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Rusted S275 steel profiles were used in the experimentation. According to standard ISO 8501-1 the steel rust grade - B. The steel was cut into nine samples with dimensions 150×150 mm and brought into three groups with three samples in each group. In each group the surface for anticorrosive coating of specimen was prepared in three different methods. The steel surface was sandblasted using quartz sand with fraction 0-0.8 mm. Using this method, the preparation level of surface Sa 3 according to standard 8503-1 was achieved. The specimen in second group were prepared by mechanical method using the wiry brush. The level of surface St 2 was achieved according to standard ISO 8503-1. In third group the specimen were not prepared in any method. According to the standard ISO 12944-5:2007 three different anticorrosive coating systems were selected: one component alkyd paint system, two component epoxy and polyurethane paint system and two component zinc, epoxy and polyurethane paint system. The paint systems were selected considering the category of corrosion C3 and C4. The coating of paint systems was performed using the airless painting equipment. The thickness of each layer, wet and dry, were controlled. The thickness results of dry coating were measured with digital device "Positector". To accelerate the process of corrosion, the aggressive artificial atmosphere was created according to the standard ISO 9227:2017 Corrosion tests in artificial atmospheres – Salt spray tests. Neutral salt spray test is the method in which 5 % neutral sodium chloride melting is automated in controlled environment. The sufficient amount of sodium chloride is dissolved in distilled water with specific conduction not exceeding the 20 μS/cm at 25 ± 2°C to get the concentration of 50 ± 5 g/l. The steel samples were kept in artificial atmosphere for 500 hours. Anticorrosive coating characteristics for differently prepared surfaces were analysed by testing the adhesion according the standard ISO 4624:2016 using digital adhesion gauge "Elcometer 506".

Keywords: preparation level of steel surface, steel protection from corrosion, painting systems, salt spray test, adhesion test.

Introduction

Oil recycling, petrol, chemistry, ships, food and other industrial objects metal constructions often are affected by extremely aggressive atmosphere. Strict anticorrosive safety requirements are applicable to these constructions. Financially it is very important to protect the products from corrosion. The durability of a product will be prolonged, the maintenance expenses reduced and the risk of accidents lowered, which can affect the people and the atmosphere. In some cases it is difficult to define what is a protection and what is a cosmetic. Nice-looking buildings are usually well maintained. For some structures the cosmetic is unnecessary and for others – conversely, for example, the appearance for cruisers is very important.

Nowadays, the building constructions becoming larger and more complex, construction companies have to expeditiously plan consumption of their materials, the speed of works and the use of

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innovative technologies. Constructive and technological solutions, clarity of clients' expectations, time, choosing the right materials, project management, investment are the most important things which determine the profit.

Roselli *et al.* 2013 analysed the role of aluminium phosphosilicate in painting rusted steel. The aim of this investigation was to employ a wash-primer to accomplish the chemical conversion of rusted surface when current cleaning operations were difficult to carry out. The active component of wash-primer was aluminium phosphosilicate. Primed rusted steel panels were coated with an alkyd system to perform accelerated tests in the salt spray chamber and electrochemical impedance measurements. Tests were conducted in parallel with a chromate wash-primer and the same alkyd system. Results showed that the wash-primer containing aluminium phosphosilicate could be used satisfactory to paint rusted steel exhibiting a similar performance to chromate primer.

Carpen, 2008 in her research report of stainless steel used in fire protection systems analysed two failure cases in fire protection systems, one in stainless steel factory and one in power plant have been studied. Most of corrosion damages are associated on the weld nuggets or in the heat-affected zones of girth site welds. One of the most important factors affecting the corrosion resistance of stainless steel at welds and in heat-affected zones are the surface oxide films originating from the welding heat in the presence oxygen. Proper root shielding is important where the water is taken from natural sources, as microbially inducted corrosion can increase the risk for corrosion damage significantly.

Melchers, 2006 studied modelling immersion corrosion of structural steels in natural and brackish waters. The multi-phase mean-value model previously proposed for modelling the marine immersion corrosion of low carbon and low alloy structural steels were examined for application to fresh and brackish waters. Corrosion in brackish and fresh waters corrosion depends on water hardness, pH and nutrient levels, with higher pH levels and lower water hardness associated with higher anaerobic levels of corrosion but these are not significant for anaerobic corrosion.

Hoeke *et al.* 2009 analysed the degradation of steel girder bridge bearing systems by corrosion. Corrosion of anchor bolts in bridge bearings presents two principal problems: (1) failure of the anchorage due to loss of bolt shear strength, and (2) loss of bearing functionality due to the build up of corrosion products. Field investigations were performed at eight bridges around Georgia. Anchor bolt corrosion was found to be locally accelerated, with necking occurring at the concrete interface. This degradation is primarily due to the formation of concentration cells with the alkaline concrete embedment and to crevice effects where the build up of soil and debris occurs at the anchorage. An experimental program was developed, including long-term in-solution exposures in addition to electrochemical testing. Results of long-term concentration cell experiments indicate corrosion rates up to 4.5mpy, 4 to 6 times that of the same bolt anchor in an uncoupled state. Type 304, 316, 2101, and 2205 candidate stainless steels were investigated using cyclic polarization. Each alloy showed adequate corrosion resistance in the simulated bridge bearing environment, with Type 304 showing the least resistant to localized corrosion.

Ramezanzadeh *et. al.* 2016 investigated the enhancement of barrier and corrosion protection performance of an epoxy coating through wet transfer of amino functionalized graphene oxide (FGO). An amino functionalized graphene oxide was synthesized and characterized by Fourier transform infrared spectroscopy and X-Ray diffraction analysis. Then, FGO/epoxy composite was prepared through dispersing 0.1 wt.% of FGO oxide in an epoxy coating through wet transfer method. The GO/epoxy and FGO/epoxy composites were applied on the mild steel substrates and their barrier and corrosion protection performance were characterized by salt spray test and electrochemical impedance spectroscopy. Incorporation of 0.1 wt.% of FGO nanosheet into the epoxy coating significantly enhanced the corrosion resistance of the coating through improving its ionic resistance as well as barrier properties.

Ulaeto *et. al.* 2017 investigated the progress in organic coatings. Smart coatings are innovative coatings that can react spontaneously, due to inbuilt stimuli-responsive mechanisms. The functionality obtained from these class of coatings at the metal-solution interface in aggressive environments has led to advances in anticorrosion studies and applications. The smart coatings respond to single/multiple external stimuli such as light, dirt, pH changes, temperature, aggressive liquids, bio-foulant, impact, fatigue etc.; and have demonstrated outstanding, barrier properties with scratch resistance, in-situ healing, high optical transmission, thermal stability, and resistance to strong acids etc.

According to authors studies the conclusion was made that appropriately unprotected steel structures and mechanisms are affected by corrosion, steel structures lose their strength and the time of exploitation is significantly reduced. One of the most dangerous zones for corrosion is welding seams. In these science publications origin of corrosion grounds, determination of corrosion failures, innovative technologies of smart coating systems and the effect of different environment were analysed.

The aim of this work – to analyse the steel constructions' protection from corrosion installation technologies and to investigate how the level of surface preparation influence the anticorrosive coat characteristics.

The steel protection from corrosion using different painting systems and different ways of preparation the surface of steel was analysed. In the research it was seeking to reveal the main advantages and disadvantages comparing different technologies and how the steel surface prepared in different ways can affect the anticorrosive coat characteristics.

Methods

In the research, the chosen rusted steel samples were cut into nine samples with dimensions 150×150 mm and brought into three groups with three samples in each group. According to standard ISO 8501-1, the primary condition of steel was determined as rust grade B (see Fig. 1).

Fig. 1

According to ISO 8501-1 the primary condition of steel was determined as rust grade B

In each group the surfaces of specimen were prepared in different ways for the applying the anticorrosive protection. Three different preparation methods were selected:

- The surface of corroded steel specimen was processed by sand blasting according to the standard ISO 8501-1. Quartz sand with fraction 0-0.8 mm. was used in the process. The level of surface Sa 3 according to standard 8503-1 was achieved and presented in Fig. 2.
- The surface of corroded steel specimen was tooled using wiry brush. According to the standard ISO 8501 the level of preparation St 2 was achieved (Fig. 3).
- The surface of corroded steel specimen was not prepared in any way.

Fig. 2

The level of surface preparation Sa 3 was achieved by processing the steel using sand blasting method

Fig. 3

The level of surface preparation St 2 was achieved by tooling the steel using the wiry brush

Three different paint systems were selected according to standard ISO 12944-5:2007. The paint systems were selected according to the similar categories of environment corrosivity C3 and C4. The extract from the ISO 12944-5:2007 standard is presented in Fig. 4.

In the research chosen paint systems technical characteristics are presented in Table 1.

Investigating how the preparation of steel surface can affect the anticorrosive coating characteristics, the selected three different paint systems were applied on three specimen which were prepared in three different methods. The research scheme is presented in Fig. 5.

Substrate: Low-alloy carbon steel

Surface preparation: For Sa 2½, from rust grade A, B or C only (see ISO 8501-1)

System No.	Priming coat(s)				Subsequent coat(s)	Paint system		Expected durability		
	Binder	Type of primer [a]	No. of coats	NDFT [b] in µm	Binder type	No. of coats	NDFT [b] in µm	Low	Med	High
A3.01	AK	Misc.	1-2	80	AK	2-3	120			
A3.02	AK	Misc.	1-2	80	AK	2-4	160			
A3.03	AK	Misc.	1-2	80	AK	3-5	200			
A3.04	AK	Misc.	1-2	80	AY, PVC, CR [c]	3-5	200			
A3.05	AY, PVC, CR [c]	Misc.	1-2	80	AY, PVC, CR [c]	2-4	160			
A3.06	AY, PVC, CR [c]	Misc.	1-2	80	AY, PVC, CR [c]	3-5	200			
A3.07	EP	Misc.	1	80	EP, PUR	2-3	120			
A3.08	EP	Misc.	1	80	EP, PUR	2-4	160			
A3.09	EP	Misc.	1	80	EP, PUR	3-5	200			
A3.10	EP, PUR, ESI [d]	Zn (R)	1	60 [e]	—	1	60			
A3.11	EP, PUR, ESI [d]	Zn (R)	1	60 [e]	EP, PUR	2	160			
A3.12	EP, PUR, ESI [d]	Zn (R)	1	60 [e]	AY, PVC, CR [c]	2-3	160			
A3.13	EP, PUR	Zn (R)	1	60 [e]	AY, PVC, CR [c]	3	200			

Substrate: Low-alloy carbon steel

Surface preparation: For Sa 2½, from rust grade A, B or C only (see ISO 8501-1)

System No.	Priming coat(s)				Subsequent coat(s)	Paint system		Expected durability		
	Binder	Type of primer [a]	No. of coats	NDFT [b] in µm	Binder type	No. of coats	NDFT [b] in µm	Low	Med	High
A4.01	AK	Misc.	1-2	80	AK	3-5	200			
A4.02	AK	Misc.	1-2	80	AY, CR, PVC [c]	3-5	200			
A4.03	AK	Misc.	1-2	80	AY, CR, PVC [c]	3-5	240			
A4.04	AY, CR, PVC	Misc.	1-2	80	AY, CR, PVC [c]	3-5	200			
A4.05	AY, CR, PVC	Misc.	1-2	80	AY, CR, PVC [c]	3-5	240			
A4.06	EP	Misc.	1-2	160	AY, CR, PVC [c]	2-3	200			
A4.07	EP	Misc.	1-2	160	AY, CR, PVC [c]	2-3	280			
A4.08	EP	Misc.	1	80	EP, PUR	2-3	240			
A4.09	EP	Misc.	1	80	EP, PUR	2-3	280			
A4.10	EP, PUR, ESI [d]	Zn (R)	1	60 [e]	AY, CR, PVC [c]	2-3	160			
A4.11	EP, PUR, ESI [d]	Zn (R)	1	60 [e]	AY, CR, PVC [c]	2-4	200			
A4.12	EP, PUR, ESI [d]	Zn (R)	1	60 [e]	AY, CR, PVC [c]	3-4	240			
A4.13	EP, PUR, ESI [d]	Zn (R)	1	60 [e]	EP, PUR	2-3	160			
A4.14	EP, PUR, ESI [d]	Zn (R)	1	60 [e]	EP, PUR	2-3	200			
A4.15	EP, PUR, ESI [d]	Zn (R)	1	60 [e]	EP, PUR	3-4	240			
A4.16	ESI	Zn (R)	1	60 [e]	—	1	60			

Fig. 4

Paint systems were selected according to ISO 12944-5:2007 standard

Table 1

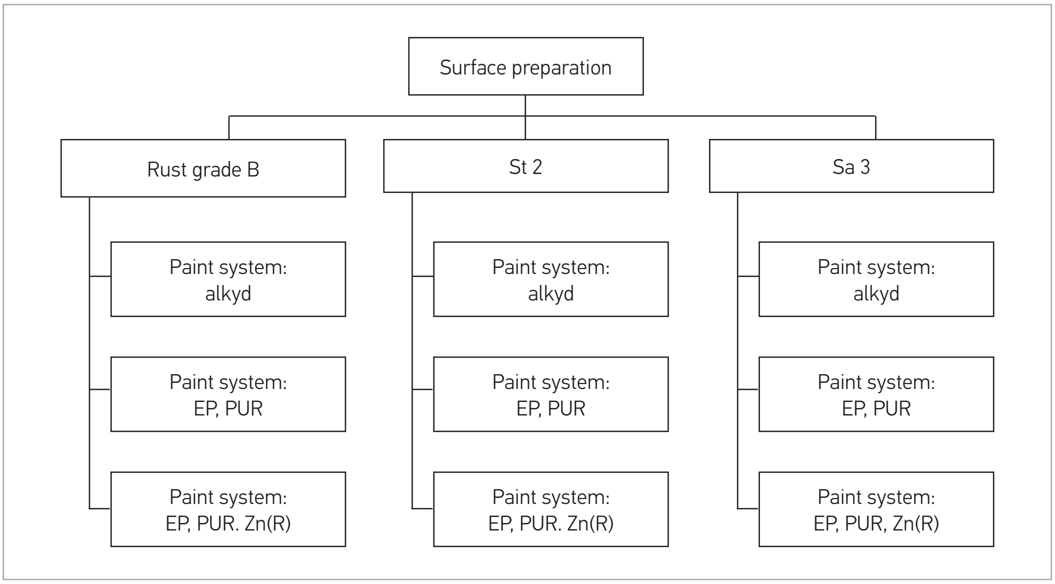
Technical characteristics of paint systems

Paint system: AK	Priming coat	Subsequent coat	Subsequent coat
Paint type	Alkyd	Alkyd	–––––
Corrosivity category	CM3	CM3	–––––
WFT, µm	130	115	–––––
NDFT, µm	80	80	–––––
Volume solids, %	65 ± 2	52 ± 2	–––––
Curing agent mixing ratio	–––––	–––––	–––––
Paint system: EP, PUR	**Priming coat**	**Subsequent coat**	**Subsequent coat**
Paint type	Epoxy	Polyurethane	–––––
Corrosivity category	C4	C4	–––––
WFT, µm	260	160	–––––
NDFT, µm	160	80	–––––
Volume solids, %	80 ± 1	51 ± 1	–––––
Curing agent mixing ratio	3:1	7:1	–––––
Paint system: Zn (R), EP, PUR	**Priming coat**	**Subsequent coat**	**Subsequent coat**
Paint type	Zinc	Epoxy	Polyurethane
Corrosivity category	C4	C4	C4
WFT, µm	81	120	120
NDFT, µm	60	100	80
Volume solids, %	65 ± 1	80 ± 1	51 ± 1
Curing agent mixing ratio	4:1	3:1	7:1

Notes: AK – Alkyd paint system; EP, PUR – Epoxy polyurethane paint system; Zn (R), EP, PUR – Zinc, epoxy, polyurethane paint system.

Fig. 5

The research scheme



Painting conditions: the specimen were painted outside, the air and surface temperature was +7°C, the dew point temperature 4.1°C. The airless painting equipment was used for coating the specimen. The paint systems consist of 2-3 coats. During the painting process in each coating the WFT was controlled by special tool. The steel specimen painting process is shown in **Fig. 6**.

Fig. 6

The steel specimen painting process

After each coat of paint was completely dry (drying time according to weather conditions given in technical data sheet), the dry film thickness was measured using DFT coating thickness gauge. For each specimen five measurements were taken after each coat. DFT measurements presented in **Table 2**.

Table 2

DFT measurements of specimen

Level of surface preparation	Paint system						
	AK		EP, PUR		Zn (R), EP, PUR		
	Priming coat, μm	Subsequent coat, μm	Priming coat, μm	Subsequent coat, μm	Priming coat, μm	Subsequent coat, μm	Subsequent coat, μm
B	58	494	110	168	48	148	262
	86	242	178	200	42	170	280
	59	154	120	158	38	142	240
	61	402	136	238	64	151	268
	64	154	112	246	60	156	268
St 2	52	248	112	126	49	232	260
	76	326	136	230	68	272	320
	58	354	110	192	75	220	260
	60	304	106	114	51	262	278
	52	276	126	164	82	250	280
Sa 3	45	170	212	258	58	190	218
	70	126	215	350	68	160	198
	50	116	204	224	80	198	234
	52	306	180	200	72	212	260
	48	162	108	148	62	204	260

Fig. 7

Equipment for salt spray test in artificial atmosphere

Rarely exists direct connection between metal spray with salt and corrosion resistance. In the industry the conditions of aggressive atmosphere, which affect the structures significantly differ from artificial atmospheres and is not recommended to assess the long-term effect for anticorrosive coating systems. To accelerate the process of corrosion, the aggressive artificial atmosphere was created according to the standard ISO 9227:2017 Corrosion tests in artificial atmospheres – Salt spray tests (see **Fig. 7**). Neutral salt spray test is the method in which 5 % neutral sodium chloride dissolving is automated in controlled environment. The sufficient amount of sodium chloride is dissolved in distilled water with specific conduction not exceeding the 20 μS/cm at 25 ± 2°C to get the concentration of 50 ± 5 g/l. The steel samples were kept in artificial atmosphere for 500 hours.

The specimen in salt spray artificial atmosphere were photo fixated and visually analysed every 120 hours. Photo fixation and description is presented in **Fig. 8**.

Fig. 8

Photo fixation and description of specimen in salt spray artificial atmosphere

Duration, hours	Specimen photo fixation in salt spray artificial atmosphere	Specimen characterisation
120	 	The steel specimen visually examined in 120 hours in salt spray artificial environment. No obvious changes were noticed in research zones of specimen. Corrosion marks noticed on the edges of specimen and welding spatters.
240	 	The steel specimen visually examined in 240 hours in salt spray artificial environment. No visible changes were noticed in specimen research zones. More corrosion marks appeared on the edges and spatters of the specimen.
360	 	The steel specimen visually examined in 360 hours in salt spray artificial environment. Research zones of specimen were not affected by corrosion. More corrosion marks continued to appear on the edges and spatters of the specimen.
500	 	The steel specimen visually examined in 500 hours in salt spray artificial environment. The specimen research zones were not affected by corrosion. The corrosion marks were found on the edges and welding spatters. The specimen with alkyd paint system had outspread corrosion around the spatters. The EP, PUR and Zn (R), EP, PUR paint systems had no impact of corrosion outspread around the spatters.

The influence of surface preparation the anticorrosive coating characteristics was investigated and the results were assessed referencing the methodology for FROSIO inspectors "Inspection of corrosion protective coating" of Norway institute "Teknologisk institut".

Results

In the research the specimen were prepared by sand blasting using quartz sand (fraction 0-0.8 mm.) and tooling using the wiry brush. The surface preparation levels Sa 3 and St 2 were achieved. The tests were also performed with specimen which were not prepared in any way with rust grade B.

Correct steel surface preparation and paint system application is complex and precision requiring process. Usually industrial paint systems have two components paint systems with two or three coats and each paint system requires different steel surfaces preparation level and method, needs control of thickness in every coat. By applying the paint on the specimen using the airless paint equipment it was difficult to achieve the equal thickness of coating. Dry film thicknesses were achieved in 20% error.

After the salt spray test the specimen were properly cleaned. Anticorrosive coating characteristics for differently prepared surfaces were analysed by testing the adhesion (pull-off test) according to the standard ISO 4624:2016 using digital adhesion gauge "Elcometer 506". To bond the gauge cylinder to the top coat of specimen the glue "Locitite 435" was used. Investigating how the preparation of surface influences the anticorrosive coating characteristics, the results were assessed referencing the methodology for FROSIO inspectors "Inspection of corrosion protective coating" of Norway institute "Teknologisk institutt" (the example is given in Fig. 9). Three adhesion tests were carried on each steel specimen. The tests result presented in Table 3.

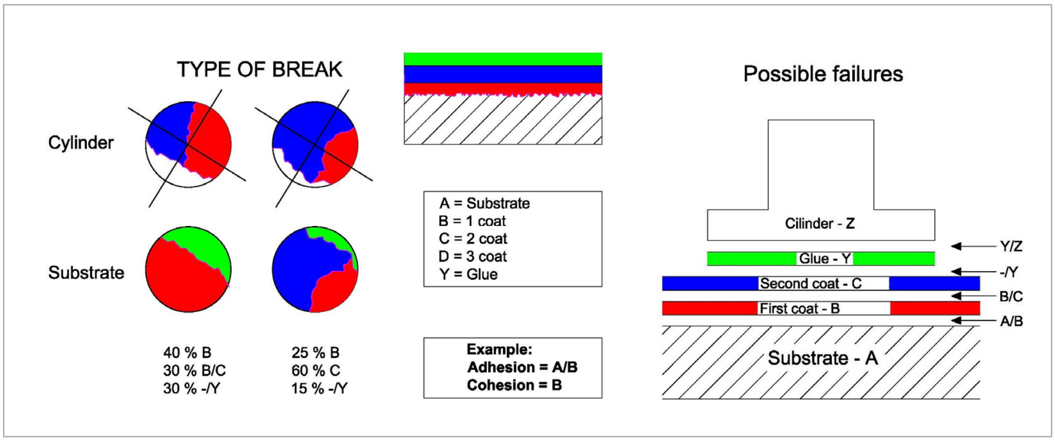


Fig. 9

Adhesion tests results assessing the reference of methodology for FROSIO inspectors "Inspection of corrosion protective coating"

In Table 3 the pull-off tests were analysed in detail referencing the methodology of "Inspection of corrosion protective coating" and the effect of steel surface preparation depending on paint system was noticed. In surface preparation Sa 3 and St 2 every paint system performed slightly different but positive result. The tests with specimen, which were not prepared in any way, the results were significantly worse with one component alkyd paint system and cohesion results were obtained. Pull-off strength results presented in Fig. 10, 11 and 12. Adhesion tests comparison results shown in Fig. 13.

Comparing the pull-off tests results the average values of three tests for each specimen were assessed. The adhesion tests' results of each specimen with every paint system and surface preparation were <5 MPa. Considering EP, PUR and Zn (R), EP, PUR coating systems the pull-off strength results were very similar with variations of 1.8 – 4.03 % between the systems considering the preparation method. Alkyd paint system tests results significantly differentiated and the pull-off

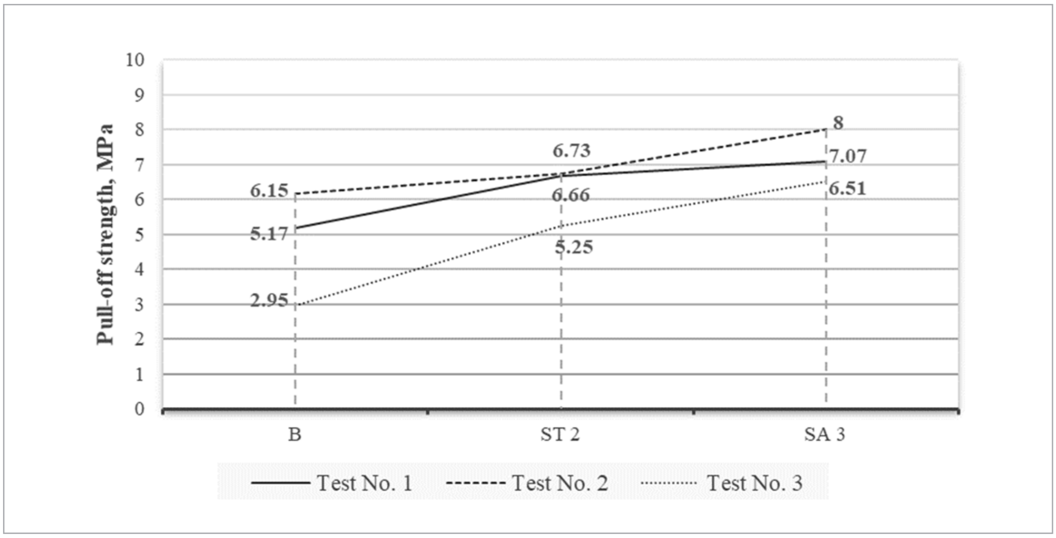
Table 3

Adhesion tests results

Paint system	AK (C3M)	AK (C3M)	AK (C3M)	EP, PUR (C4)	EP, PUR (C4)	EP, PUR (C4)	ZN (R), EP, PUR (C4)	ZN (R), EP, PUR (C4)	ZN (R), EP, PUR (C4)
Steel substrate preparation	B	St 2	Sa 3	B	St 2	Sa 3	B	St 2	Sa 3
No. of coats	2	2	2	2	2	2	3	3	3
First coat thickness	80	80	80	160	160	160	60	60	60
Second coat thickness	80	80	80	80	80	80	100	100	100
Third coat thickness	---	---	---	---	---	---	80	80	80
Equipment used	Elcometer 506	Elcometer 506	Elcometer 506	Elcometer 506	Elcometer 506	Elcometer 506	Elcometer 506	Elcometer 506	Elcometer 506
On which layer test performed	Temalac AB 70	Temalac AB 70	Temalac AB 70	Hemathene Topcoat 55210	Hemathene Topcoat 55210	Hemathene Topcoat 55210	Hemathene Topcoat 55210	Hemathene Topcoat 55210	Hemathene Topcoat 55210
Type of break. Test No. 1	90% A 10% B	50% A 50% B	100% B/C	5% C 95% Y/Z	10% C 90% Y/Z	10% C 90% Y/Z	15% C 85% Y/Z	100% C	100% Y/Z
Type of break. Test No. 2	85% A 15% B	45% A 55% B	100% B/C	5% C 95% Y/Z	100% Y/Z	5% C 95% Y/Z	10% C 90% Y/Z	100% Y/Z	100% Y/Z
Type of break. Test No. 3	40% A 60% B	20% A 80% B	100% B/C	5% C 95% Y/Z	30% C 70% Y/Z	15% C 85% Y/Z	10% C 90% Y/Z	5% C 95% Y/Z	5% C 95% Y/Z

Fig. 10

Alkyd paint system pull-off tests results



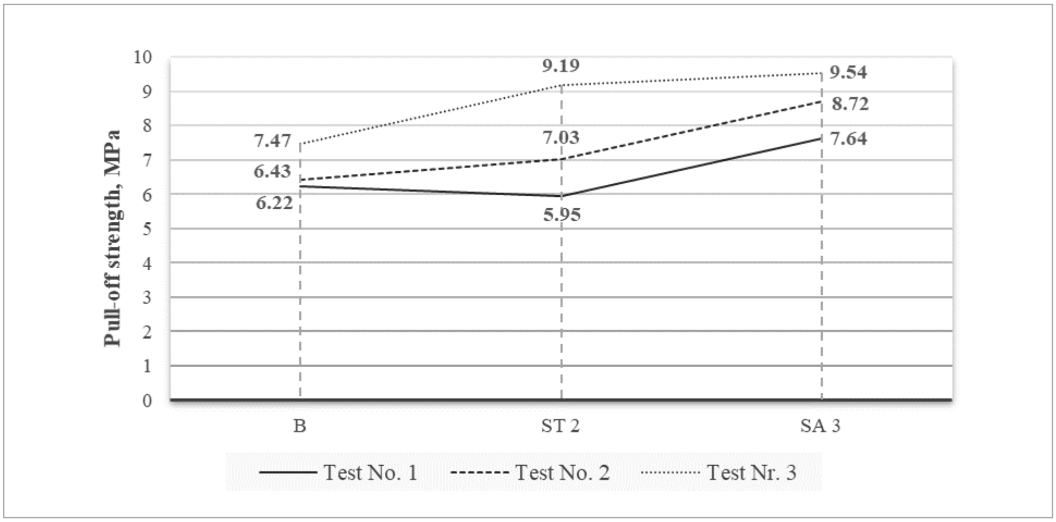


Fig. 11

Epoxy and polyurethane paint system pull-off tests results

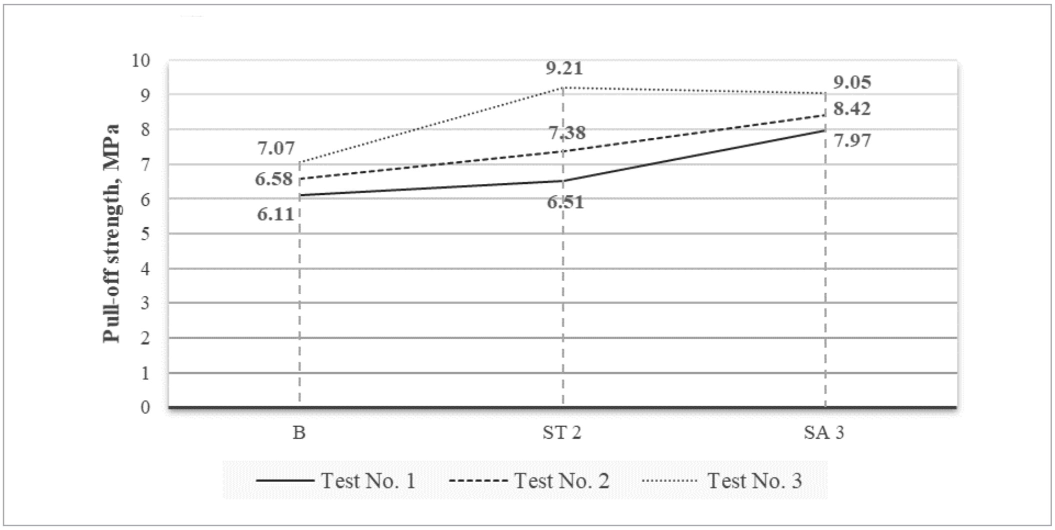


Fig. 12

Zinc, epoxy and polyurethane paint system pull-off tests results

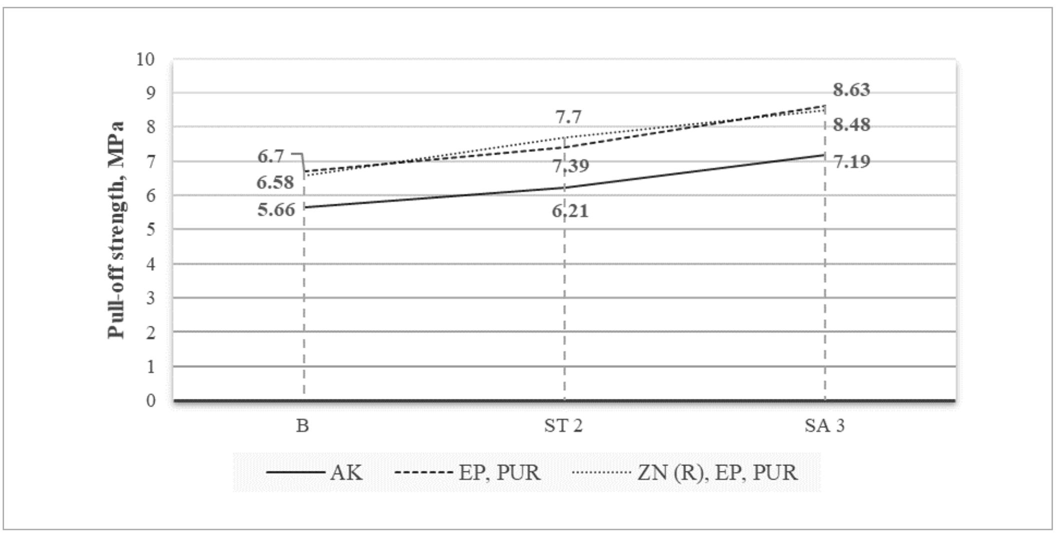


Fig. 13

Comparison of adhesion tests results (average values considered) strength values were 14 – 16 % lower comparing to the average results of EP, PUR and Zn (R), EP, PUR coating systems. Assessing the substratum preparation method effect for coating strength characteristic the results were higher and directly related to the preparation method.

Jamali and Mills, 2014 investigated the influence of surface preparation on performance of alkyd coatings on steel. Degreasing, abrasion with emery, acid pickling, hydroblasting and wet abrasive blasting methods were used to modify the surface of steel before painting. In their study it was shown that the level of recovery adhesion may not be a reliable criterion for the corrosion protection in some cases. It was demonstrated that increasing surface roughness together with a stable surface oxide effectively increases on the interfacial bonding.

Comparing the researches with different ways of steel surface preparation and different methods of analysis, the results achieved were very similar and revealed that the value of adhesion was subordinate in determining the anticorrosion performance of an organic coating.

Conclusions

1 Steel specimen coated in different painting systems were kept in salt spray artificial atmosphere for 500 hours delivered the conclusion that properly prepared surface in the research zones of specimen had no impact of corrosion uprising. Corrosion marks developed on the edges and around the spatters of the specimen, where inappropriate surface preparation was performed.

2 Although the experimentation was short-term and adhesion tests results independently from the surface preparation method were positive <5 MPa but when Pull-off tests were examined visually between the anticorrosive coats and the cylinder revealed more definite conclusions that in some cases surface preparation affected the anticorrosive coating characteristics. Referencing the results using this method the worst characteristics were recorded in specimen with surface preparation of St 2 or rust grade B coated in one component alkyd paint system. Determined that the film in these specimens were detached from the substratum of steel. The specimen with Zn (R), EP, PUR and EP, PUR paint systems had insignificant alteration considering the steel surface preparation method.

3 In the research comparing the paint systems used to protect the steel surface from corrosion the best results were achieved by coating the surface using two component EP, PUR and ZN(R), EP, PUR paint systems. Pull-off strength results variations between the systems were marginal and ranged from 1.8 to 4.03 % considering the same preparation methods. Comparing EP, PUR and ZN(R), EP, PUR to alkyd paint system the latter pull-off test results were 15.2 % lower considering surface preparation Sa 3, 16.0 % lower considering surface preparation St 2 and 14 % lower results when no preparation was performed. The results demonstrate that barrier and cathodic anticorrosive protection have more efficient characteristics to protect the steel from corrosion in average industrial atmosphere comparing to AK coating systems.

4 From pull-off tests reports it was determined that using different paint systems, the level of steel surface preparation directly affects anticorrosive coating characteristics. Between the specimen with no preparation with surface rust grade B and with preparation to St 2 the pull-off strength values increased from 8.86 to 14.55 % subject to the paint system. The most increase in values was determined when the surfaces were coated in ZN(R), EP, PUR and the least when the surfaces were coated in AK paint system. Comparing steel surface preparation St 2 and Sa 3 the pull-off strength values increased 9.2 – 14.37 %. Calculated that ZN(R), EP, PUR coating characteristics were least affected considering preparation level St 2 and Sa 3. AK paint system was affected considerably comparing insignificant values of increase between rust grade B and St 2. From the results it was determined that steel surface preparation level affects the anticorrosive coating characteristics.

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