Basic approach for the diagnosis of concrete after fire exposure

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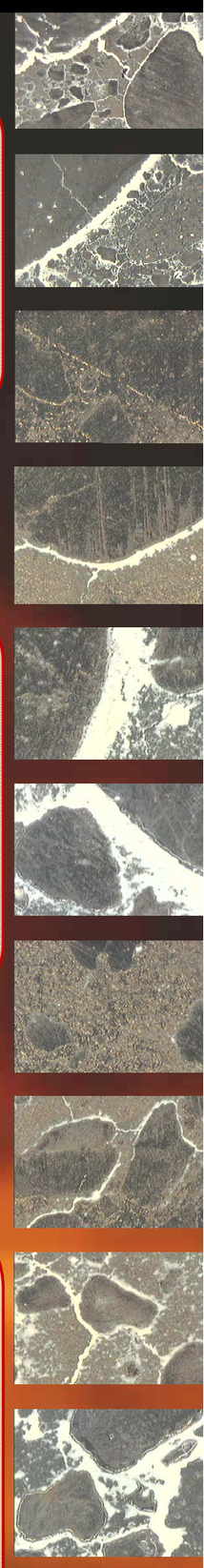


Concrete structures don't necessarily collapse during a fire.

It is of economical interest to reuse the structure after appropriate repair.

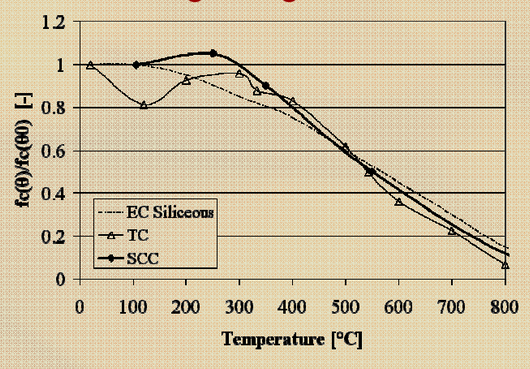
A scientific and systematic methodology to assess the damage and to estimate the residual strength is of great importance.

Concrete changes physically when heated: crack development and colour change.

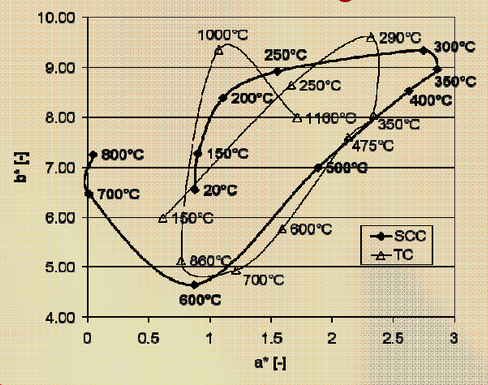
Quantification of these alterations supplies the needed information to assess the temperature and the residual strength.

TC and SCC are two types of concrete; SCC has higher flow ability which results in a larger potential for practical applications.

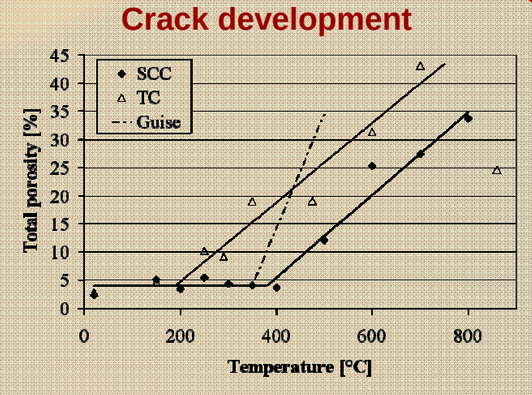
Strength degradation



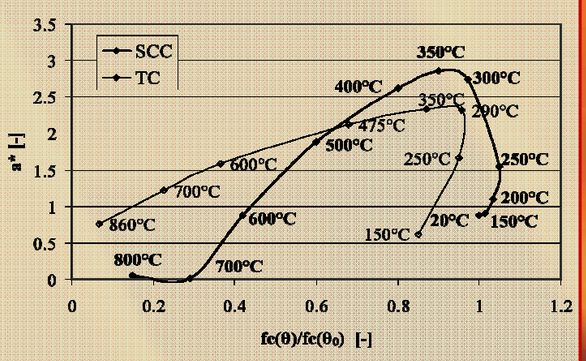
Colour change

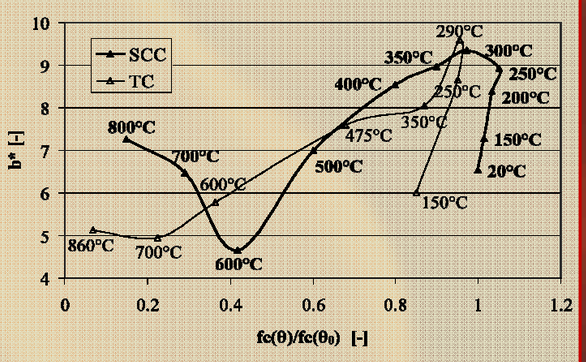


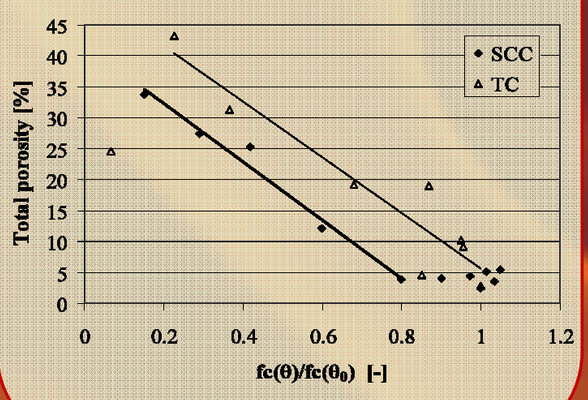
Crack development



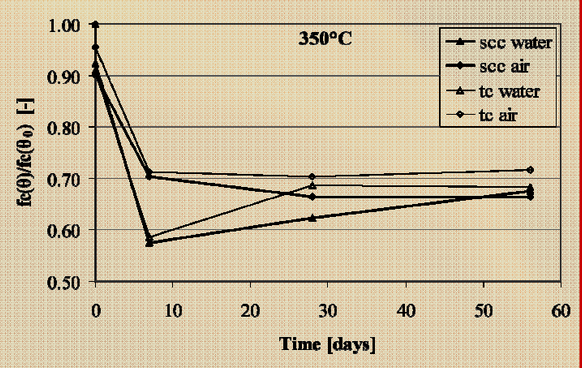
ASSESSMENT OF RESIDUAL STRENGTH

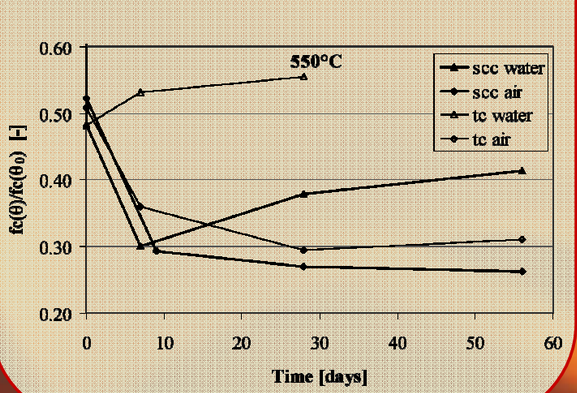




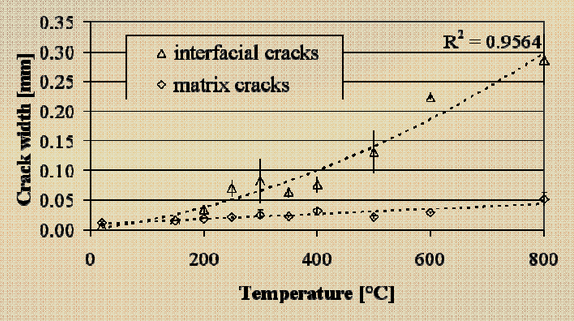


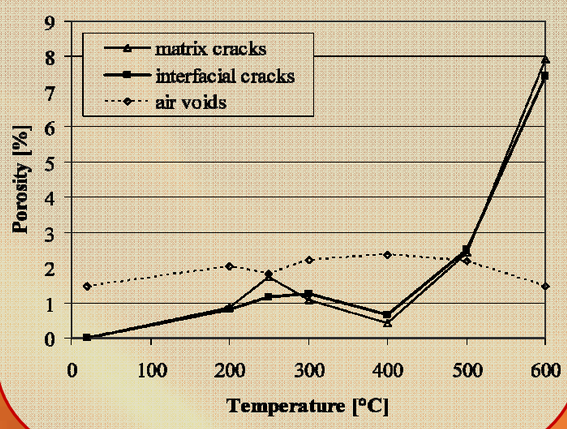
Effect of storage after fire (Recuring)





Cracks in cementmatrix and interfacial zone





CONCLUSIONS

1. **Measurements of colour and porosity are good indicators for assessing the residual strength of concrete after fire exposure. An elliptical path in the a*b*-colour space can be noticed. In this colour space: a* ~ red and b* ~ yellow.**
2. **A strength recovery is noticeable after a further degradation of 7-28 days, but is still lower than the strength directly after cooling down (0 days after fire) to ambient temperature.**
3. **There are two types of cracks: interfacial and matrix cracks. They have the same contribution to the increase of the total porosity.**

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