Moscow State University
for Civil Engineering

Nikolai G. Golowin

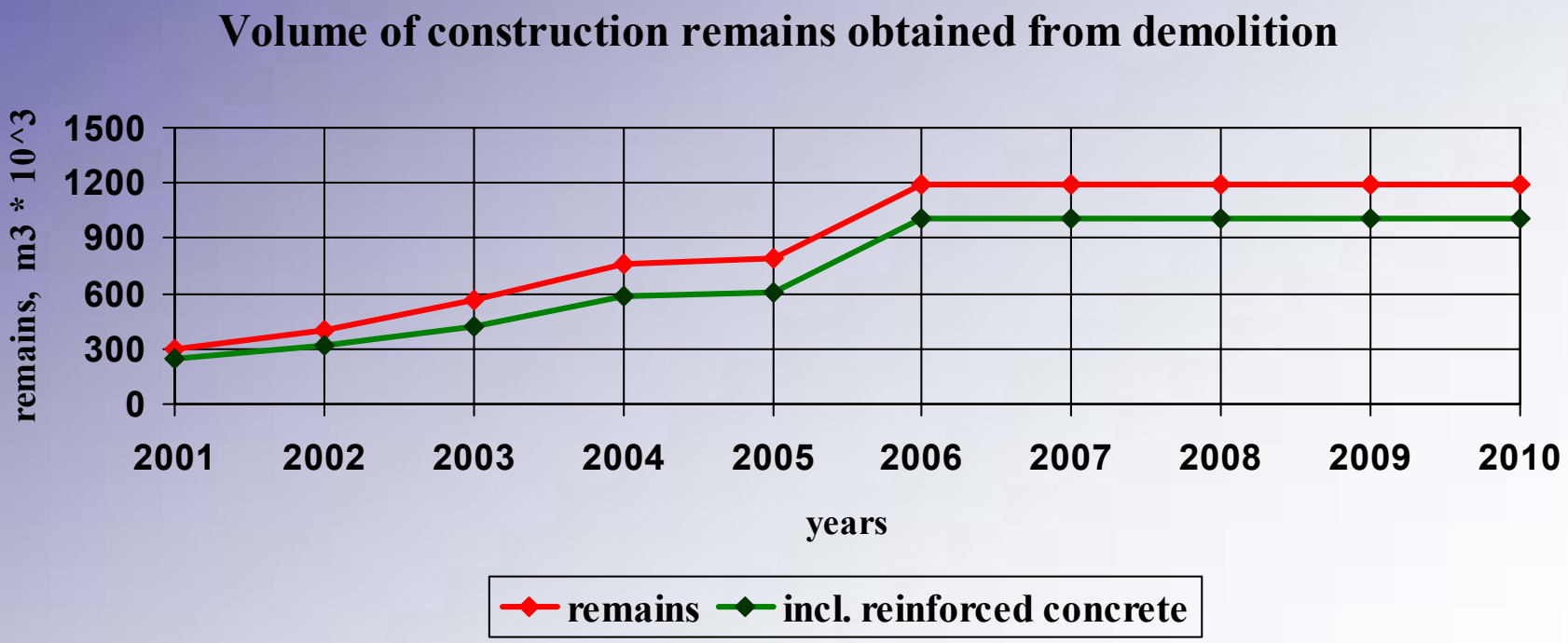
"Use of reinforced concrete remains obtained by recycling of destroyed buildings and structures"

Use of reinforced concrete remains obtained by recycling of destroyed buildings and structures

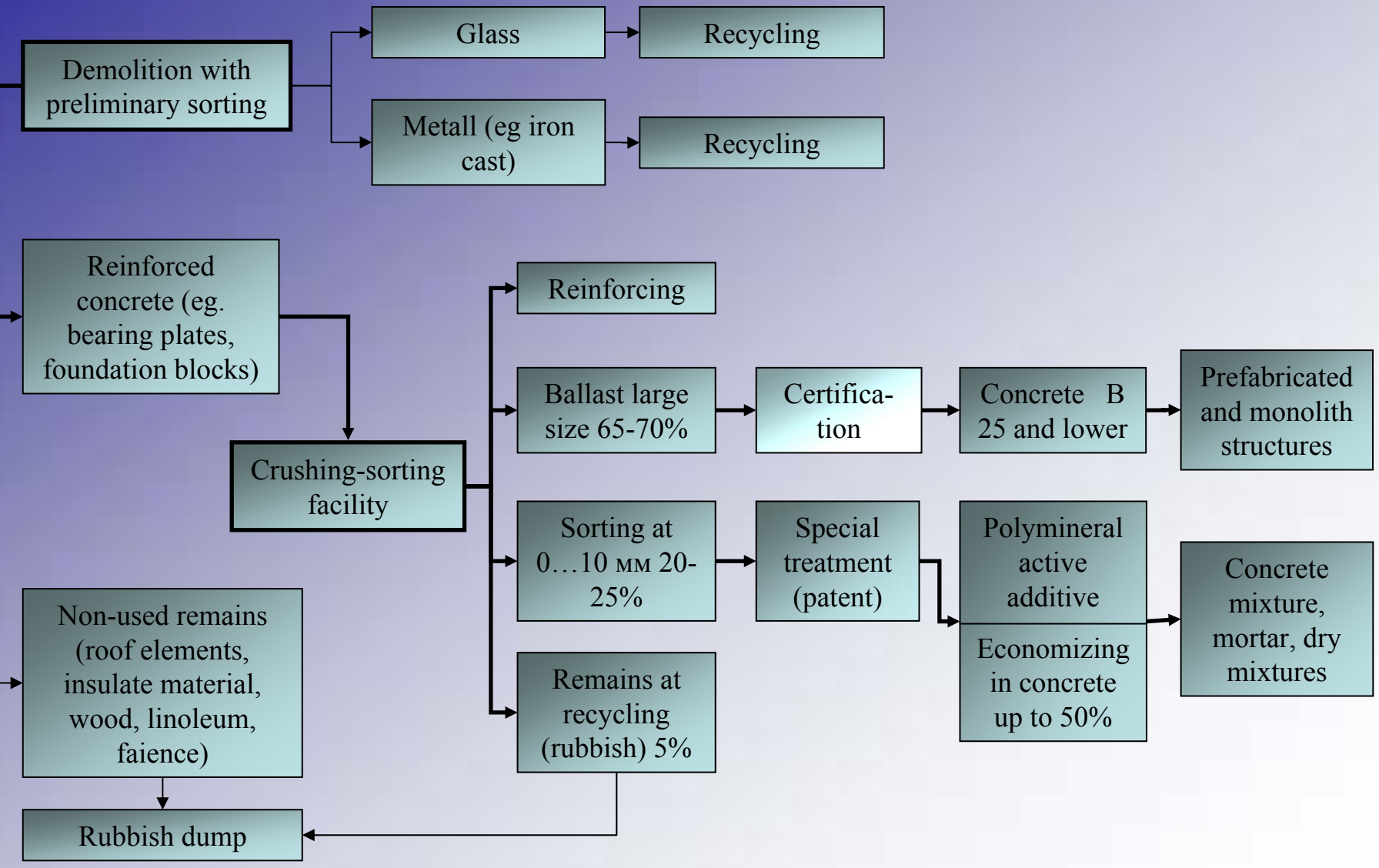
- Problems of demolition and recycling, solutions
- Material properties of the ballast obtained from crushed concrete, standardisation of requirements, certification
- Material properties of the ballast obtained from crushed concrete, comparison with concrete based on natural ballast

Programm of demolition of old buildings in Moscow 2001 - 2010

5. Floor houses	- 5,4 million. м2
Old buildings	- 0,9 million. м2



Procedure of recycling of destroyed buildings and structures

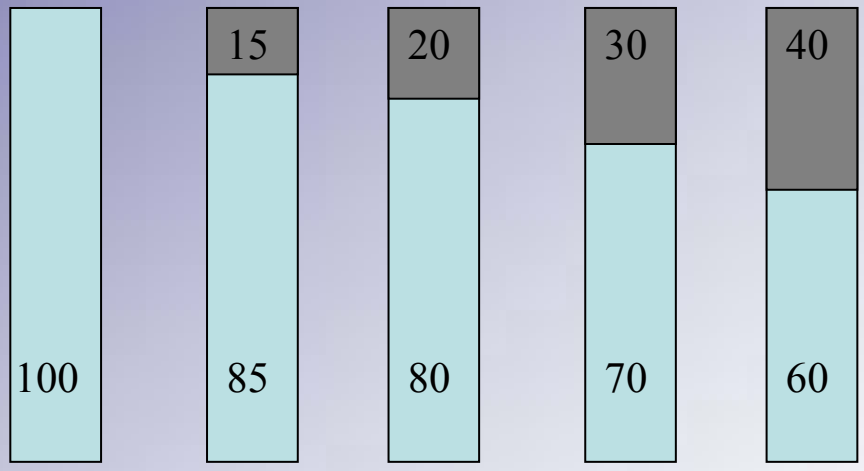


Quality parameters for ballast from crushed concrete fractions 5 – 20; 10 – 40

Properties	Test results	Technical requirements
Average density, g/см³	2,16 – 2,39	2,0 – 3,0
Content of grains with plate and needle shape, %	15 – 25	≤ 50
Content of weak grains, %	12 – 15	≤ 15
Strength of ballast grains (crushing mark)	300 – 400	≥ 300
Frost resistance	75 – 100	≥ F 15

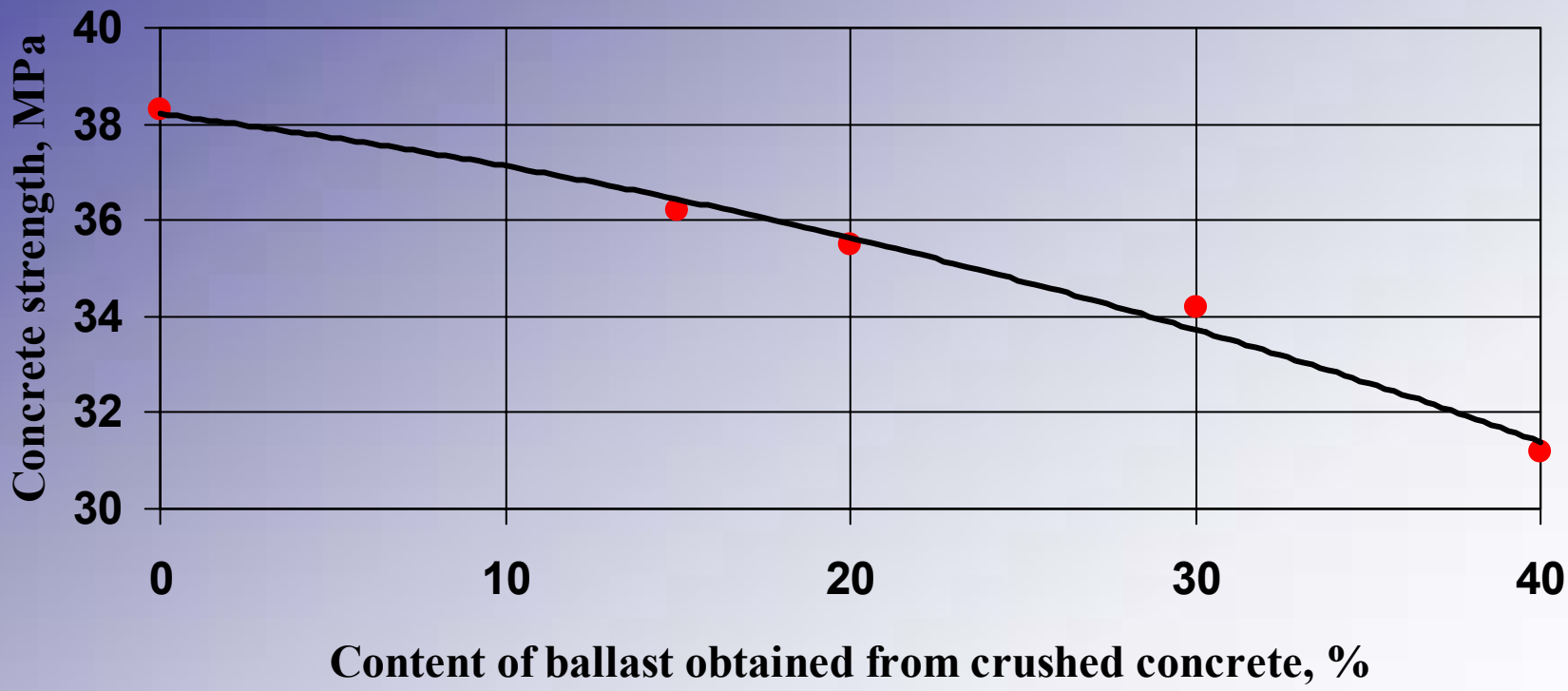
Content and properties of concrete based on limestone ballast and mixture of natural limestone ballast and ballast obtained from crushed concrete

cement, кg/м³	400
sand, кg/м³	740
water, кg/м³	210
ballast, кg/м³	995



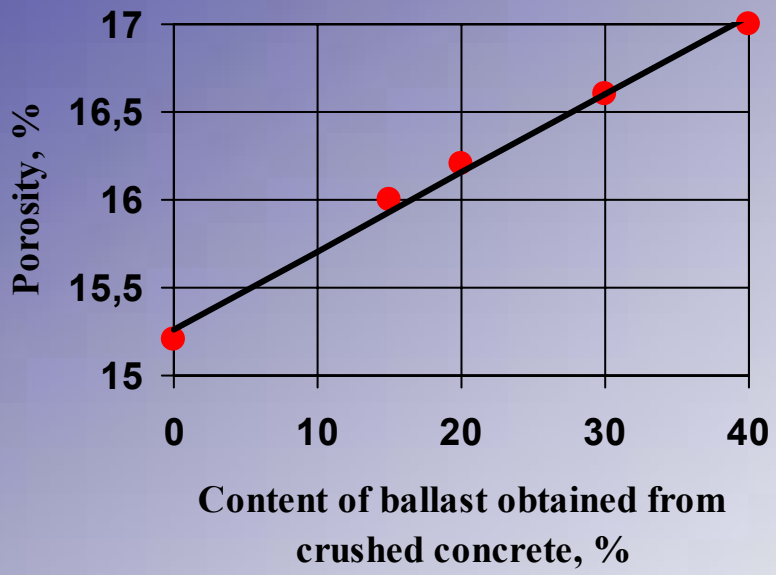
Concrete strength, MPa	38,3	36,2	35,5	34,2	31,2
Strength reduction	1,0	0,95	0,93	0,89	0,82
Concrete porosity, %	15,2	16,0	16,2	16,6	17,0
Porosity increase	1,0	1,05	1,07	1,09	1,12

Relationship between concrete strength and content of ballast obtained from crushed concrete in large size component filling



Relationship between structure of crushed concrete and concrete strength

Relationship between porosity and content of ballast obtaibed from crushed concrete in large size component filling



Relationship between concrete strength and porosity