CORROSION OF PRESTRESSING CABLES AND ITS EFFECT ON THE LOAD CAPACITY OF BRIDGES

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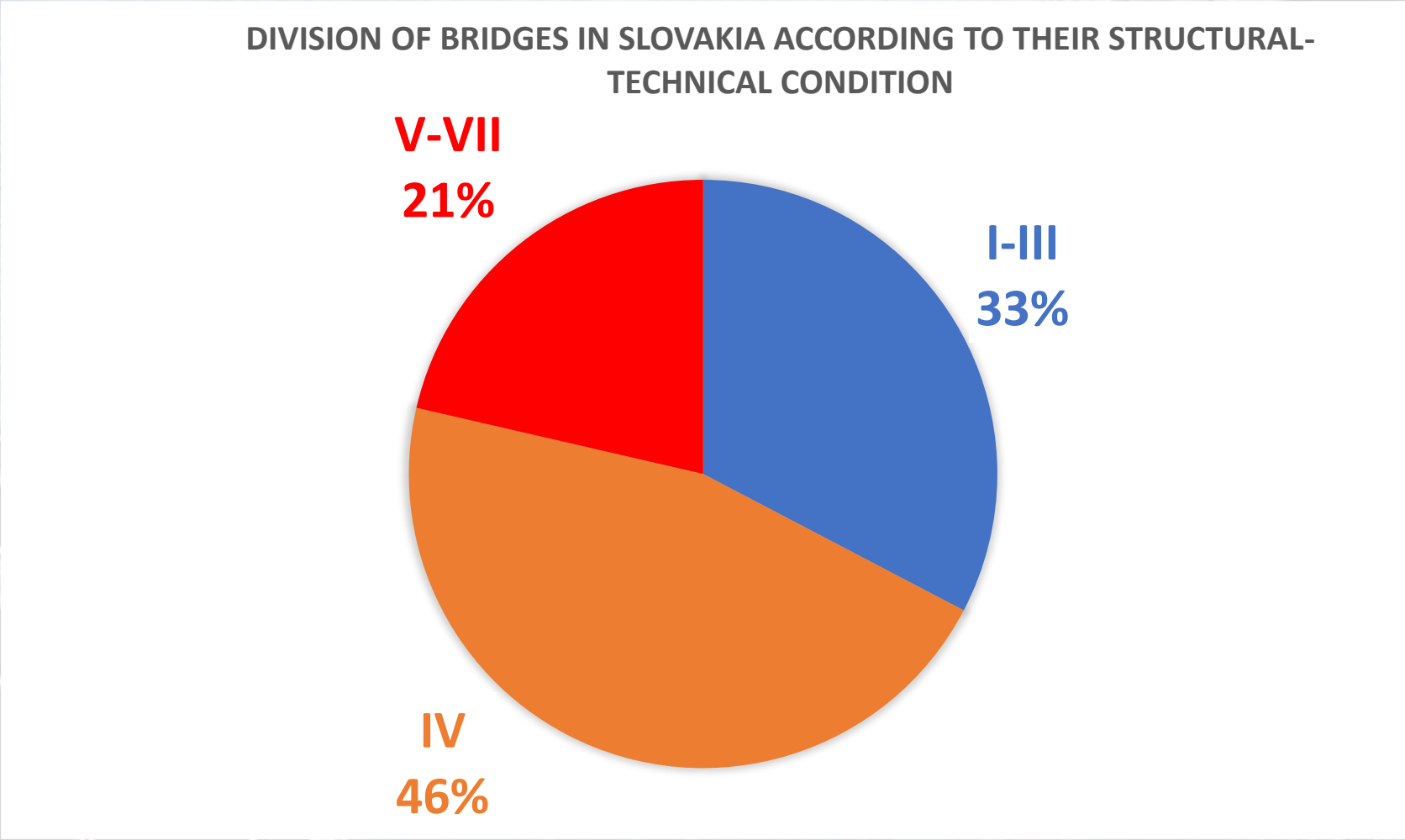
Condition of bridges in Slovakia

Division of bridges in Slovakia

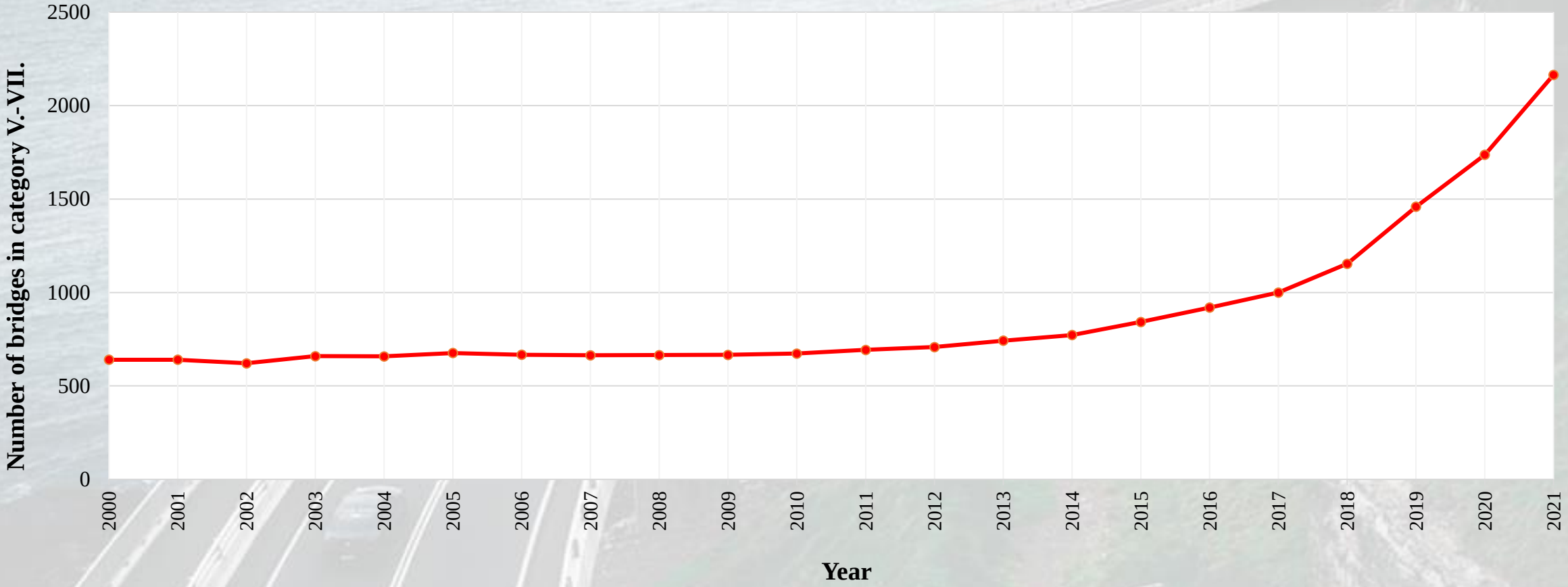
7 categories according to the building-technical condition

Grade	Condition	Description of failures of an element, part or object
I.	flawless	without any hidden or obvious defects
II.	very good	the occurrence of appearance defects only, which do not affect the load capacity of the bridge
III.	good	occurrence of major faults that do not affect the load capacity of the bridge
IV.	satisfactory	the occurrence of defects which do not have an immediate effect on the load capacity of the bridge, but which may affect it in the future
V.	bad	the occurrence of defects that adversely affect the load capacity of the bridge, but can still be rectified without replacing the defective components
VI.	very bad	the occurrence of faults that affect loadability and cannot be rectified without replacing faulty or missing components
VII.	disrepair	the occurrence of defects which affect the load carrying capacity of the bridge to such an extent as to require immediate remedial action to avert an impending catastrophe

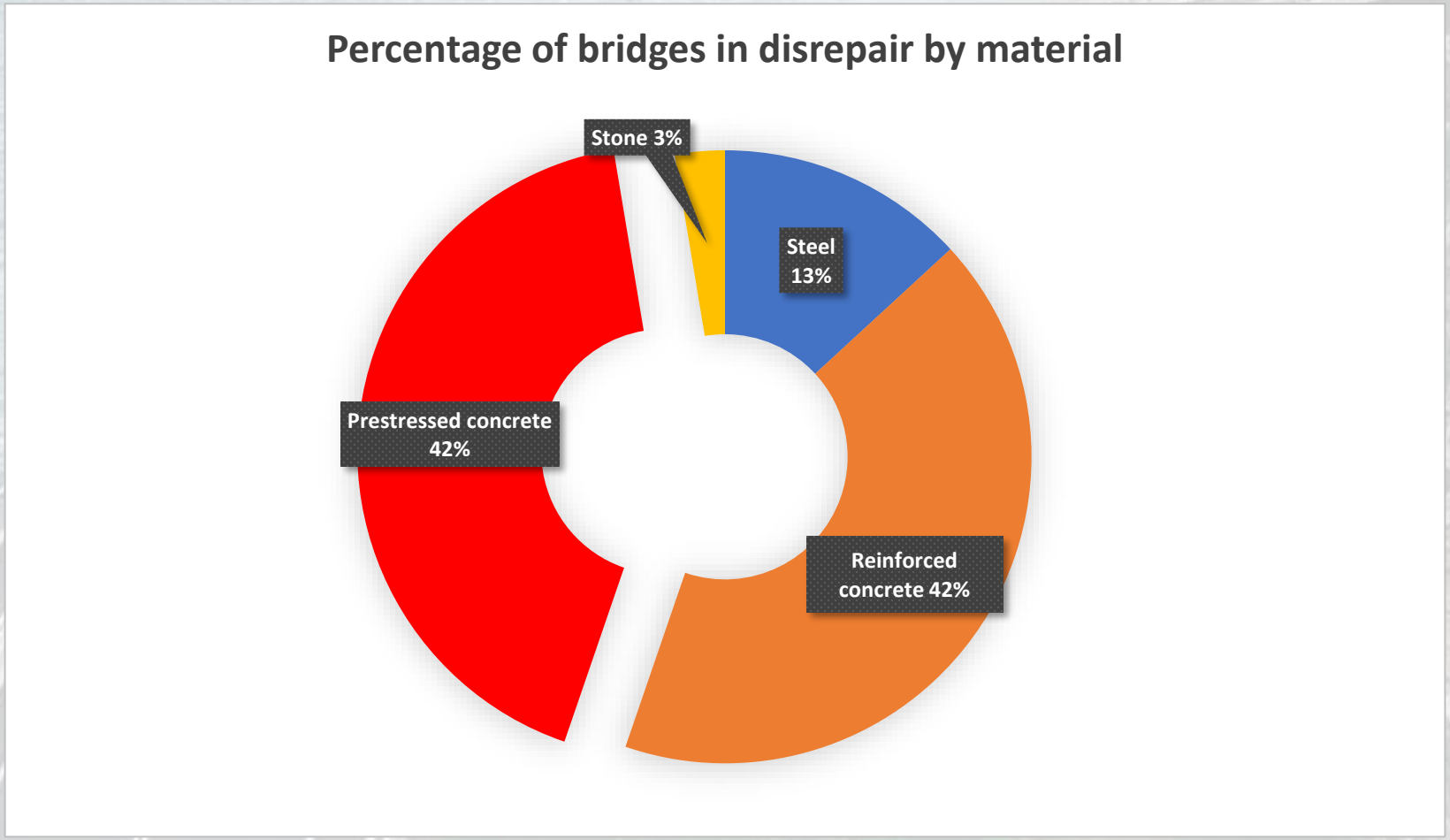
Condition of bridges in Slovakia

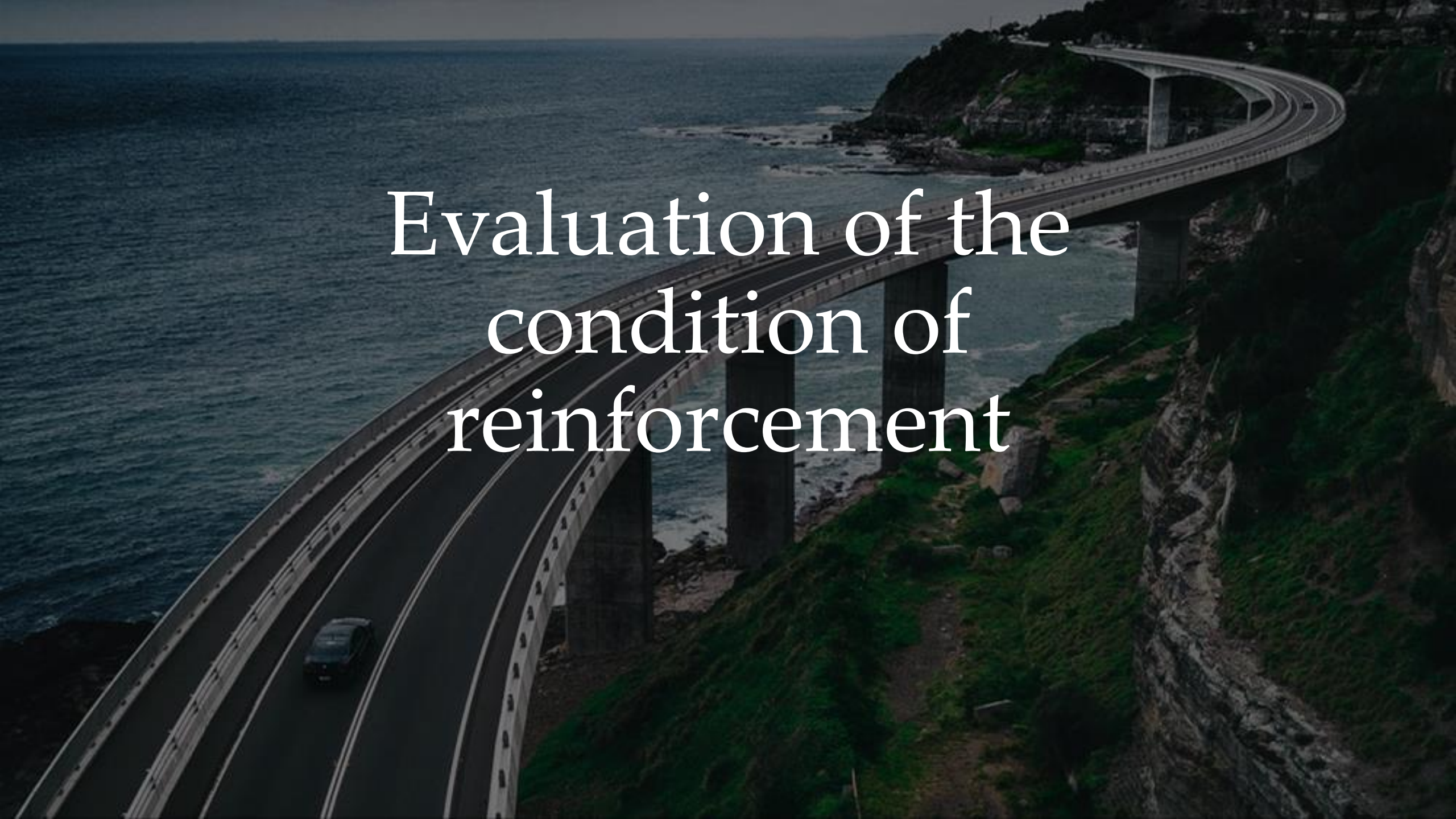


Condition of bridges in Slovakia



Typology of bridges in Slovakia





Evaluation of the condition of reinforcement

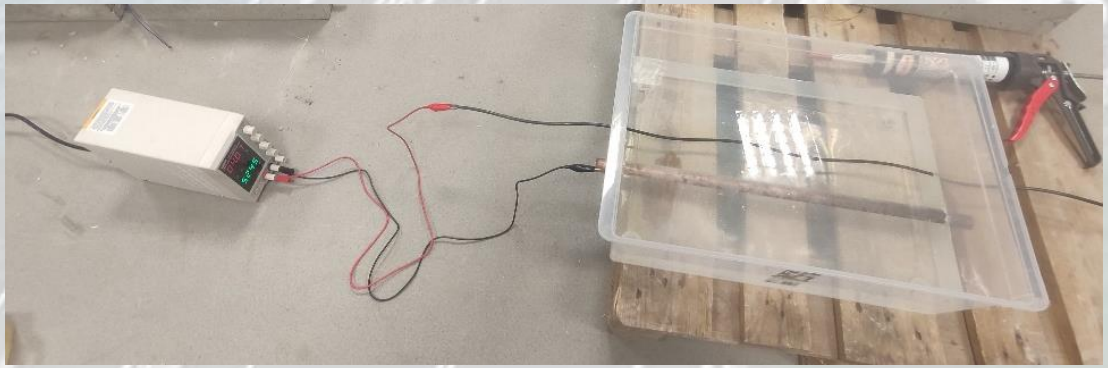
Main factors of reinforcement corrosion

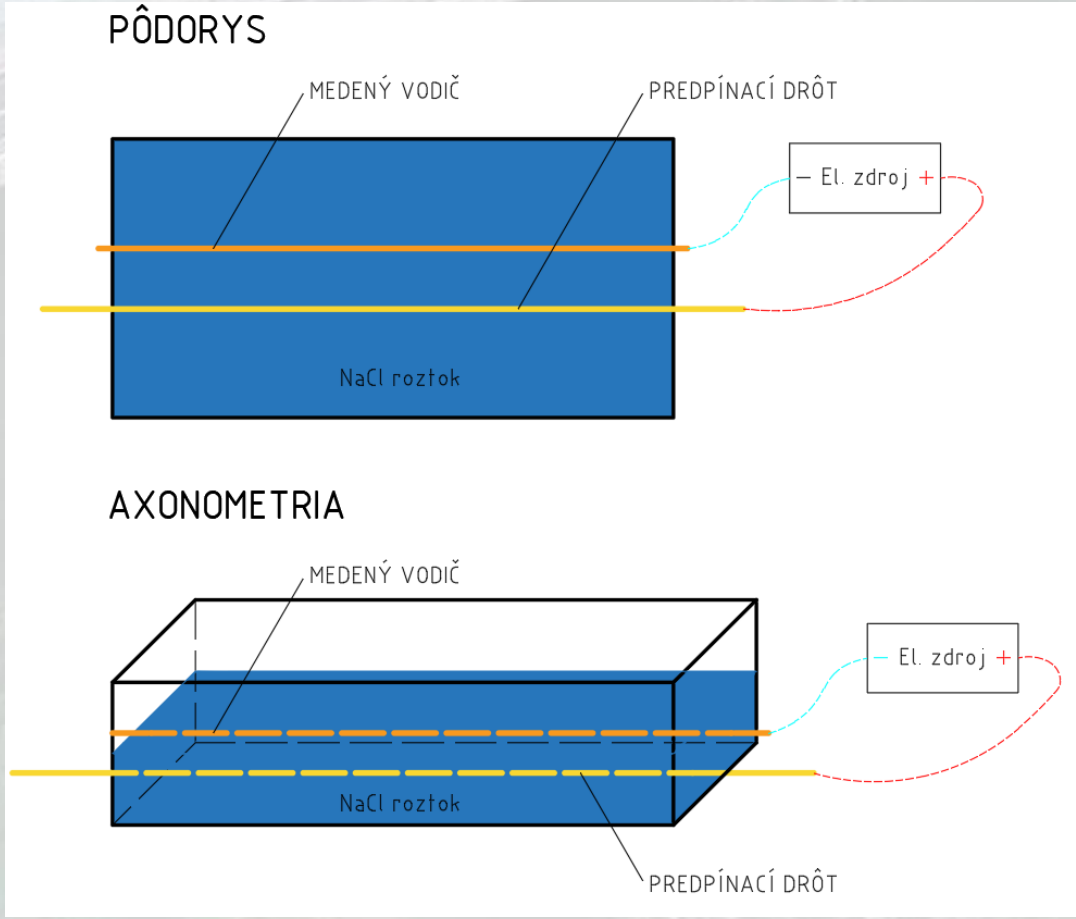
- Carbonation
- Chlorides
- Combination carbonation + chlorides

Experiments carried out

Accelerated corrosion experiment

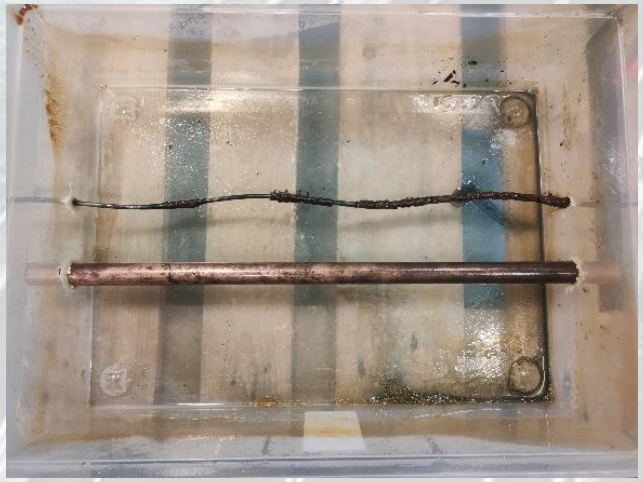
- Accelerated corrosion involves the use of sodium chloride (NaCl) and electric current, which together simulate the corrosive process of materials (metals). It is a method of artificially accelerating the natural corrosion process. This process is called electrochemical corrosion





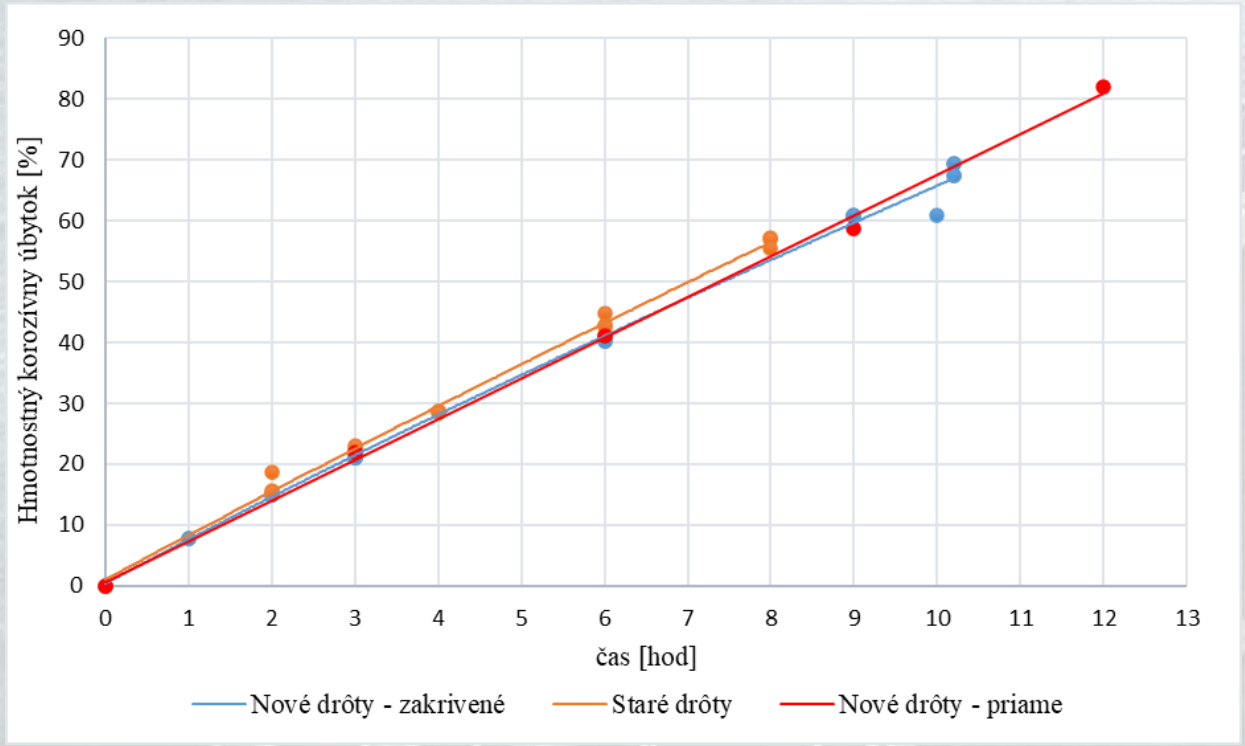
The actual experiment



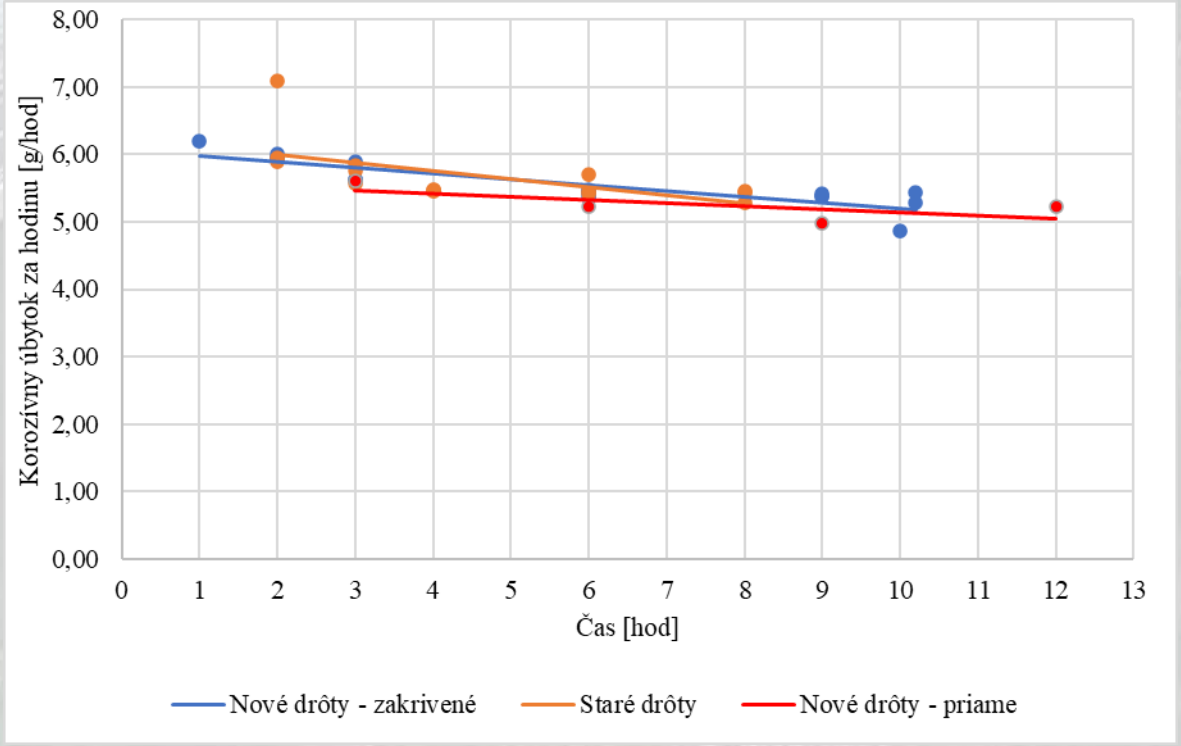



The course of the corrosion experiment a)before starting, b)during, c)after finishing, d, e, f)corrosive residues on the corroded reinforcement

Results of the primary experiment

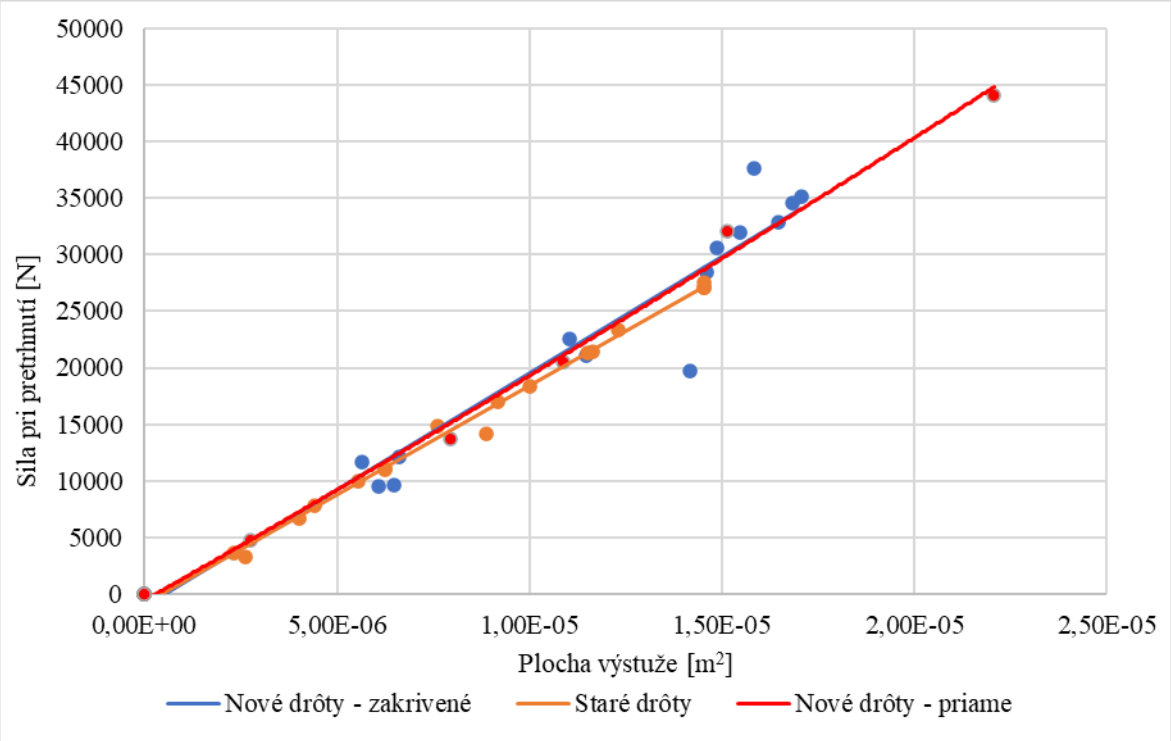


Corrosion mass loss versus corrosion time

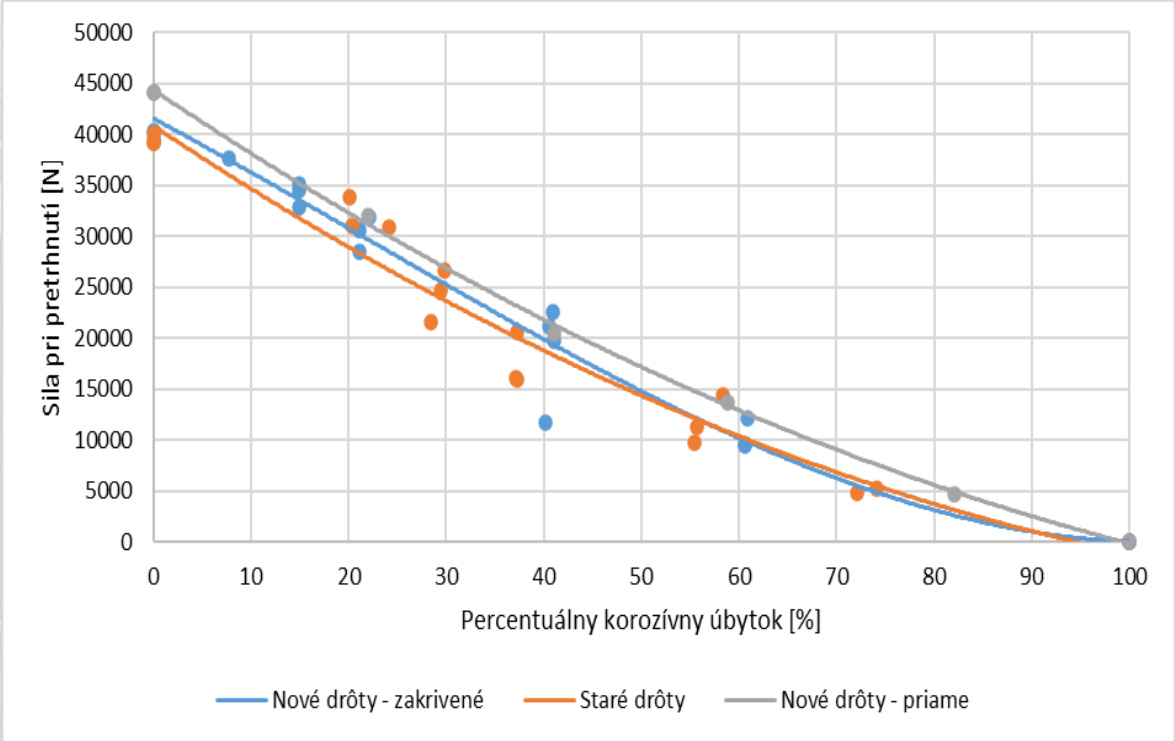


Corrosion rate per hour to the length of the corrosive process

Results of the primary experiment

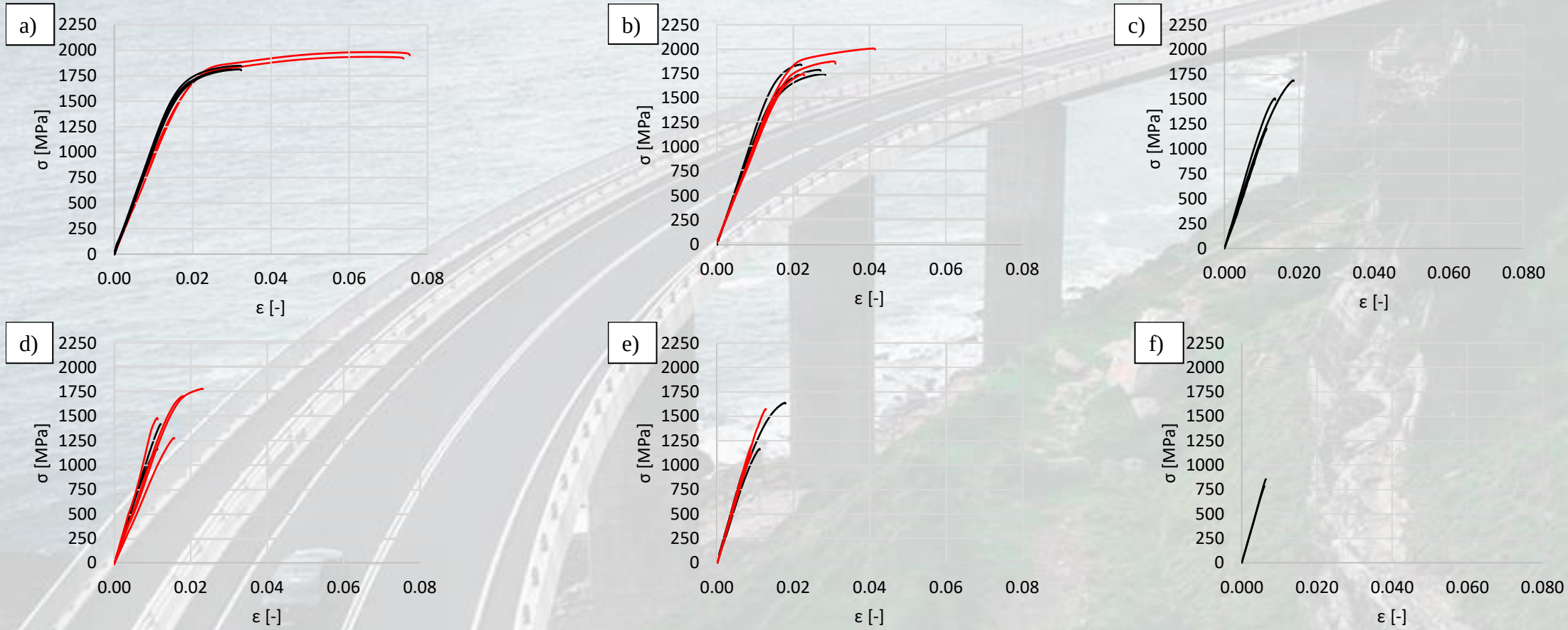


Breaking force to reinforcement area



Breaking strength due to corrosive mass loss

Tensile test



Prestressing reinforcement diagram - mass corrosion loss

a)0%, b)20%, c)30, d)40%, e)60%, f)80%


Thank you for your attention.

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