Corrosion damages in drinking water systems – examples out of the practice

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Introduction

On its way from source to tap raw water, treated water and drinking water comes into contact with different metallic and non-metallic materials. Besides of the water quality the material itself might undergo alterations. In very unfavourable cases this can even lead to corrosion damages of the product. There are a variety of reasons for corrosions damages and in most cases several aspects have to be regarded. Among others one has to discuss the manufacturing process of the product especially when site applied, the operation time and the operation conditions, the surrounding and the water quality. With this report a short summary about recently observed corrosion damages in the drinking water sector shall be given.

Examples out of the practice

Water storage

In water reservoirs cementitious products, tiles and e.g. coatings and paintings are used. Possible corrosions damages in respect of the water quality but also the material are given in the following pictures.

Figure 1: Flaking of a coating

Figure 2: Fungus on a mortar surface

Figure 3: Weld seam of PE plates

Drinking water network

In the drinking water network old cast iron pipes are still in use. Corrosion damages of distribution network pipes can lead to succeeding damages especially in areas with a high building density. In such cases one reason for corrosion damages is the graphite corrosion (spongiosis) which can be characterised with figure 1 and 2.

Figure 4: Corrosion damage of an old cast iron pipe

Figure 5: Graphite corrosion (spongiosis)

Moreover, in many regions asbestos cement pipes are still in use. Whereas, the oral intake of asbestos fibres can not be regarded as health risk one has to be careful at repair works especially at cutting actions. Corrosion damages can be caused by the water quality or by mechanical loads. In such cases the fracture appearance is as given in figure 6.

Figure 6: Corrosion damages of a cement asbestos pipe

Household Installations

In household installations galvanised steel and copper are used since decades. In the last years stainless steel and plastic pipes are more and more in the market. Furthermore, gun metals and brasses are used for joints and e.g. valves. In figure 7 an example for stress corrosion cracking of a brass material is given.

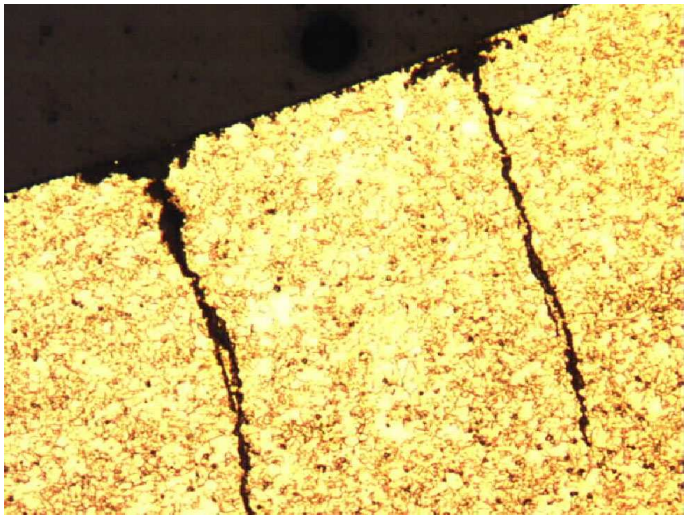

Figure 7: Stress corrosion cracking