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PASSIVE FIREPROOF COATINGS: MECHANISM OF ACTION, PHYSICAL AND CHEMICAL PROCESSES IN FIRE

Keywords: fireproof protection, mechanism of action

Abstract

A basic components of fireproof products including fire retardant, cementitious based and intumescent, and its mechanism of action in fire has been described.

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THE ROLE OF DESIGN AND MAINTENANCE IN EXTENDING SERVICE LIFE OF ANTICORROSION PROCEDURE

Keywords: maintenance of anticorrosion systems; coating failures, anticorrosion coatings

Abstract

An overview of the state of art of corrosion control in both design and service life inside the most widespread and technically critical fields like cars, containers, marine, offshore structures, buildings and infrastructure is done. For the last two ones, for which no fixed procedure for anticorrosion is foreseen, two propositions are considered: to use either extremely durable, strictly supervised during application anticorrosion systems, which need knowledge, investment and governmental rules or to focus on maintenance works to allow badly protected construction to survive some more years. Examples are shown for each one solution.

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ELECTROCHEMICAL MEASUREMENTS IN CORROSION ENGINEERING

Keywords: corrosion, electrochemistry, monitoring, metal potential, corrosion rate, impedance

Abstract

Fundamentals and features of electrochemical measurements of corrosion behaviour of metals are described and examples of their applications in corrosion engineering are reviewed. Measurements of metal potential in corrosive medium afford possibilities for assessment of risk of galvanic corrosion, probability of steel corrosion in concrete as well as effect of electrochemical protection. Upon analysis of the relationship between metal potential and current it is possible to assess the corrosion rate, whereas protective properties of highly resistive coatings, e.g. paint and oxide films, can be evaluated from the interpretation of electrochemical impedance data.

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THE CRITICAL FACTORS ASSOCIATED WITH APPLICATION OF INTUMESCENT PAINT SYSTEMS

Keywords: fire protection systems for structural steelwork, intumescent paint

Abstract

Main goal of this presentation is to point out important technological parameters which have to be kept to obtain the operation properties of intumescent fire protection coatings. It contains application rules, criteria of acceptance and solution for specific steel sections, mainly based on the recommendations of ASFP (Association for Specialist Fire Protection, UK). It also consists of description of basic relationships between properly designed, applied and used fire protection coating system and expected durability of protection declared by manufacturer in the context of corrosion and fire protection.

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PRIMARY CAUSE OF PROBLEMS WITH DURABILITY OF ANTICORROSION COATINGS

Keywords: corrosion, anticorrosion coatings, durability

Abstract

Obviously, anticorrosion coatings durability depends on a number of agents. Usually the contractor is considered as guilty of the problem. I would like to present slightly different point of view in my lecture, especially I will stress the designer role and responsibility of the final anticorrosion protection effect.

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SELECTED EXAMPLES OF CORROSIVE RISKS ON BRIDGES AND HYDRO-TECHNICAL STRUCTURES

Keywords: corrosion, bridges, civil and marine hydraulic constructions, similarities and differences in corrosive factors' influence on constructions, systemic protective solutions defined in PN-EN 1504 standard

Abstract

Corrosive risks refer to both the engineering and hydro-technical structures. Regardless of structures differences, exploitation conditions and the intensity of corrosive factors - primarily chlorides - similarities in its risks and outgrowths are significant. The authors are taking into consideration the jeopardy appearing in splatter and alternative liquid column zones. As result, technological solutions decreasing or restricting corrosive risks on the presented buildings are recommended according to PN-EN 1504-2 standard.

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THERMALLY SPRAYED COATINGS USED IN PROTECTION BEFORE CORROSION PROCESSES

Keywords: thermal spraying, corrosion, wear

Abstract

Thermal spraying of protective coatings, as one of the base technologies of surface engineering, allows the preparation coatings with different properties and high utility. In this article, it is indicated the basic thermal spray methods, that allow to generate a coating with the established chemical and phase composition and structure. These coatings have got utility functionally properties, especially high resistance to corrosion and abrasive wear. The application of thermally sprayed chosen coatings in the energy industry, machinery and processes of regeneration is presented. In the article the advantages and disadvantages of thermal spraying methods are presented.

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TRWAŁE ZABEZPIECZENIE CIENKOŚCIENNYCH ELEMENTÓW METALOWYCH – OCENA SKUTECZNOŚCI NA PODSTAWIE BADAŃ EKSPLOATACYJNYCH

Keywords: aluminium, ekrany akustyczne, badania eksploatacyjne, profile cienkościenne.

Abstract

In the paper it has been presented how to make case study data useful to confirm the performance of solutions proposed for corrosion protection for the thin-wall structures prior their erection in traffic lane. Authors state that natural weathering performance behaviour is more accurate than accelerated laboratory testing in artificial atmospheres. Thus, monitoring and assessment of the condition of the solutions being already in service is absolutely desired.

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ENVIRONMENTALLY FRIENDLY SOL-GEL COATINGS FOR ALUMINIUM ALLOYS

Keywords: Cr-free coatings; sol-gel; aluminium; adhesion.

Abstract

Development of Cr-free coatings is an important issue for replacement of chromate conversion coatings in aerospace and automotive industry. Our research approach considered the development of thin ZrO₂ coatings (100-200 nm) by means of sol-gel technology for different aluminium alloys (AA2024, AA6060 and AA3105). ZrO₂ films were deposited employing solutions of Zr precursors. Two preparation routes were followed: the first employed a metal-organic precursor in an alcoholic solution; the second one used a water-based solution of a Zr salt. Coating application was carried out by dipping and spraying technology at a laboratory scale. Morphology of ZrO₂ pre-treatments was investigated by means of SEM-EDXS. Film thickness and composition were studied by means of glow discharge optical emission spectroscopy (GDOES). Substrates pre-treated with ZrO₂ films were painted with an organic primer and top coat in order to evaluate paint adhesion and electrochemical behaviour of painted systems. In addition, coating deposition was successively carried out with a robot-controlled air pressure gun in spraying cabins in order to evaluate industrial production of the ZrO₂ films.

Leszek Komorowski

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DURABILITY OF ANTICORROSION SYSTEMS ON THE STEEL BRIDGES ESTIMATED BY IMPEDANCE SPECTROSCOPY

Keywords: impedance spectroscopy, anticorrosion systems, paint coatings failures

Abstract

The assessment of the size and type of the anticorrosion systems defects on the steel bridges are made according to standard PN-EN ISO 4628 basing on the visual observations. Blistering, rusting, cracking, flaking and chalking are estimated. For the maintenance planning and quick estimation of the new types of paint systems one needs the method which allows to discover the failures like undercoating corrosion or decrease of barrier properties in the initial phase. Such a method is impedance spectroscopy (EIS) which is used on the Polish steel bridges. The lecture will show the EIS results obtained from the tests of anticorrosion systems on the bridges in the 5 –years intervals. These systems have up to now no visual damages.

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JEDNAK MALOWANIE – ALE JAK I GDZIE... ZABEZPIECZENIE ANTYKOROZYJNE KONSTRUKCJI STALOWYCH W ENERGETYCE ZAWODOWEJ

Keywords: konstrukcja stalowa, przygotowanie pow. do malowania, sposoby zabezpieczenia antykorozyjnego, czas do transportu, malowanie naprawcze.

Abstract

The paper is focused on surface treatment execution with regards to which step of manufacture has been selected to apply particular layer of paint. Obviously, protective coating is damaged during assembly what induces the necessity of touch up. Some examples of different by reason type damages, typical for power industry, have been described. Numerous pictures included can help to illustrate the range of the problem. Authors claim that designers forwarded the full load of painting work to prefabrication step not taking into consideration enough important factors. There is no economic reason in that especially when wide range of damages makes necessary to repaint the whole surface but the money, for that purpose, had been already spent..

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CEMENT-POLYMER CONCRETE USED TO REPAIR THE OFFSHORE BREAKWATER AT THE PORT OF GDYNIA

Keywords: cement-polymer concrete, concrete durability, polymer dispersion, scaling, freeze resistance

Abstract

An assessment of the effect of different amounts of polymer modifier on the freeze resistance of concrete used for structural repairs of the offshore breakwater at the Port of Gdynia is presented. An analysis of the results of tests carried out to determine the influence of a styrene-acrylic copolymer dispersion additive on the scaling resistance of concrete in a 3% NaCl solution, its water-tightness, compressive and flexural strengths and the extent of concrete shrinkage deformation is discussed. The evaluation of the influence of the polymer additive was carried out on the basis of results obtained in tests carried out in industrial conditions on concrete samples taken from trial mixes and in the course of repair of the breakwater.

Mirosław Iłski

Sto-ispo Sp. z o.o., Poznań

DEEP HYDROPHOBISATION – NEW STRATEGY OF CONCRETE STRUCTURE DURABILITY IMPROVEMENT

Keywords: transportation objects, soak-in profile, deep-set hydrophobisation

Abstract

In practical application hydrophobic agents pass for little exacting technically materials. As result of this misestimation reaches often to short duration and ineffective impregnation. For the purpose of this situation improvement is necessary proposing the course of action, permissive on the realization of the permanent and effective hydrophobic protection. It cannot be forgot about the soak-in profile as the essential part of the quality inspection. Diagnostic procedure in case of transportation objects was presented. The base is the exact research and choosing for every object a suitable hydrophobisation.

Michał Jaczewski

Tikkurila Polska S.A.

AN ATTEMPT TO ANALYZE OF THE CLAIMS TARGETED TO MANUFACTURERS AND SUPPLIERS OF ANTI-CORROSION PAINTS

Keywords: corrosion, claim of paint quality, anti-corrosion paints, industrial paints, corrosion protection, painting of steel structures

Abstract

The analysis is based on more than 20 years of work experience for producers and suppliers of anti-corrosion paints, and the attempts of the statistical approach presented phenomena including cases from the years 2005-2013. The source of knowledge about the claims were both my experience from working for manufacturers or distributors of paints and expertise and opinions commissioned by various entities, including the Polish Corrosion Society.

Michał Wójtowicz

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MARKETING OF CONSTRUCTION PRODUCTS UNDER REGULATION OF THE EUROPEAN PARLIAMENT AND THE COUNCIL EU NO 305/2011 AND ACT ON CONSTRUCTION PRODUCTS

Keywords: approvals, assessment documents, construction products, European harmonization, CPR, fire protective products

Abstract

The requirements of Regulation No. 305/2011 (CPR) establishing harmonized conditions for the marketing of construction products came into force in 2013. The effect of this was also an amendment to the Act on Construction Products. The paper presents the current situation of legal implementation of Regulation 305. The obligations of the manufacturer, importer, distributor, and rules for products on the market are presented. It also presents the current status of implementation of the requirements for the marketing of fire protective products.

Małgorzata Zubielewicz

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DEVELOPMENTS IN THE FIELD OF ANTICORROSIVE COATINGS PRESENTED AT EUROPEAN CONFERENCES

Keywords: corrosion, protective coatings, nanotechnology, self-healing coatings

Abstract

New developments in the field of protective coatings are discussed on the basis of papers presented at European conferences. Materials of following conferences are included: European Technical Coatings Congress (ETCC), Advances in Coatings Technology (ACT) and European Corrosion Congress (EUROCORR).

Piotr Skrzypczak

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ROAD AND RAIL TUNNELS – THE REQUIREMENTS FOR FIRE RESISTANCE

Keywords: fire resistance of tunnels, tunnel curves, spoiling

Abstract

Fire resistance requirements concerning the construction of road and railway tunnels in Poland and abroad as well as phenomena occurring during a fire have been described.

Robert Chrzanowski

Agnieszka Kulesza

Zarząd Dróg Miejskich w Warszawie

THE COMPARISON OF THE ANTICORROSION SYSTEMS WORKING ON THE ROAD AND URBAN INFRASTRUCTURE

Keywords: bridge constructions, road infrastructure, anticorrosion protection

Abstract

The behavior of the anticorrosive systems (epoxy-poliurethane EP/PUR) on the new and renovated road and urban infrastructure objects are described. The exploitation time is up to 13 years. Analyzing similar systems working during the same time in the corrosion atmosphere C4-C5, the biggest influence of the application conditions and ability on the coatings durability was observed.

Sylwia Schab

PROZAP Sp. z o.o., Puławy

SELECTION OF ANTICORROSIVE PROTECTION SYSTEMS FOR FACILITIES OF CHEMICAL INDUSTRY

Keywords: corrosion, selection of anticorrosive protection systems, chemical industr

Abstract

PROZAP is a multidiscipline engineering office providing engineering services for Polish and foreign customers for more than 40 years. The company is mainly involved in design and revamping of facilities of chemical industry, general and municipal constructions, also performs duties of leading design office, general contractor and provides supplies. Concentration of corrosive contaminants is very high in industrial plants, therefore appropriate selection of anticorrosive protection systems is necessary for failure-free operation of machinery, equipment or structures made of carbon steel. As a part of preparation of engineering, documentation with guidelines for selection of anticorrosive protection systems is prepared, which specifies, among others, basic requirements for surface preparation, recommended types of paints and information regarding performance of protected area.

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PROTECTIVE AND DECORATIVE COATINGS ON ALUMINIUM FOR ARCHITECTURAL PURPOSES - REQUIREMENTS AND TESTING

Keywords: aluminium profiles, powder paint coatings, anodic oxide coatings, protective and decorative coatings

Abstract

The paper concerns the testing and assessment of the protective and decorative coatings on aluminum profiles for architectural applications. It also relates to the issue of surface treatment of aluminium before the application of the powder and anodic coatings as well as its effect on their protective characteristics against aggressive environment impacts in use.

Urszula Lipska

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DESIGN OF BUILDINGS EXPOSED TO CHEMICAL AGGRESSIVENESS

Keywords: concrete durability, durability of reinforced concrete structure, exposure classes related to environmental, protection of concrete

Abstract

The paper presents the formal and the technical requirements for permit building design of chemical industry objects. Design solutions are presented in order to meet the basic requirements for objects in line with building law and ensuring the durability of the buildings and structures in the proposed period of use. The principles of selection of materials and structural solutions for the reinforced concrete structures, as a material particularly susceptible to chemical corrosion, are presented so that to provide required durability of the structure. The ways of protection of the exposed to the chemical impact concrete surfaces are presented.

Urszula Szczyrek

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CORROSION PROTECTION TECHNOLOGY DEDICATED TO INDUSTRIAL PLANTS

Keywords: corrosion protection, Flue Gas Desulphuration, rubber linings

Abstract

This report is study of corrosion protection technology dedicated to industrial plants, basing on the case of Flue Gas Desulphurisation Plants . In fact, due to the specifics of corrosion risk, these are in fact chemical installations. The reason of choosing on Flue Gas Desulphurisation is thy fact that recently number of newly build installations has increased. Thru environmental issues there will certainly come more of them , also by the opportunity of new Power Plants. Very important point of the report is showing that within last ten or fifteen years the technology and solutions hasn't changed much. However, crucial issue is the awareness of a must to use more advanced solutions and strict following of technological principles on every stage of corrosion protection application process.

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THE TECHNICAL REQUIREMENTS FOR CORROSION PROTECTION OF STEEL AND GALVANIZED STEEL FOR TRANSMISSION TOWERS

Keywords: corrosion protection, transmission towers, steel galvanized m

Abstract

Requirements for corrosion protection of galvanized steel by PSE S.A. for transmission towers have been described.