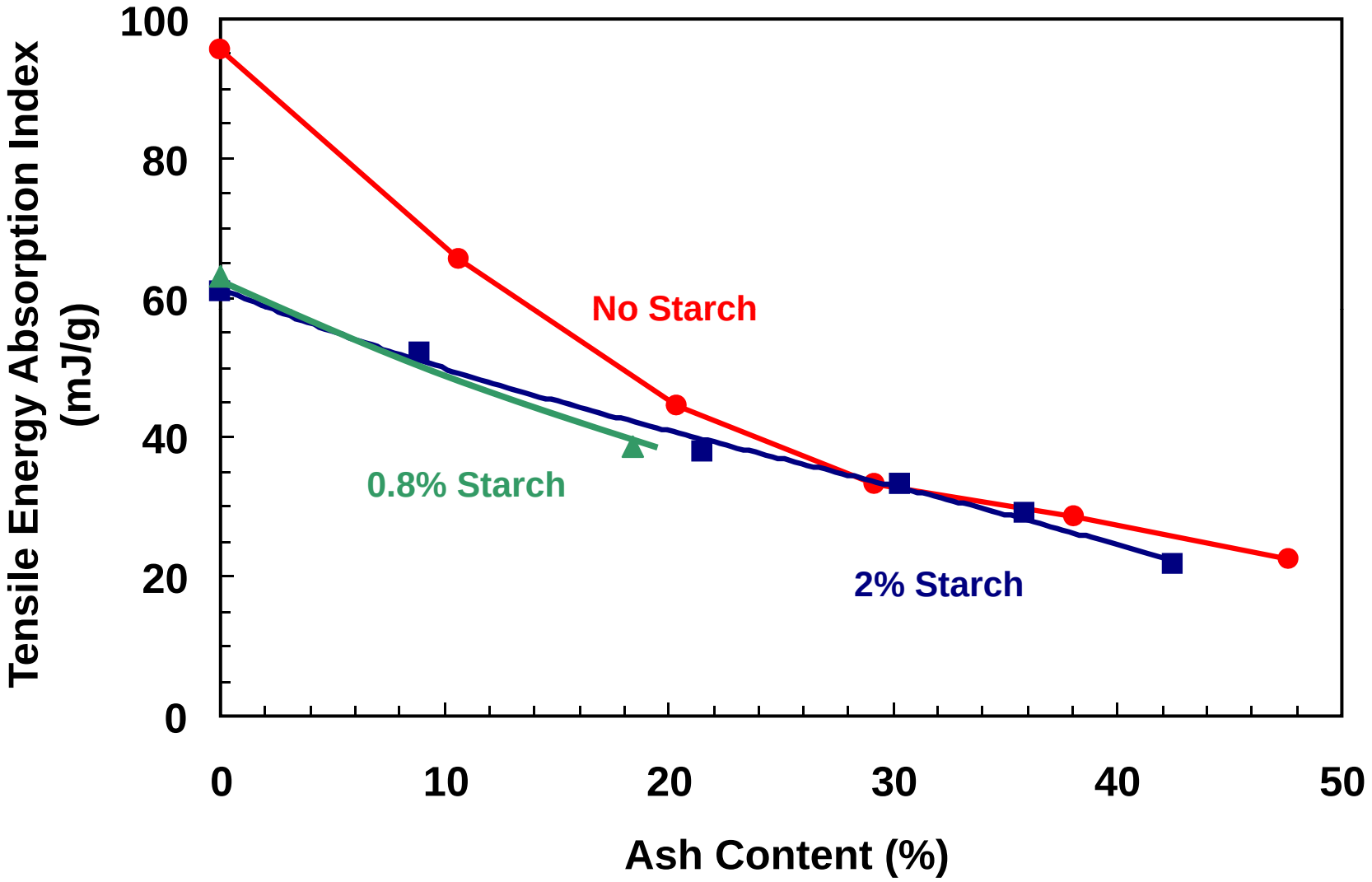
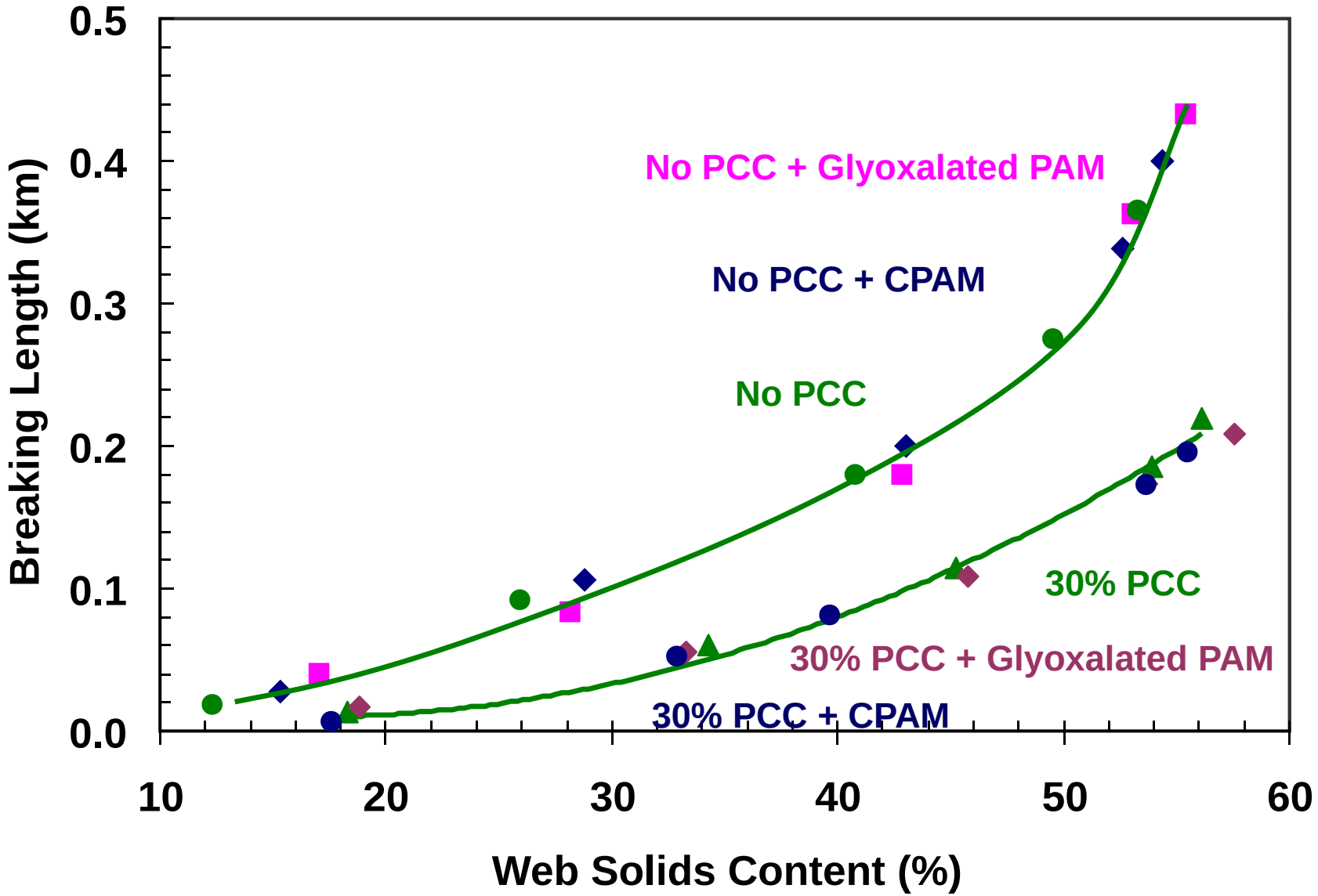
Effect of Starch on TEA at 50% Solids



Tensile Strength with Strengthening Agents



Conventional Strength Agents

- Do not improve wet-web strength

Conclusions

- **Filler reduces wet-web tensile strength significantly at a given solids content. The extent of reduction depends on filler type.**
- **PCC increases couch and press solids under given drainage and press conditions, but PCC actually reduced the web pressability, and PCC-filled webs are significantly weaker.**
- **Cationic starch reduces wet-web strength at low filler levels (<25%). Other strengthening agents have no significant effect on wet-web strength.**
- **To make highly filled paper, some counter actions will be needed to have good machine runnability.**