



## Influence of curing temperature on development of compressive strength and resistance to chloride ingress of concrete with different binder systems

Martin Kaasgaard, Claus Pade  
Danish Technological Institute



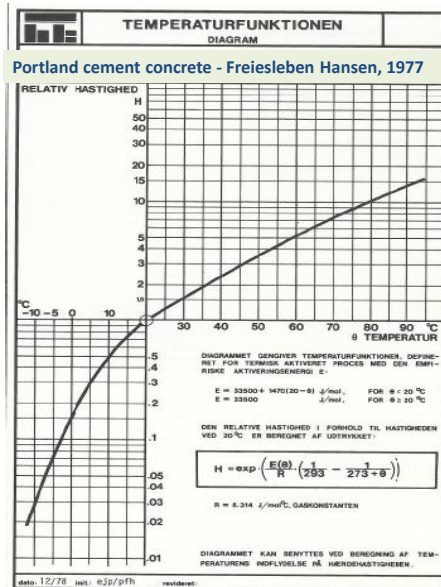
### Background


#### Scope 1

- In Denmark, the maturity concept is used for estimating the strength development of a concrete as a function of temperature – based on data measured at 20 degrees

#### Input to:

- Optimization of curing
- Striping of formwork
- Evaporation protection
- Selection of binder combination
- Early age crack control

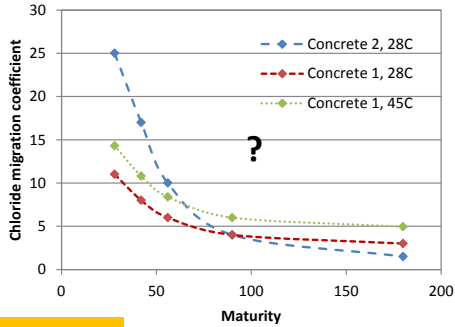




## Background


Scope 2

Is it possible to use a similar relation to describe the development of resistance to chloride ingress??



Input to:

- selection of binder combination
- optimization of curing
- choice of maturity at first exposure



## Experimental program

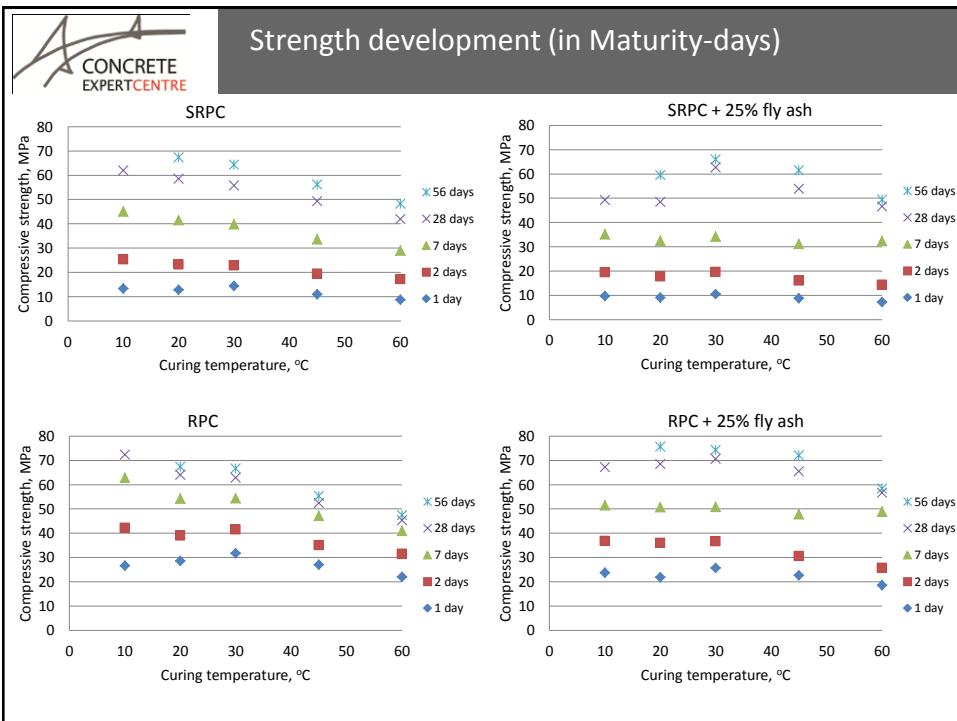
	10°C	20°C	30°C	45°C	60°C	
	MPa: 1,2,7,28, 56 days	MPa: 1,2,7,28, 56,180 Days	MPa: 1,2,7,28, 56 Days	MPa: 1,2,7,28, 56 days	MPa: 1,2,7,28, 56 Days	Slump 120-180 mm  ΔAir content < 0,5% between batches  EN 480- 11/batch  NTB388/ batch
RPC						
SRPC	NTB492: 28,56,90 ,180 days	NTB492: 28,56,90 ,180 days	NTB492: 28,56,90 ,180 days	NTB492: 28,56,90 ,180 days	NTB492: 28,56,90 ,180 days	
RPC + 25% fly ash						
SRPC + 25% fly ash	NTB443: 28, 180 days	NTB443: 28, 180 days	NTB443: 28, 180 days	NTB443: 28, 180 days	NTB443: 28, 180 days	
CEM III/B						
SRPC + 4% SF						
SRPC + 4% SF + 12% FA						

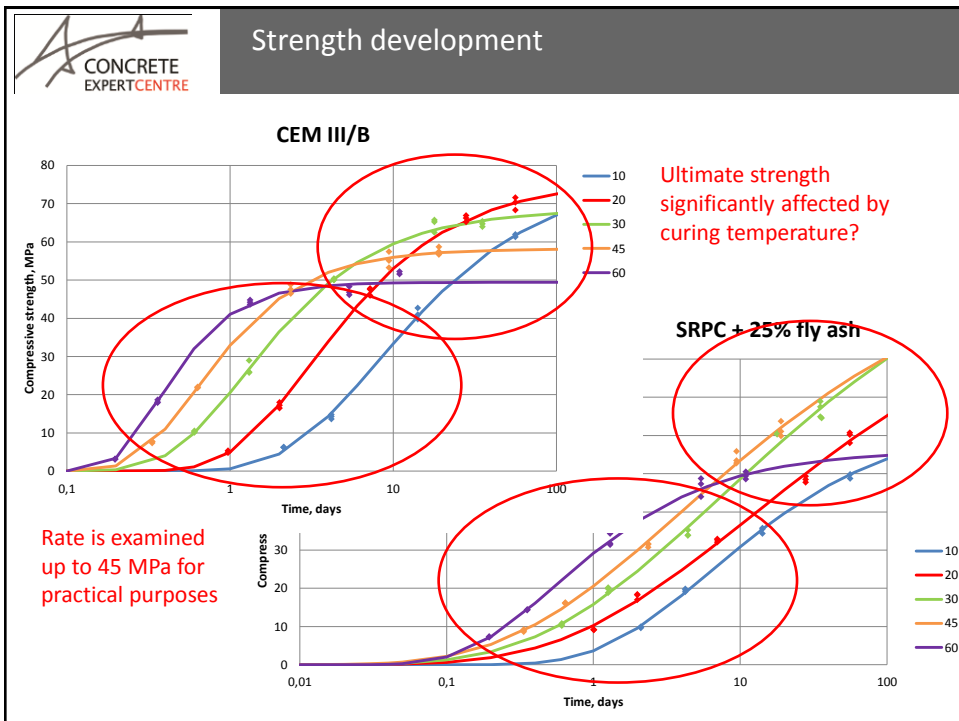
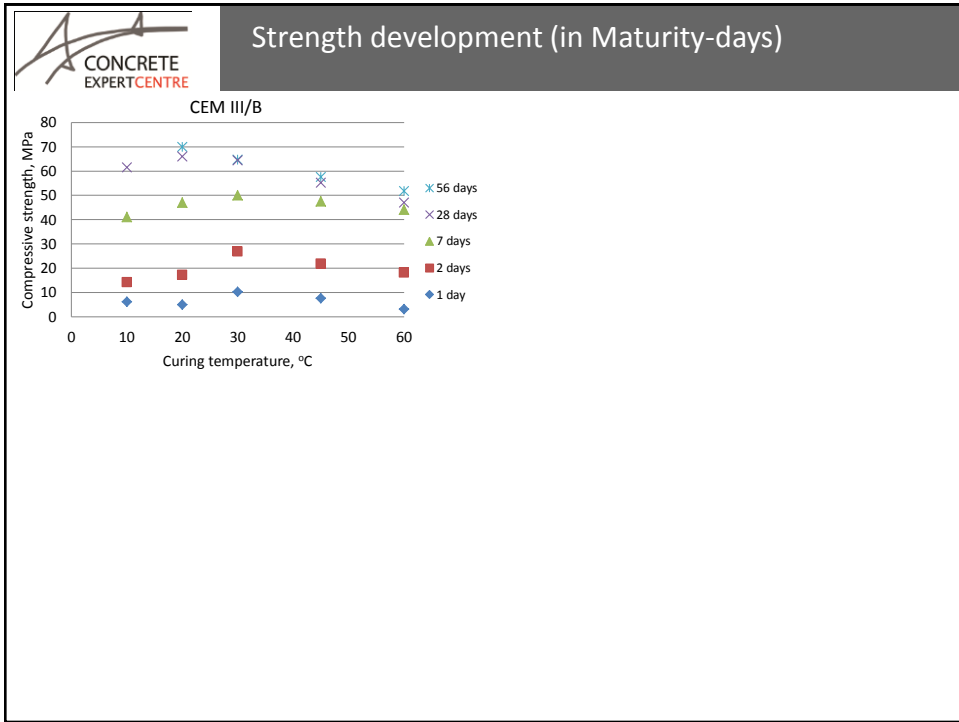
Each concrete type: eq. w/c-ratio at 0.40, d<sub>max</sub> = 22 mm

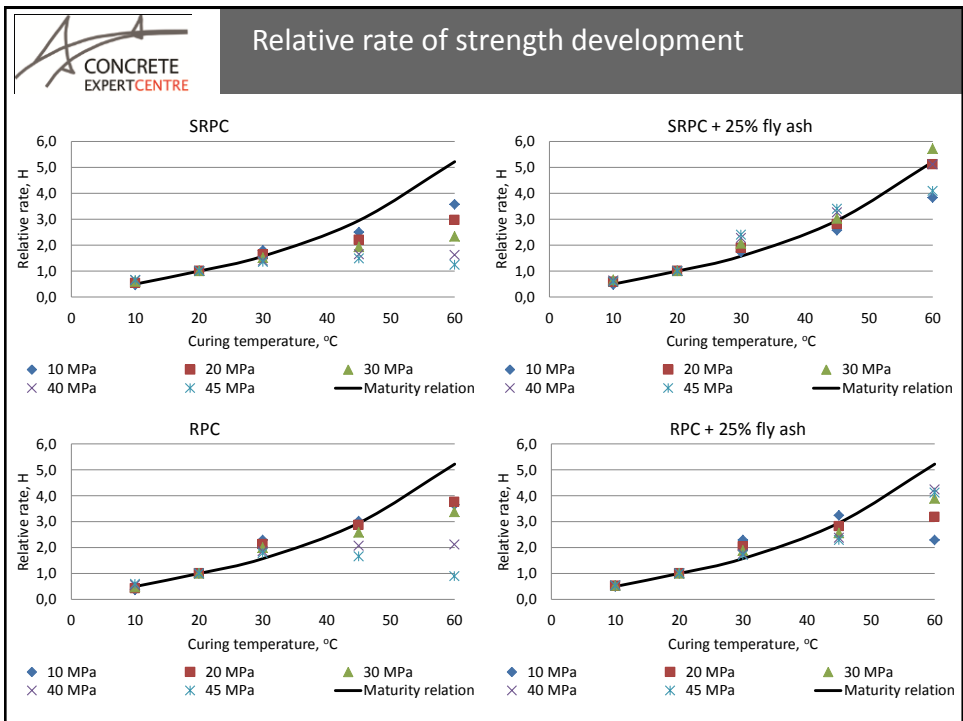
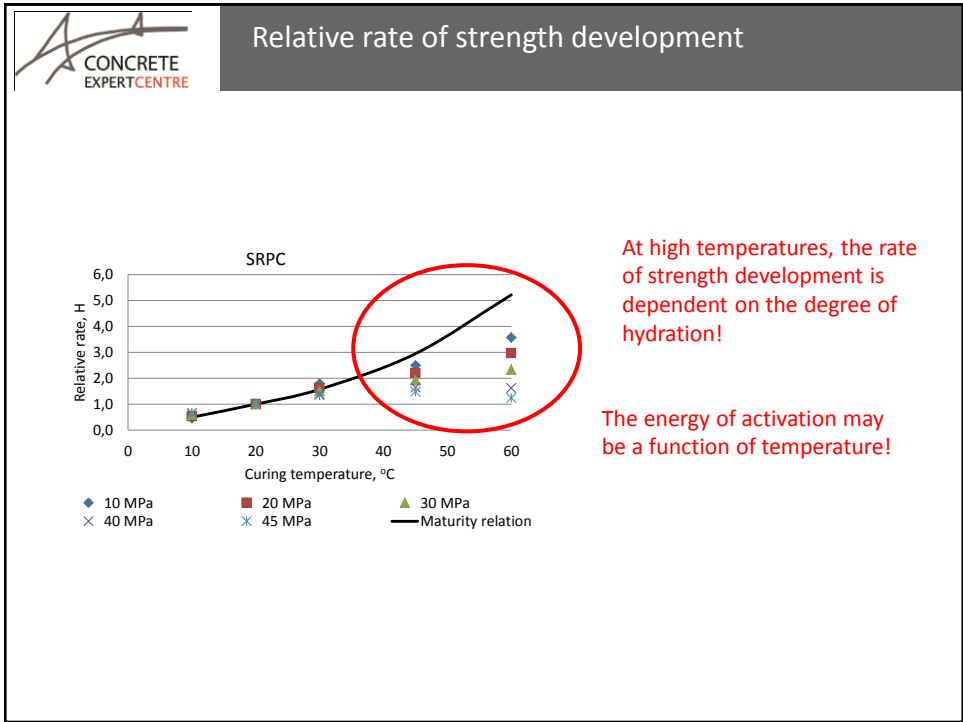
78 Ø150 cylinders
30 Ø100 cylinders

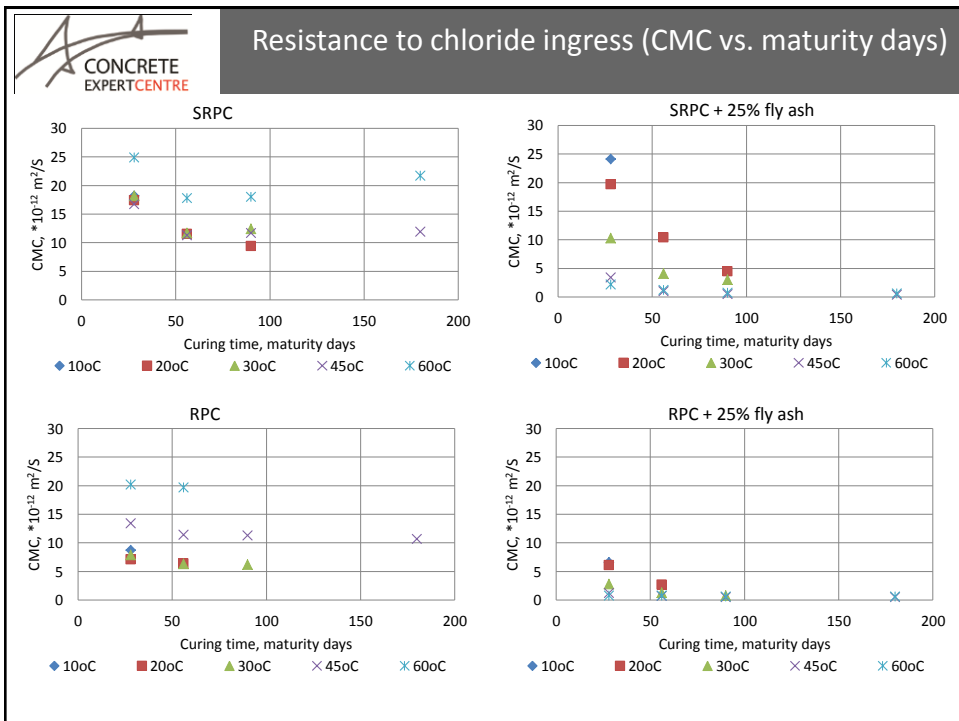
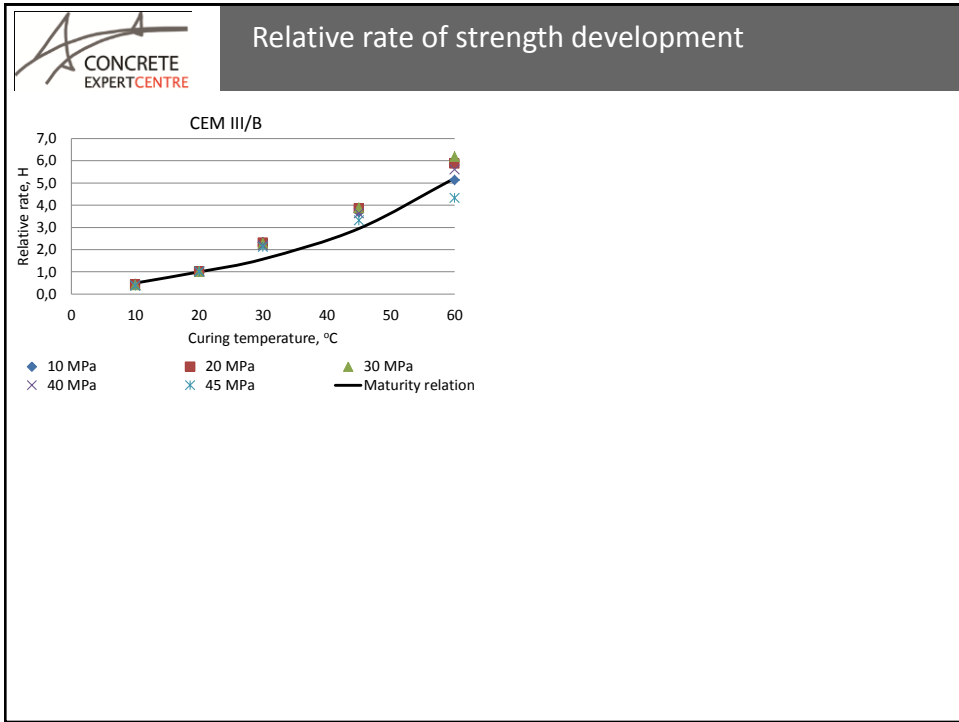
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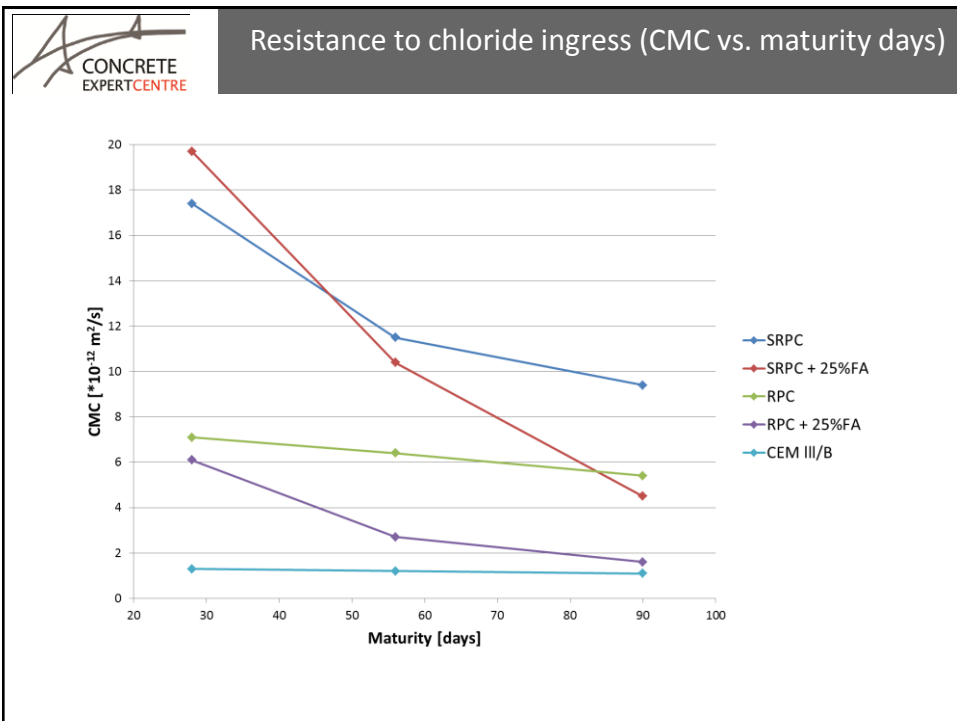
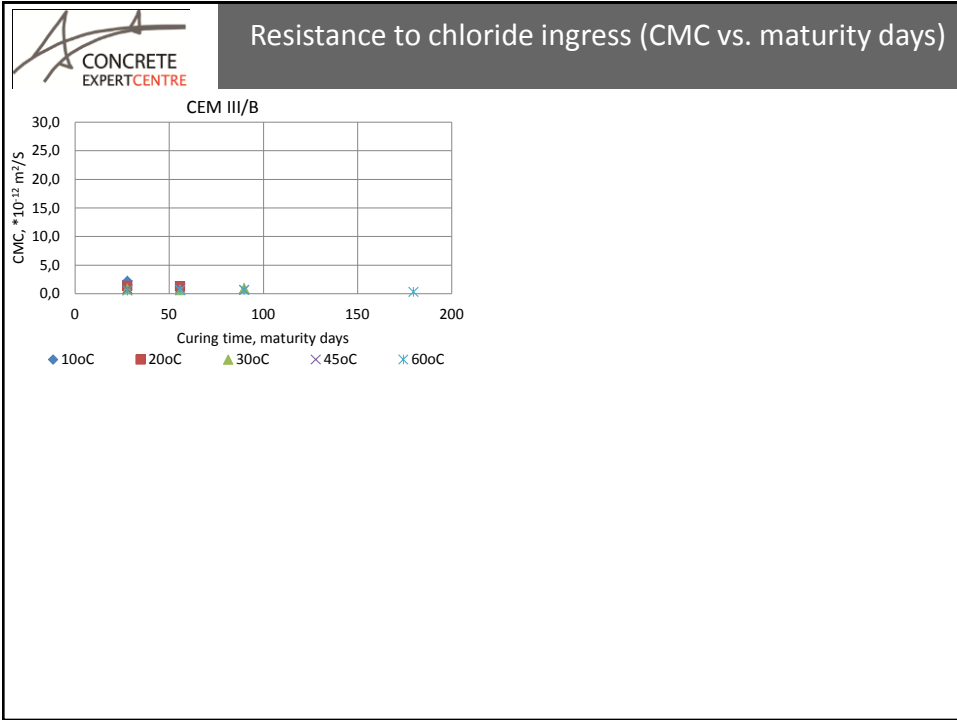
500 liter

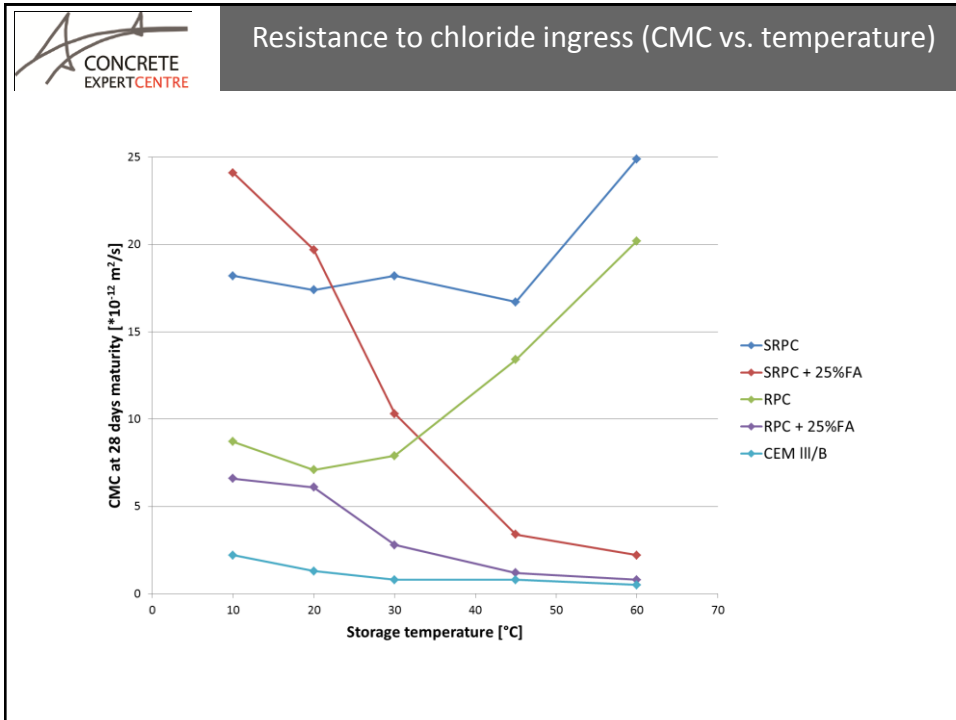













 Resistance to chloride ingress (CMC vs. CDC)

Concrete Type	Curing temp	Maturity	CMC, NTB 492	CDC, NTB 443
SRPC	20	28	17,4	10,8
SRPC	30	28	18,2	15,7
SRPC	45	28	16,7	17,3
SRPC	60	28	24,9	28,6
SRPC+25%FA	20	28	19,7	8,0
SRPC+25%FA	30	28	10,3	5,5
SRPC+25%FA	60	28	2,2	2,0



