



Fosroc Solutions for the Thermal Power Industry

www.fosroc.com



constructive solutions

ABOUT FOSROC INTERNATIONAL

Since the company's beginnings over 80 years ago, Fosroc has developed into an International leader in delivering Constructive Solutions for projects across a broad range of market segments including transport, utilities, industrial and general buildings.

Fosroc's commitment to customer service and technical support is second to none. We work closely with architects, structural engineers, contractors and owners to best understand their requirements. Together we can develop a bespoke solution for a construction project, adding value and becoming more than just a materials supplier, but a solution provider.

Fosroc has an extensive network of offices and manufacturing locations across Europe, the Middle East, India, North and South Asia, and is further represented in other regions across the world by distributor and licensee partners.

Selecting from the full portfolio of Fosroc products and services and integrating expert technical support, world class customer service and innovation, Fosroc goes beyond just product selling to ensure that we partner with our customers to deliver complete constructive solutions.

- > Admixtures
- > Adhesives
- > Protective Coatings
- > Concrete Repairs
- > Industrial Flooring
- > Grouts & Anchors
- > Joint Sealants
- > Surface Treatments
- > Grinding Aids
- > Waterproofing



Leader in delivering
Constructive Solutions
Worldwide!



FOSROC DELIVER SOLUTIONS NOT JUST PRODUCTS

CAD Details

A library of standard CAD details are available, bespoke CAD details can be created for your specific project

Project Specifications

Dedicated specification managers on hand to assist with correct system choices and tailored solutions

Site Support

Expert product and application support made available from our specialist teams.

Seminar & Training

Comprehensive programme of seminars and training courses designed to expand and reinforce your knowledge.

Energy plant solutions

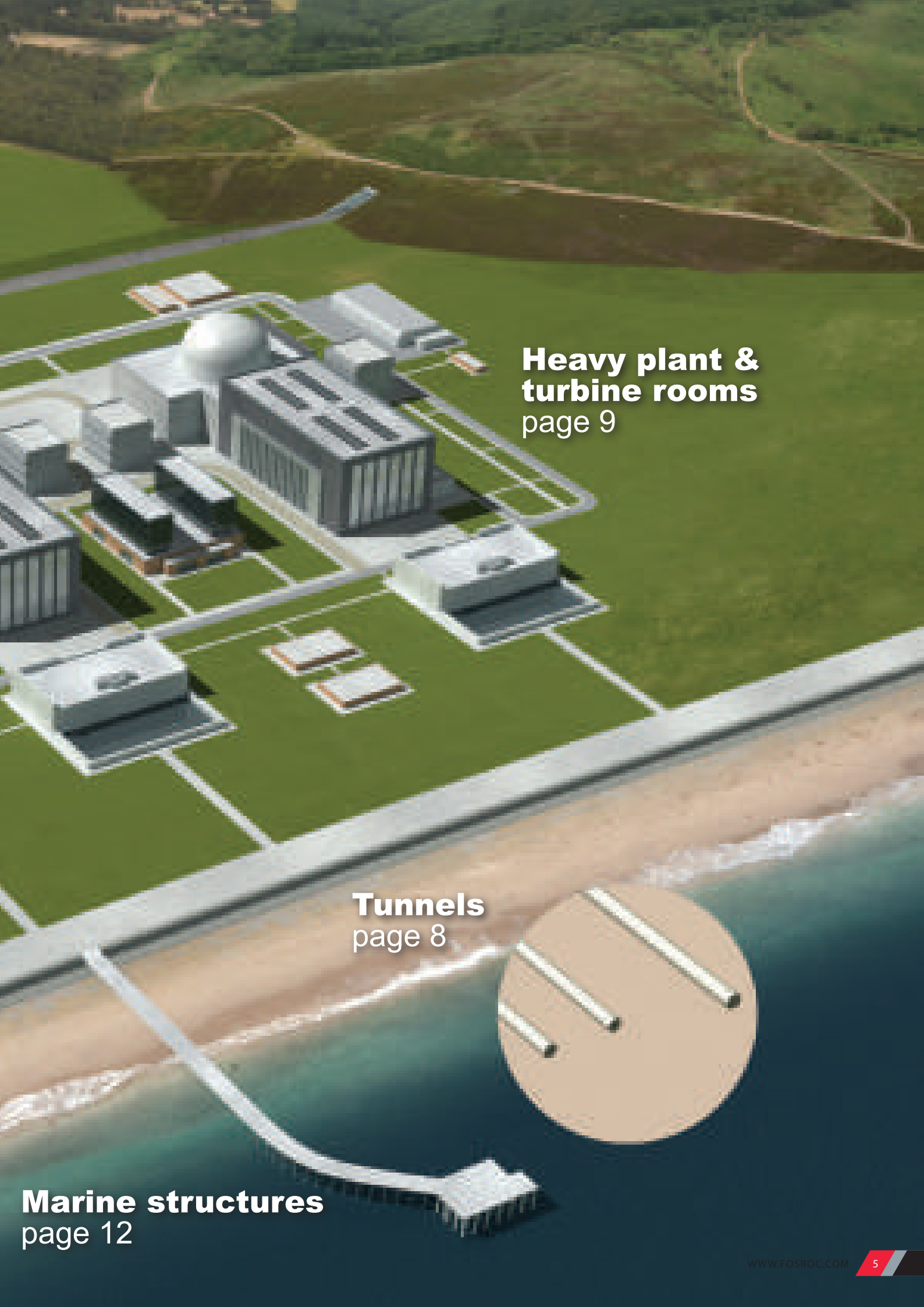
Many of the Fosroc product applications that are demonstrated within a nuclear power plant are common to other types of thermal power plants, although there may be variations to suit particular structures.

While reactor buildings and radioactive waste repositories may be specific to a nuclear plant, many other areas such as electricity transmission sub stations, access tunnels, and heavy plant and turbine rooms, as well as other support buildings, car parks and offices, are to be found in 'conventional' thermal power generating plants such as:

- Combined Cycle Gas Turbine
- Energy from Waste
- Biomass
- Clean Coal

Support buildings, car parks and bridge solutions pages 10-11

Concrete structures, Nuclear power plants pages 6-7



**Heavy plant &
turbine rooms**
page 9

Tunnels
page 8

Marine structures
page 12

Nuclear power generation plants

Concrete is a key requirement of Nuclear Power Plants and is associated with a range of product applications from precast and ready-mix admixtures for construction, to concrete repair, crack injection and protective coatings to maintain the fabric of buildings.

Waterproofing solutions are also an integral part of concrete construction as they are essential in ensuring watertight integrity and structural durability.

Throughout the plant, chemical and fire resistant seals and coatings are required, along with a range of flooring solutions to produce a safe, durable environment.



Floors

Paaveroc and Patchroc repair mortars for small or large areas

Fosroc XR rapid setting bedding mortars

Cemtop floor levelling compounds

Nitoseal and Thioflex tough, highly resistant floor joint sealants

Flamex fire-rated sealants

Precast concrete structures

Auracast precast admixtures

Auramix ready-mix admixtures

Auramol mould release agents

Preco surface retarders used with precast and cast in-situ concrete to avoid scabbling

Conbextra PM structural grout for gaps in precast units

Conbextra BM for bedding in precast units



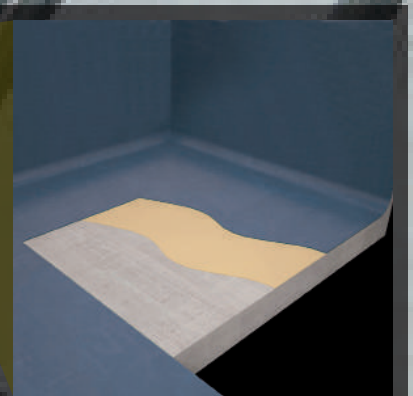
Flat roofs

Nitoproof fire-rated UV stable coating
Fosroc Polyurea waterproof, spray-applied coating
Nitoseal sealants
Flamex fire-rated sealants



Concrete repairs and coatings

Nitofill crack injection
Nitoprime Zincrich steel protective coating
Renderoc repair mortars for soffits and walls
Dekguard protective anti-carbonation coating



Floor, bund and tank coatings

Nitoflor high performance epoxy resin, PU and anti-static coatings
Nitocote highly chemical resistant coatings

Below ground and tank structures

Proofex fully integrated range of waterproofing and drainage membranes and ancillaries, including gas proofing membranes
Supercast PVC and hydrophilic waterstops
Fosroc Polyurea waterproof spray-applied seamless coating



Tunnel solutions

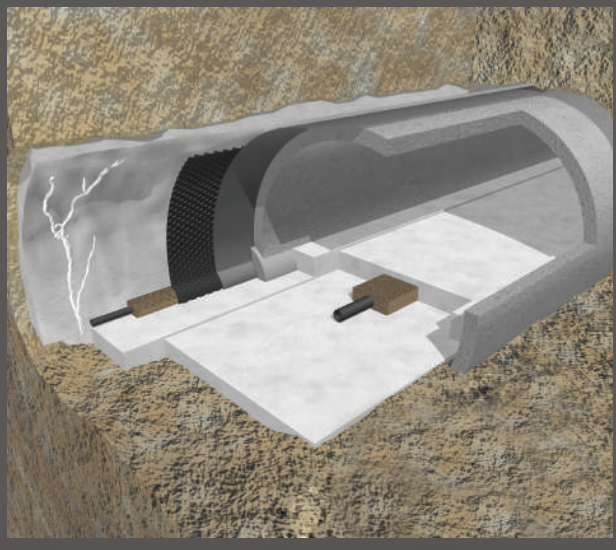
Access routes such as road, rail and pathways may have to be constructed below ground. Tunnels are also used for cable routes, power transmission and for supplying water to cooling systems. Due to limited access, tunnels require durable and low maintenance construction solutions.

Fosroc offers a variety of solutions for Tunnel Boring Machines (TBM), Cut and Cover, Drill and Blast tunnel construction methods, delivering improvements in performance and cost-effectiveness through trouble-free shotcreting, waterproofing and crack repairs.

Tunnel boring

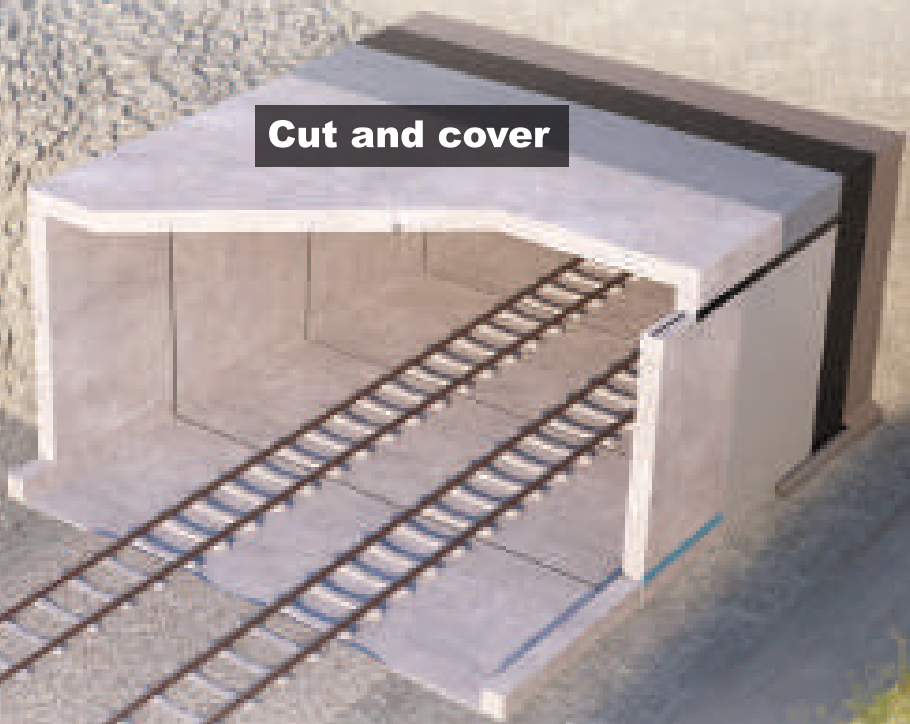


Drill and blast



Cut and cover

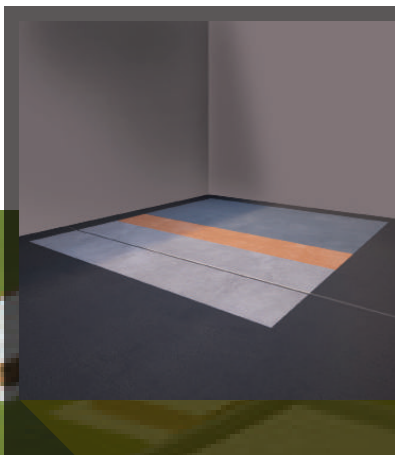
- Auracast precast concrete admixtures
- Auramix readymix concrete admixtures
- Auramol mould release agents
- Sprayset Shotcrete rock structure consolidation
- Polyurea WPE waterproof coating
- Proofex waterproofing, drainage and PVC lining membrane
- Supercast PVC and hydrophilic waterstops
- Nitoseal joint sealants
- Nitofill crack repair
- Cebex, Conbextra and Lokfix grouts



Heavy plant and turbine rooms

Fosroc offers a wide range of high precision grouts and fixing solutions for plant and rail base plates and pads, which may be subjected to heavy dynamic and mobile loads, as well as corrosive compounds.

Heavy plant and turbine rooms also require high performance flooring that is both durable and resilient. Fosroc's solutions extend from initial construction of the actual floor slab to chemical and fire resistant seals and coatings to protect these flooring areas.



Floors and coatings

Paveroc and Patchroc patch repair mortars for small or large areas

Fosroc XR rapid setting bedding mortars

Cemtop floor levelling compounds

Nitoflor high performance epoxy resin, PU and anti-static coatings

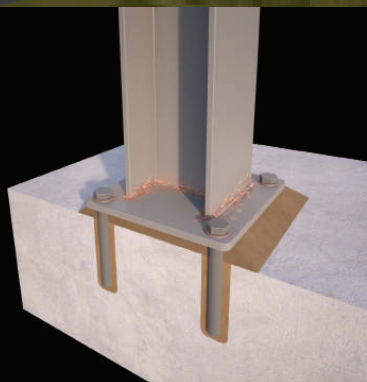
Nitoseal and Thioflex tough, highly resistant floor joint sealants

Flamex fire-rated sealants

Nitocote highly chemical resistant coatings

Machinery and rail fixing

- Conbextra cementitious grouts for grouting in base plates and filling large voids.
- Lokfix grout for bolt fixing and anchoring
- Galvafrid rust protection
- Conbextra resin-based grouts for gaps up to 120mm and under rail grouting



Support buildings, car parks and bridge solutions

Fosroc has vast experience in providing constructive solutions to a wide range of building structures. Our solutions are built on a broad portfolio of products including concrete admixtures, waterproof membranes, waterstops, joint sealants, concrete repair mortars, resin flooring, protective coatings, structural strengthening and grouts.

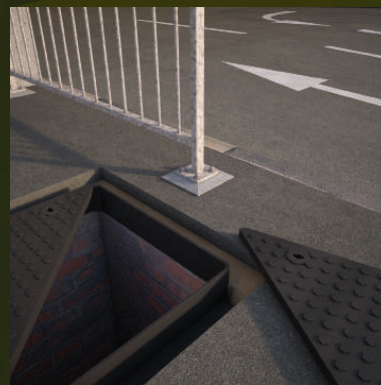
A variety of these solutions are demonstrated here in the general structures that can be found on a nuclear power plant.



Decks, turning circles and ramps

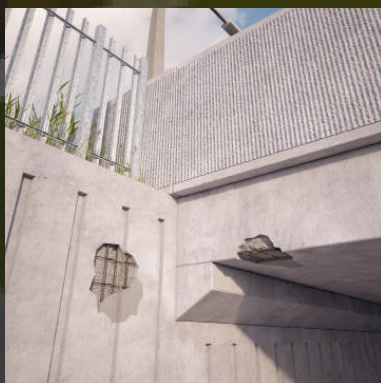
Nitodek range of car decking systems providing a highly durable solution for decks, turning circles, ramps and pedestrian walkways

- Patchroc GP and Paveroc patch repair mortars
- Thioflex and Nitoseal fuel resistant, high movement, joint sealant



Roadway and pavement repairs

- Fosroc® XR rapid setting bedding mortars for repairs, bedding-in ironwork and installing stone setts, paving and block pavements
- Conbextra and Lokfix grouts for fixing ironwork handrails and bollards



Parapet and concrete repair solutions

- Renderoc repair system for bridge strike, soffit repairs; spalling due to de-icing salts causing corrosion
- Dekguard anti-carbonation protective coatings
- Nitoseal roadway joint sealants

Cycle path/Footbridges

- Nitoproof anti-slip coating
- Nitoseal joint sealant



Car park deck coatings

- Nitodek flexible skid-resistant car decking systems providing a highly durable and aesthetically pleasing solution for exposed, intermediate and basement park areas.
- Nitodek UVR Topcoat, UV-stable coating for top deck
- Nitodek UV-LM line marking



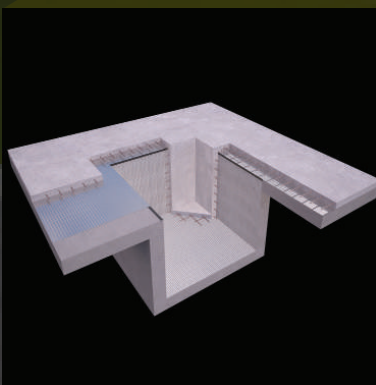
Stair and lift well

External

- Renderoc wall repair and fair facing mortars
- Dekguard protective anti-carbonation coating
- Nitoseal joint sealants

Internal

- Nitoflor FC anti-slip floor coating
- Fosroc® XR rapid setting mortar for repairs to steps
- Nitoseal floor joint sealant
- Conbextra and Lokfix grouts for ironwork reinstatement



Underground concrete structures

New build

- Proofex waterproofing membranes and drainage systems for basements and lift pits
- Supercast hydrophilic waterstops for non-movement joints

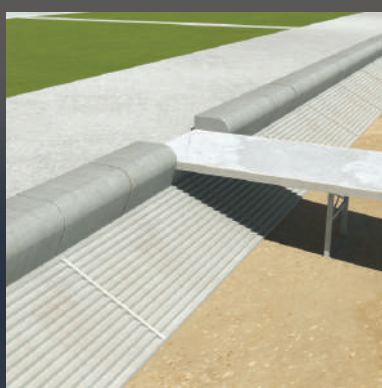
Repairs to existing structure

- Nitofill crack injection (non-structural)
- Proofex Cavitydrain internal drainage system
- Supercast PVC waterstopping systems
- Renderoc concrete repair mortars

Marine structures

Due to the aggressive nature of the marine environment, structures located in or near the sea have additional construction requirements. Harbours, jetties and sea / flood defence walls have to be built with materials that are resilient enough to withstand the impact of heavy seas, as well as the additional risk of corrosion caused by sea salts.

Fosroc offers a range of solutions that support these concrete structures and provide complete protection in the marine environment, including precast admixtures, the application of shotcrete; concrete repair products; and the use of joint sealants and surface coatings.



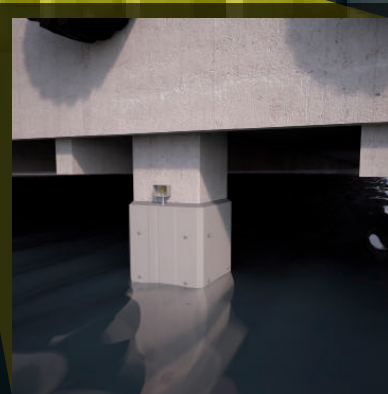
Fosroc sea and flood defence solutions

Precast concrete blocks – modular system solutions

- Auracast / Auramol admixture and demoulding agents
- Supercast SW hydrophilic waterstops and adhesive
- Hydrocell, Nitoseal, Thioflex jointing and sealants
- Mulseal DP and Polyurea WPE coatings
- Proofex waterproofing membranes and drainage
- Conbextra grouts
- Renderoc repair and water-stopping mortars
- Lokfix anchoring

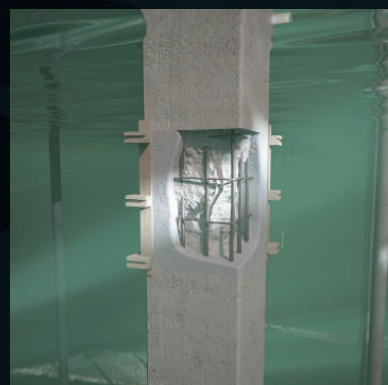
Shotcrete applications in conjunction with geotextile membrane systems

- Renderoc dry spray repair mortar
- Mulseal DP and Polyurea WPE coatings



Jetty corrosion and repair solutions

- Fosroc Marine Jacket
- Conbextra underwater grout
- Renderoc repair mortars



Combined cycle gas turbine plant

The latest CCGT Plants are very efficient and represent the simplest form of power generation. They combust gas directly in the first stage turbine, with the exhaust gasses then heating water via a boiler economiser. This produces high pressure steam to drive a second stage gas turbine, where both turbines are coupled to generators feeding electricity via on-site substations to the National Grid. As with all power plants, steam turbines, condenser cooling systems, water treatment plants and a secure water supply are required. (See case study on p17)



Cable tunnels
page 8

Substation
pages 6-7

Flood defence
page 12

Boiler room
pages 6-7

Turbine room
page 9

Water treatment plant
pages 6-7

Cooling towers
pages 6-7

Support buildings
pages 10-11

Energy from waste plant

EfW is suitable for smaller, more local and combined heat and power (CHP) plants. It generates low pressure hot water for residential and industry needs as well as electricity for the National Grid. Large volumes of residual waste are fed into a high temperature, air-assisted moving grate furnace with a boiler system to generate steam to drive a gas turbine. The power generation then follows a similar pattern to CCGT plants in terms of electricity distribution and water supply requirements. However, the fuel by-products require robust filtration and separation systems to ensure clean flue gas emissions, as well as material collections and recycling.

One of the major features of an EfW plant is the construction of a deep, watertight bunker (approximately 12 metres deep) for water collection. Fosroc's wide range of waterproofing products are perfect for this application. (See case study on p17)

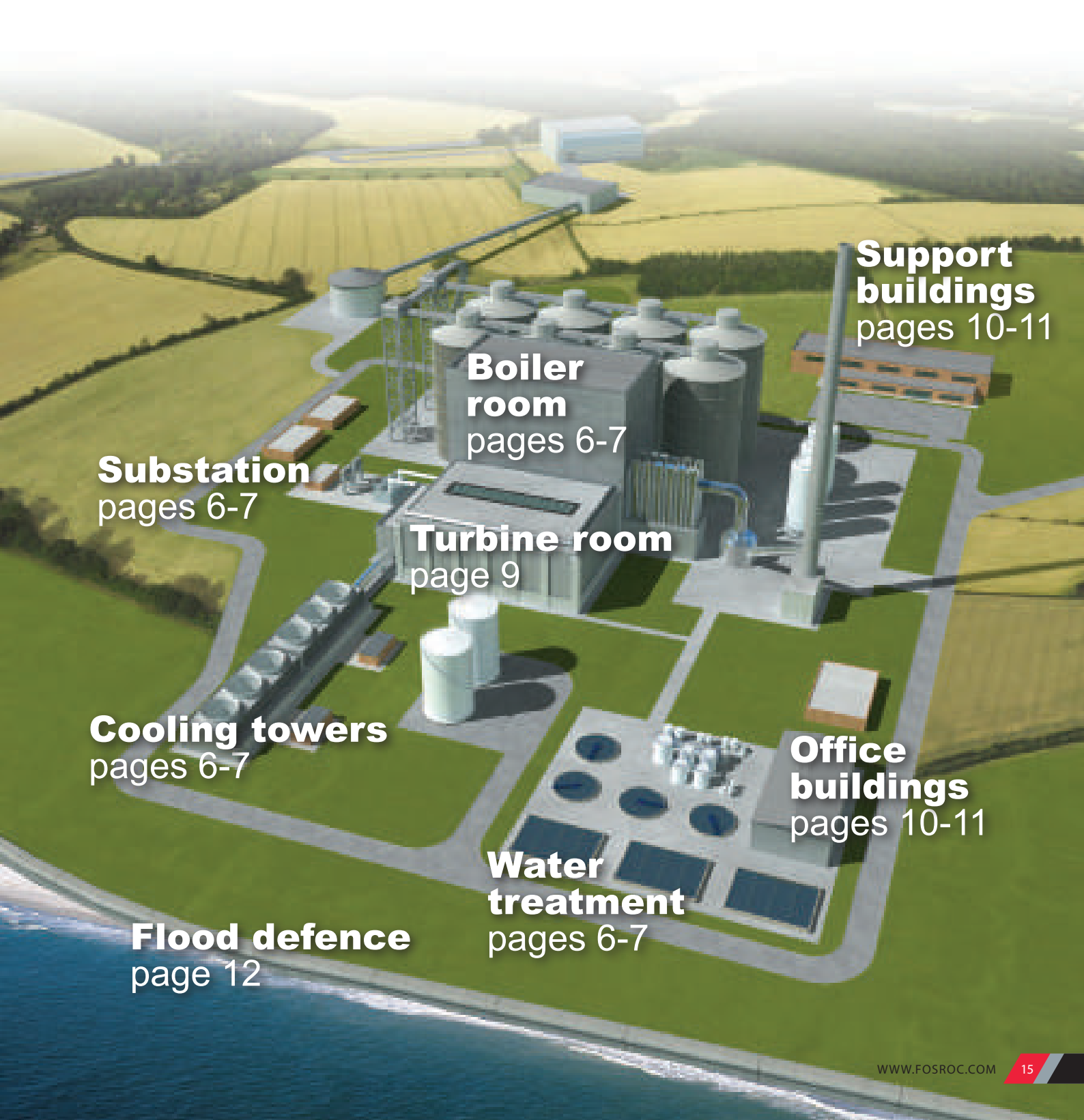


**Boiler
turbine room**
page 9

Concrete structures
pages 6-7

Biomass plant

Biomass is a fuel source consisting of wood waste or low grade new stock, often in the form of pellets. Biomass plants tend to have a similar layout to EfW plants, but instead of deep infeed fuel bunkers, they have bulk silo systems often fed directly via rail or port connections. The furnace, boiler, steam gas turbine, water supply, electricity distribution and flue gas emissions, together with residual separation and collections, are common applications.



**Support
buildings**
pages 10-11

**Boiler
room**
pages 6-7

Substation
pages 6-7

Turbine room
page 9

Cooling towers
pages 6-7


**Office
buildings**
pages 10-11

**Water
treatment**
pages 6-7

Flood defence
page 12

Clean coal plant

The new generation clean coal plants are more efficient and generate lower CO₂ emissions. They have coal gasification technology producing syngas via pressurised fluidised bed combustion, which in turn feeds into an integrated gas combined cycle similar to CCGT. It directly feeds the first stage turbine, then using combustion gasses from all sources, generates steam to feed a second stage turbine. In addition to the common water supply, electricity distribution and flue gas emission requirements, clean coal plants have carbon capture and storage systems linked to underground and offshore geological storage.



Coal bunkers
pages 6-7

**Substation and
cable tunnels**
page 8

**Boiler
room**
page 9

Tunnels
page 8

Turbine
page 9

**Water
treatment**
pages 6-7

**Support
buildings**
pages 10-11

Flood defence
page 12

Case studies

Magnox Nuclear Power Plant, Wylfa



Fosroc resolved an issue at Wylfa Power Station, Anglesey, where the roof joint on one of the main buildings needed to be repaired, re-sealed and then made watertight. Fosroc developed a specification to ensure watertightness and provided on-site support during several days of trials. The whole process was successful and several thousand meters of joints were subsequently sealed on the building, and resulted in further work on the site, including concrete repairs and grouting.

Thioflex 600: sealant for roof joints

Expoband H45: overbanding system

Baraka Nuclear Power Plant- BNPP – UAE



Emirates Nuclear Energy Corporation (ENEC) is developing the first nuclear power plant in the UAE. The project site area is **80** hectares where it is planned to build 4 Power Plant Reactors. The specification required a 47,000m² waterproofing system for the substructure. Fosroc specified Proofex PGP which was approved and successfully applied.

Proofex PGP: PVC waterproofing membrane system, loose laid with heat welded watertight joints

Energy from Waste Facility, Ardley



Opened in 2013, Ardley EfW processes around 300,000 tonnes of non-hazardous, post-recycling and residual waste. One of the challenges included a 12m deep basement built over an Artesian Well, alongside requirements for waterproofing, grouting, flooring and sealant work. Working with Tata Projects, Fosroc ensured the specification for the scheme was robust and crucially buildable.

Proofex Engage: chemically resistant basement barrier

Supercast SW20: used to reinforce the floor to wall joint

Conbextra GP and HF: base plate grouting

Nitocote EN901: protection against acid spillage

Nitoflor Hardtop S: finish for heavily trafficked concrete floor

Combined Cycle Gas Turbine (CCGT) Power Plant, Pembroke



With a total generating capacity of 2,160MW and thermal efficiency of 60%, the Pembroke Power Station is one of the largest and most efficient CCGT power plants in the UK. The new natural gas fuelled compact industrial plant was constructed on a site formerly occupied by an oil-fired power station. Fosroc products were supplied over a 3 year construction period to different areas of the project:

Supercast Hydrofoil PVC waterstops: used in construction joints in the large pits beneath the turbine rooms

Renderoc HB40: concrete repairs to the water intake

Paveroc: concrete repairs to the water outfall

Conbextra GP: baseplate grouting of machinery

Nitoflor Hardtop S: floor finishes

Case studies

South Hook LNG Terminal, South Wales



At South Hook, as part of the repair and strengthening of existing jetty and mooring structures, a cathodic protection system was installed. A compatible, sulphate resistant, cementitious material was required to cover a surface area of 14,000m², at a thickness of 25mm. Fosroc's dry-spray concrete repair system **Renderoc DS** was used as a template for developing a material specifically for this project.

Demokret Eco D1: mould release agent, used on 125 precast concrete decking sections

Conbextra TS: anchoring supports into the precast units

Lokfix: anchoring in rails for dolly system used to transport units to the jetty

Power Station, Lochaber



Fosroc supplied the new floor for the aluminium smelter power station at Fort William, as part of a major five turbine generator refurbishment. A durable and cost effective solution was required for replacing the uneven existing floor after the old turbines were removed.

Cemtop XD: heavy duty, highly abrasion resistant self-levelling screed.

Nitoflor FC130: high performance epoxy resin floor coating was applied to provide an aesthetic floor with a dust-proof, easily cleaned, chemical resistant finish.

Ratcliffe-on-Soar Power Station



External refurbishment was required to five of the eight steel-reinforced concrete cooling towers. The towers are 118m tall, with a base diameter of 95m, 45m at the top and 37m at the neck. The 40-year-old structures required a repair mortar that could protect from further carbonation and could be applied in thicknesses in excess of 50mm. The material needed to be lightweight due to the difficult application conditions.

Nitoprime Zincrich: galvanic protection for exposed reinforcing steel

Renderoc HB40: repair mortar applied at a thickness of 50mm

ABB Interconnector, Shotton, Deeside



The construction of a converter station on Deeside was required as part of the £560m interconnector project, designed to link the Irish and UK electricity grids. The contractor faced issues of ground subsidence, gas contamination and water ingress associated with high tides. Fosroc provided a solution encompassing water and gas proofing, joint sealing and concrete repair.

Proofex Engage: water and gas proofing membrane

Proofex WG: liquid resin pile cap waterproofing.

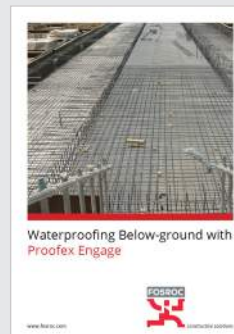
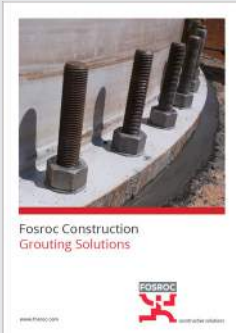
Thioflex 600: oil resistant sealant for substructure joints

Renderoc FC and Renderoc ST05: concrete repairs

Fosroc product group offer

Application	Product	Benefits
Concrete		
Precast concrete	Auracast PC Admixtures	Excellent rheology at low w/c ratios leading to high quality finish. Ideal for tunnel segment manufacture.
In-situ concrete	Auramix PC Admixtures	Increased early and long term strength of concrete. Reduced bleeding and segregation. Reduced overall application costs.
Mould release	Auramol	Biodegradable, easily sprayed, clean quick stripping of formwork.
Underwater concrete	Conbextra UW	Minimises washout of concrete placed underwater.
Shotcrete	Sprayset Shotcrete Range	Consolidation of rock structures.
	Conplast	Range of shotcrete accelerators.
Corrosion control	Fosroc Marine Jacket	Reinstatement and cathodic protection of severely exposed reinforced concrete.
Grouts & Anchors		
Anchoring	Lokfix Range	For vertical, overhead and horizontal anchors.
Grouting	Conbextra Range	Cementitious and resins systems. Thixotropic and pumpable grades, bridge bearing grout, tunnel segment grouting.
Tunnel annulus grouting	Cebex Range	Wet & dry condition admixtures, anti-washout, low strength void filling properties.
Concrete Repairs		
Concrete repair	Renderoc Hand, Spray or Flow Applied Mortars	Fast setting. High strength. High-build, low shrinkage.
Pavement repairs	Patchroc GP, Paveroc	Emergency patch repairs – small/large areas.
Rapid repair and highway maintenance	XR Range	Fast setting bedding mortars.
Waterproofing		
Waterproofing membranes for basements and below ground structures	Proofex Engage	Assured waterproofing due to mechanical bond to fresh concrete. Excellent non water-tracking performance. Easy, quick installation.
	Polyurea WPE	Shortened construction times due to rapid setting properties. Spray-applied seamless system.
	Proofex 3000, Proofex 3000MR	Self-adhesive, easy to apply. Waterproofing basements grades 2 & 3. Gas proof grade.
	Proofex Total	Totally gas impervious membrane.
	Proofex PGP	Loose laid PVC membrane.
	Proofex Alkorplan	Tunnel PVC lining system membrane.
Drainage membrane	Proofex Sheetdrain	Rapid water dispersion due to high flow capacity. Single cuspated for ease of application.
Concrete joints	Supercast PVC	Economical PVC profiles.
	Supercast SW	Basic polymer swellable waterstops giving excellent long term wet/dry cycle durability.
Water resistant concrete	Conplast WP402	Integral water resisting admixture for ready mix concrete. Reduces porosity and permeability.
Joint Sealants		
Civil engineering sealants	Nitoseal, Thioflex 600	Excellent adhesion, forming tough high chemical resistant seal.
Fire rated joint sealants	Flamex Range	Fire tested to BS476 Pt 20. For overhead and wall joints.
Pavement sealants	Colpor 200PF	Highly durable, fuel resistant.
Coatings		
Anti-carbonation	Dekguard Range	Highly durable and resistant to weathering. Decorative and protective.
Chemical resistance	Nitocote Range	Tough, chemical and abrasion resistant finish suitable for a range of environments.
Slip resistant	Nitoproof 800	Seamless, durable fire-resistant waterproof UV stable - for balconies and walkways.
Steel protective coating	Nitoprime Zincrich Plus	Anti-corrosion primer used with Renderoc.
Flooring		
Self-levelling screeds	Cemtop Range	Cementitious flooring systems.
Floor coatings	Nitoflor Range	High performance epoxy resin, PU and anti-static coatings.
Floor joint sealant	Nitoseal MS300	Tough, abrasion resistant one part sealant.
Car park decks and walkways	Nitodek Range	Flexible skid-resistant for exposed and intermediate decks.

Fosroc offers a full range of construction chemical solutions, helping to protect structures throughout the world. Please refer to our brochures, which include:



Details of your local Fosroc office can be found at
www.fosroc.com

Important Note

Fosroc products are guaranteed against defective materials and manufacture and are sold subject to its standard terms and conditions of sale, copies of which may be obtained on request. Whilst Fosroc endeavours to ensure that any advice, recommendation, specification or information it may give is accurate and correct, it cannot, because it has no direct or continuous control over where or how its products are applied, accept any liability either directly or indirectly arising from the use of its products, whether or not in accordance with any advice, specification, recommendation or information given by it.



constructive solutions