Enviromental Aspects in Secondary Conctruction Materials Production

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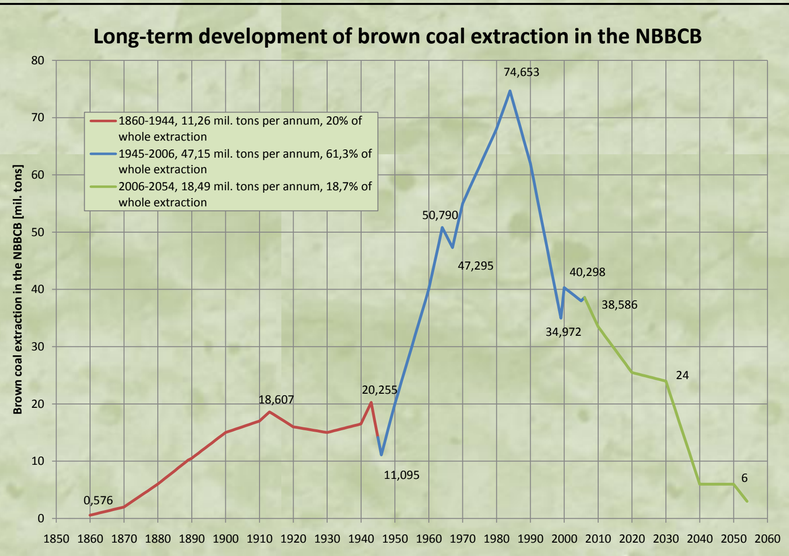
Coal Mining in Northern Bohemia

•Northern Bohemia lignite saucepan is most considerable bearing brown coal Czech Republic. In former times interlocked more than 150 years almost 80 % performance those native power raw materials and become base fast development electricity sector in Czech lands in phase after World War second. Also for ulterior almost 50, possibly as far as 120 years, is able next development mining brown coal.

•Vacation limit on two active fractures, CSA and Bilina, will heighten load oriented control reserves about 407 mil. tons, i. e. about 37 % and will ensure yet in 40. letech hereof century mining at the level 20 mil. tons, and then at consumption 0,7 kg coal on 1 kWh and production 28,5 TWh seat power control energy yearly. Mining is able to go on and after a year 2060 at grade open three reserve localities on green meadow (Zahorany, Podlesice, Bylany) and next progress stope spherical wave fracture CSA to the pillar Zaluzi (III. and IV. period development), namely as far as per annum 2120, indeed with fall below 10 mil. Tons per year in phase after a year 2080.

•It stands to reson, that if state like owner of mineral wealth of country leaves alone long term conception of coal mining , both lignite mining districts in northwest Czech are in final phase of mining. Exploitation coaly supply with blocked territorial ecological limits sometimes in distant futures is quite unreal appearance to way of final saving residual hollows of large mines, because the hydro reclamation were used.

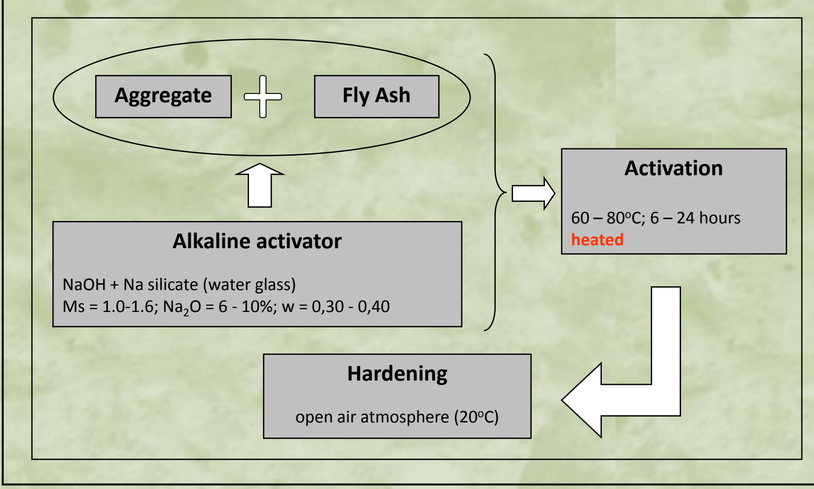


Waste from Power Plants Units and Heating Platns Units

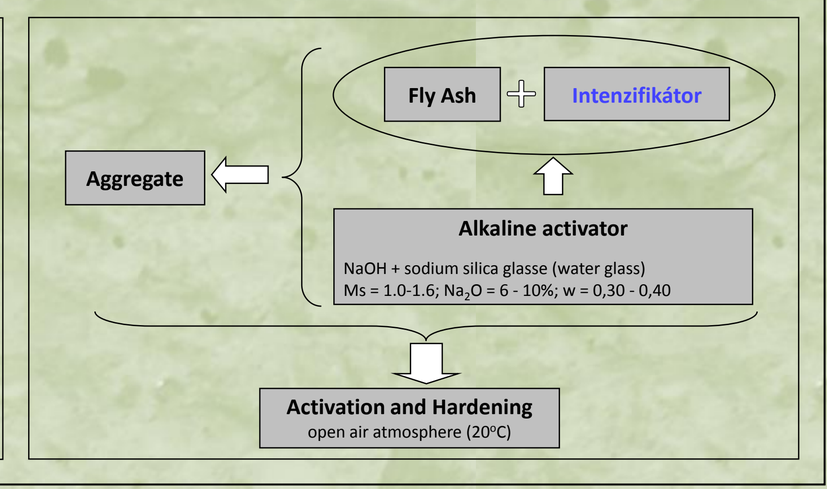
•Wastes that are caused by combustion in power plants and heating plants. Include fly - ashes and dross from high - temperature combustion and ash and fly - ashes from fluidized combustion. High - temperature fly - ashes and dross rise combustion coal at temperatures round 1200 - 1700 °C. Fluidizes combustion is technology, who principle is combustion firing together sorbent that the adds to the combustion space after content sulfur in coal. Both types of fly - ashes are used in production concretes, concrete products, lightweight concrete, in brick production, at production cement, dry plaster, build in brick, sealing and other special mixture and cements, artificial aggregate like talcum powder, packing of , soil stabilization and like filler and reclamation material. In the Czech Republic at present derive benefit from c. 10 - 15 % fly – ashes.

Scheme of preparation of mixtures

Tempered mixtures



Non-tempered mixtures



Mixture proportion

Fly Ash

Location	Type of Fly Ash	SiO_2	Na_2O	Al_2O_3
Opatovice	Brown coal	52,85%	0,36%	31,84%
Dětmarovice	Black coal	47,21%	0,53%	29,02%
EFA Fuller	Black coal	46,74%	1,12%	29,17%
Otrokovice	Brown coal	52,07%	0,31%	32,99%
Kladno	from fluidises combustion	42,25%	0,57%	32,79%

Na Silicate „water glass“

SiO_2	Na_2O	H_2O
25,73%	8,64%	65,50%

Na(OH)

Na(OH)	H_2O
100,00%	0,00%

Sand and gravel fractions

Type	Fraction	Location
Fines	0-4 mm	Dobříň
Gravel	4-8 mm	Zbraslav
Gravel	8-16 mm	Zbraslav

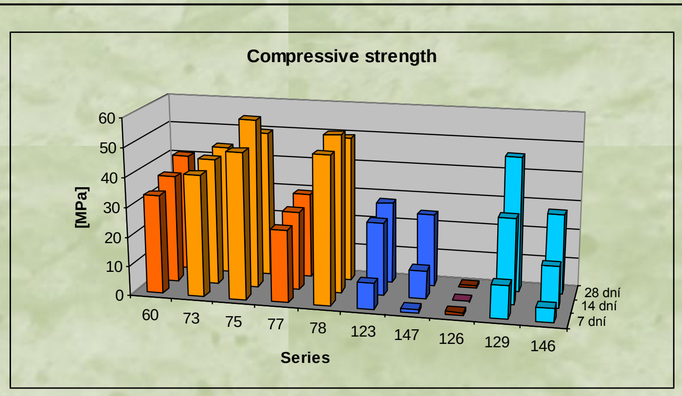
Types of mixtures

Tempered series

60	Opatovice
73	EFA fuller
75	Dětmarovice
77	Otrokovice
78	EFA fuller

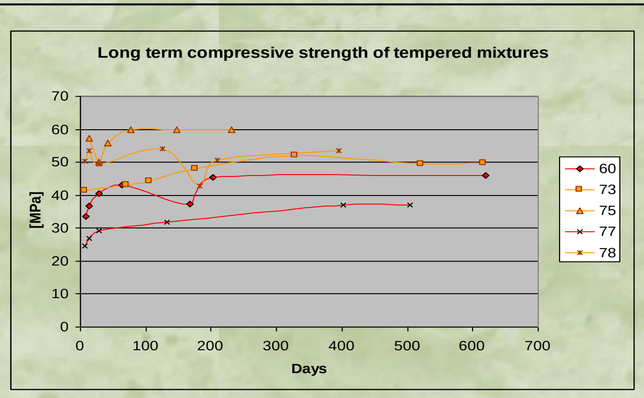
Non-tempered series

123	Opatovice
147	Opatovice
126	Kladno
129	EFA fuller
146	Dětmarovice



Tempered mixtures
- Brown Coal Fly Ash
- Black Coal Fly Ash

Non-tempered mixtures
- Brown Coal Fly Ash
- Black Coal Fly Ash



Tempered mixtures
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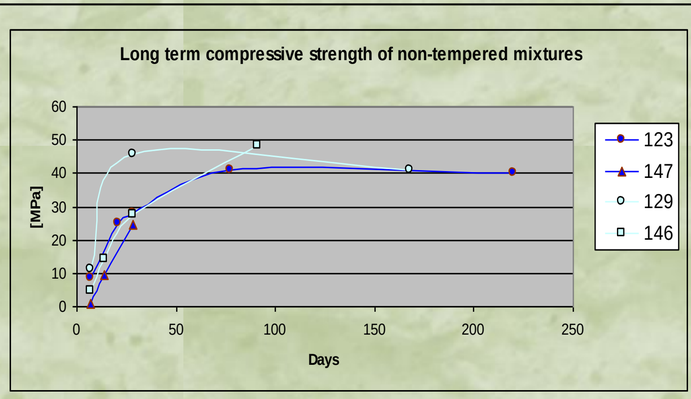

Non-tempered mixtures
- Brown Coal Fly Ash
- Black Coal Fly Ash

•The activation from black as well as from brown coal was investigated gradually. However, the necessity of tempering of new concrete mixture still remained an obstacle for broader application of activated ash as an agglutinant. POPbeton® prepared in this way could have been used just for building prefabricated smaller elements such as interlocking pavement.

•Thus it seemd necessary to develop the new technology of preparation of POPbeton® which would avoid temperation. Hence so called regulator of solidification was searched. A goal of implementation of this substance is to start the whole process of geopolymer reaction without the necessity to supply energy in the form of heat.

•Examinational cubes of size 100 x 100 x 100 were created. Press strength after 7, 14 and 28 days was examined on them. Long term press strength was examined as well. An amount of water in mixture highly influences the length of hardening of POPbeton® as well as the reached level of whole long term press strength.

• The differences between black-coal and brown-coal POPbeton® are shown by press strength results. While press strength of black-coal fly ash are about 50 MPa press strength of brown-coal one are about 40 MPa.

• Copmpressive strengths of POPbeton® were examined 7, 14 and 28 days. Press strengths were measured over time as well. All of the mixtures showed more gentle grow than the mixtures prepared with tempering. The resulted press strength after 28 days are about 10 MPa lower comparing with the tempering alteration.

• Levels of long time press strength were observed on these series. Press strength increases by around 10 MPa over time. This increase proceeds till the 40th day.

• Investigating of long term press strengths provided us with interesting outcomes. The grow of press strengths is more gentle. To maintain the exact dosage of added water is very hard. Press strengths grow until 100th day. The reached press strengths are about 5 MPa lower that these of alteration prepared by tempering.

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