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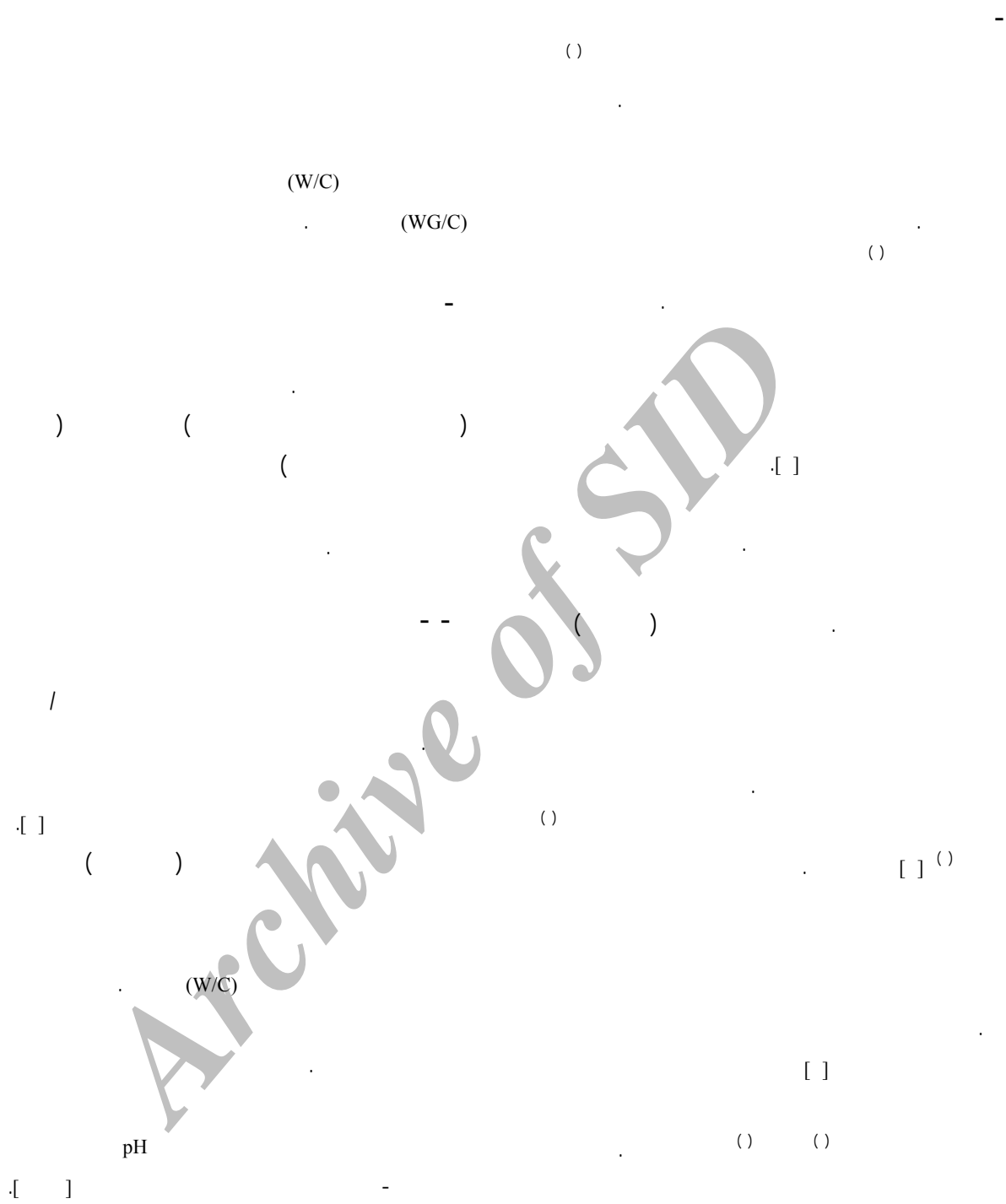
Mechanical Behavior of Concrete with Waterglass

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Abstract

Use of waterglass in concrete is limited to shotcrete for vertical faces and over head in tunnels. This material influences the time of setting and also the strength of concrete. In this study, the compressive and tensile strength and the modulus of elasticity for 7, 28 and 90 days old concrete specimens were determined. A total of 216 concrete cylindrical 150×300 mm specimens using 12 different concrete mixes with water-to-cement ratios of 0.4, 0.5 and 0.6 and waterglass-to-cement ratios of 0.0, 0.03, 0.06 and 0.09 were tested. Due to chemical reaction between sodium silicate (waterglass) and concrete ingredients, adhesion of concrete mix occurred before initial set of concrete. It was observed that adding waterglass to concrete causes a reduction in compressive and tensile strength, however the ultimate strain at failure increases, leading to a more ductile concrete.

Key words: Concrete, waterglass, silicate sodium, compressive strength, modulus of elasticity.

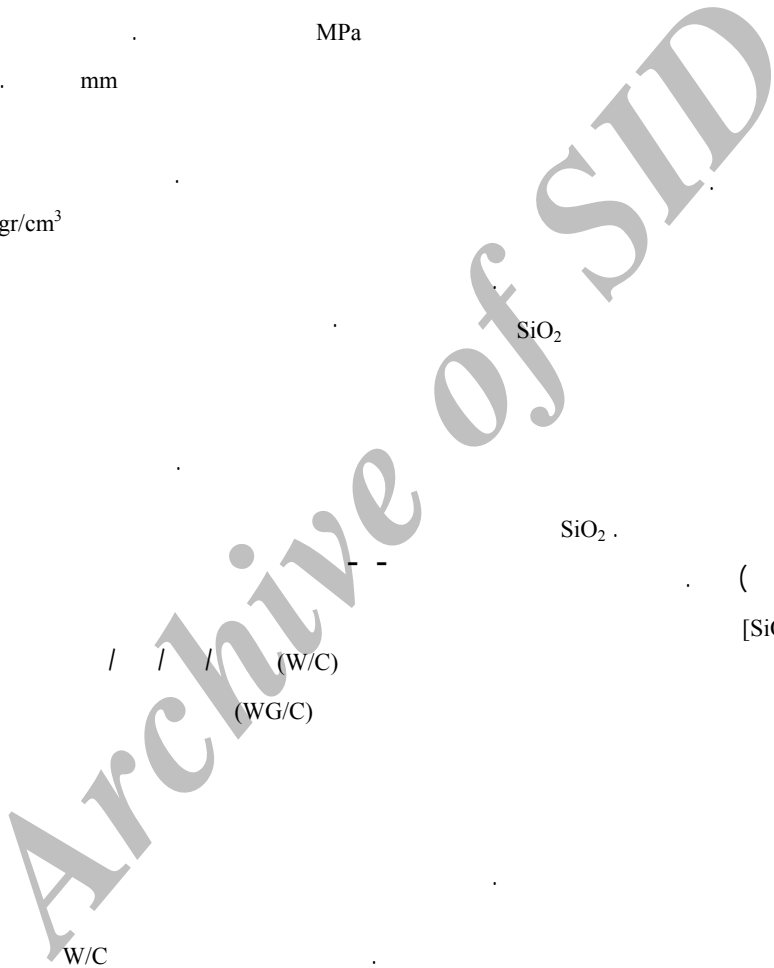


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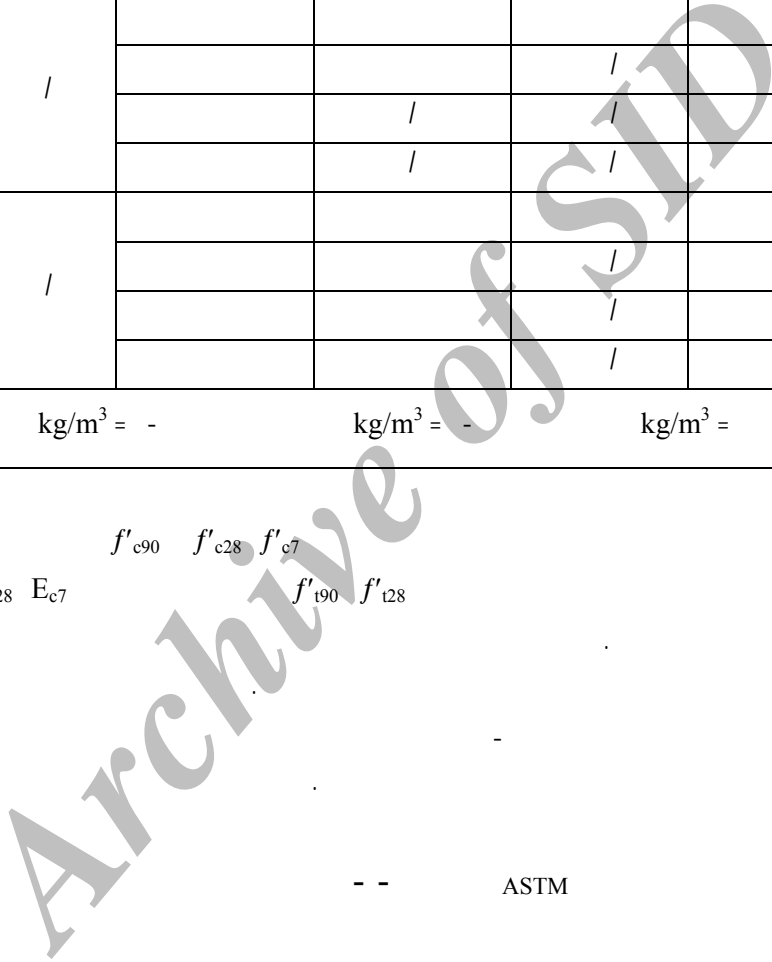
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- 1. Water Glass
 - 2. Sprayed Concrete
 - 3. Lukas, Walter
 - 4. Kusteler, Wolfgang
 - 5. Nike, Swanell
 - 6. Tom, Mallby

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 [SiO_4]⁴⁻
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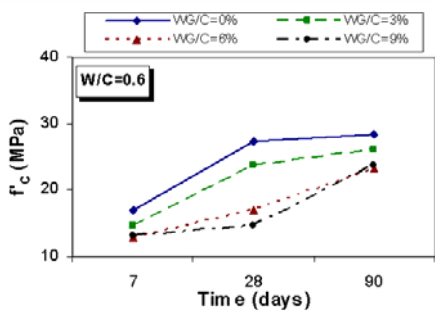
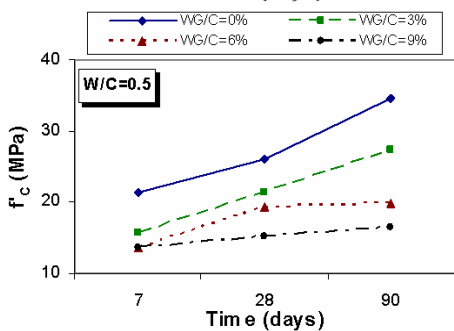
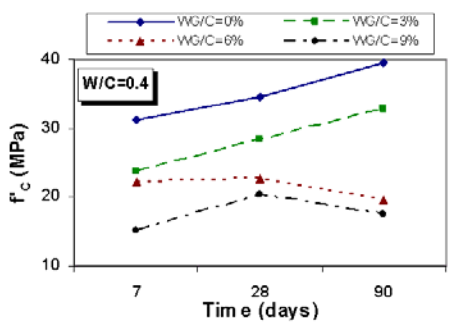
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(MPa)

	W/C	WG/C	f'_{c7}	f'_{c28}	f'_{c90}	f'_{t7}	f'_{t28}	f'_{t90}	E_{c7}	E_{c28}	E_{c90}
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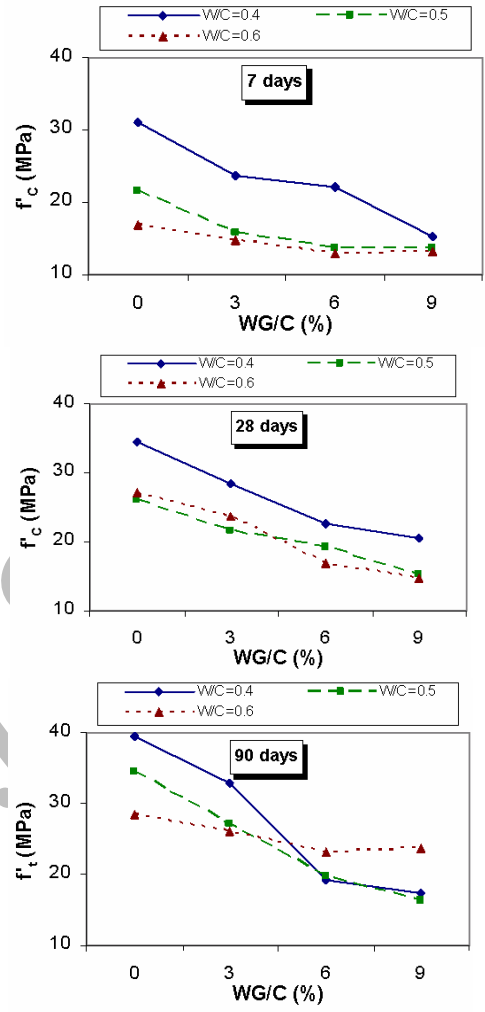
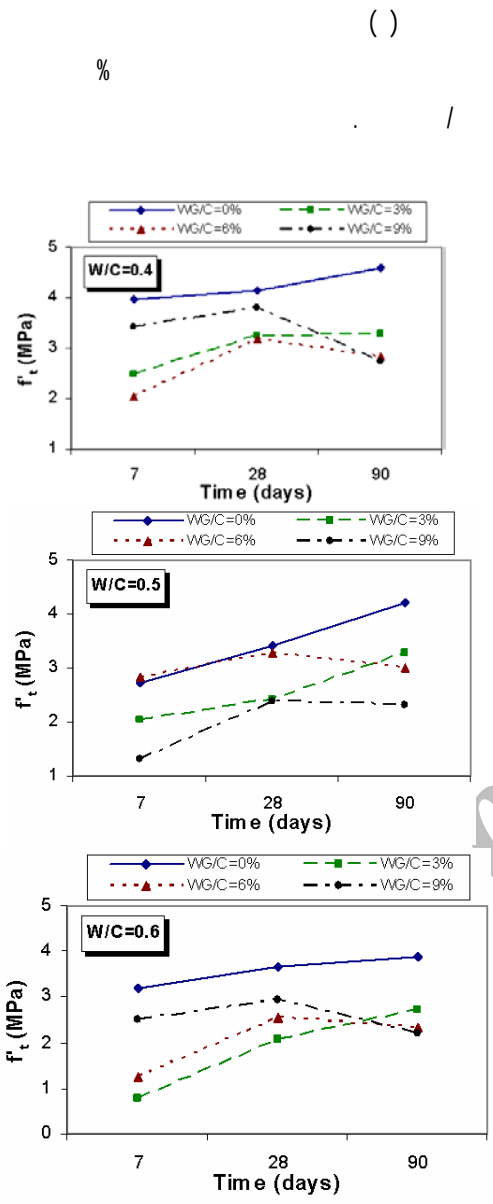
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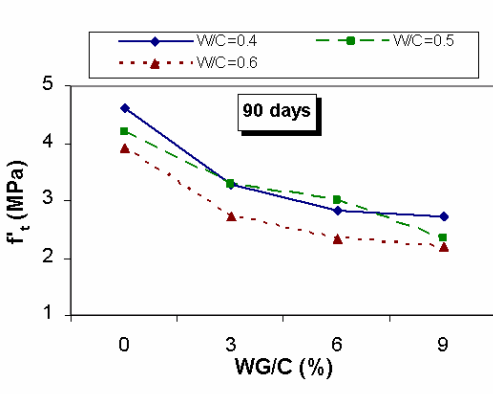
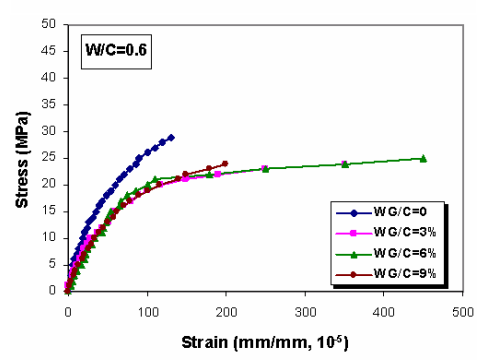
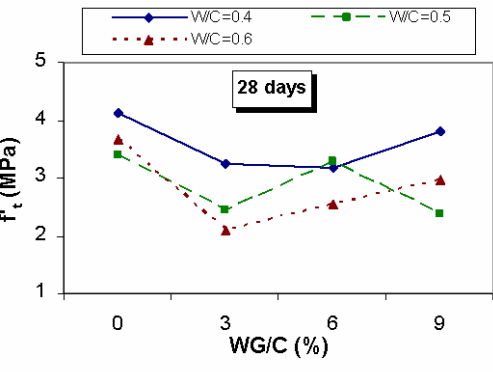
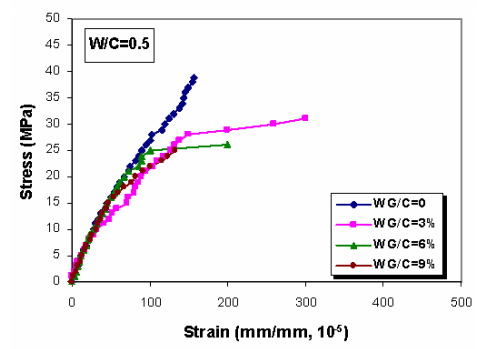
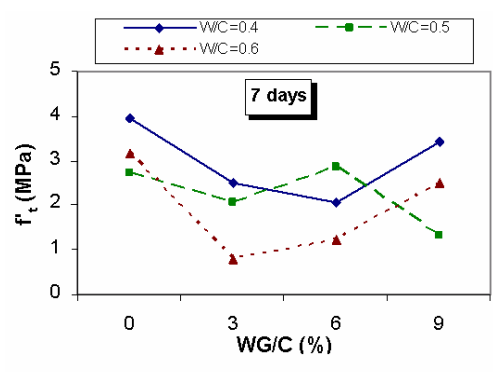
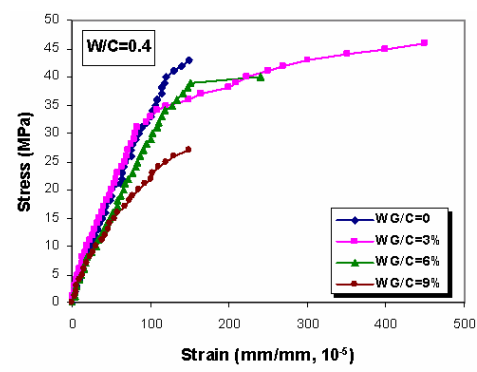
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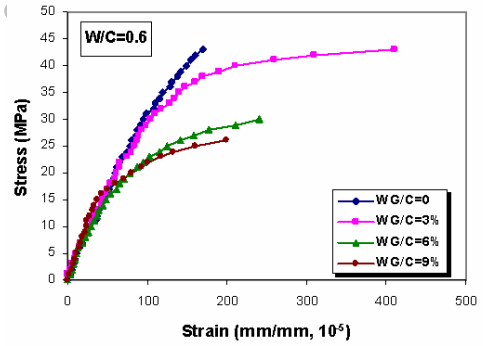
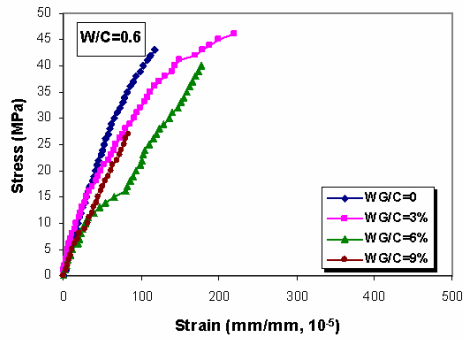
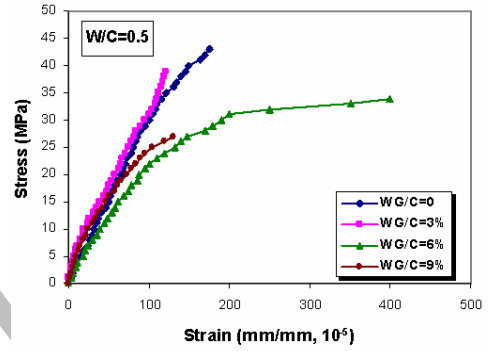
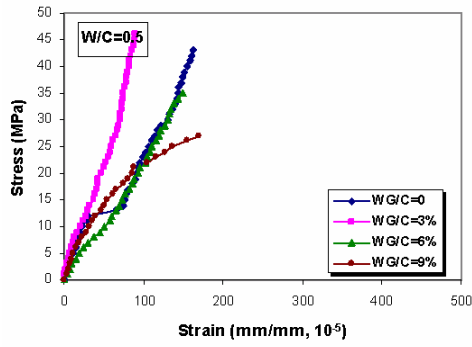
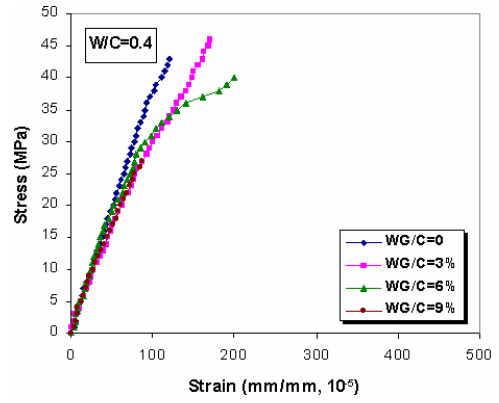
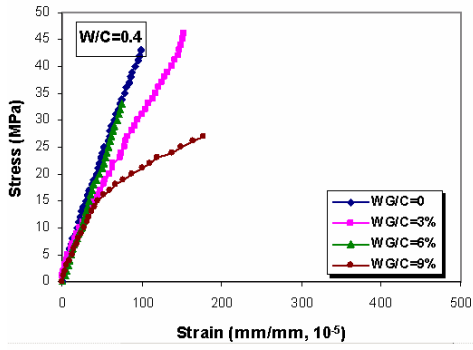
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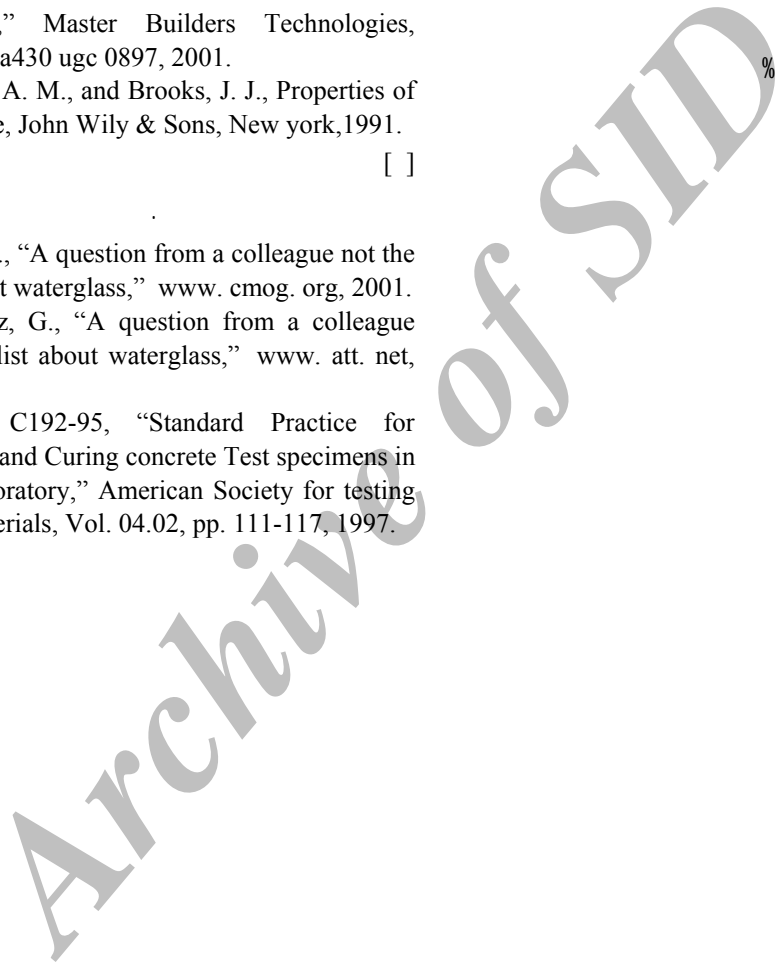
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f'_{c7}
 f'_{c28}
 f'_{c90}
 f'_{t7}
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 f'_{t90}
 E_c
 W/C
 WG/C



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