



# Fosroc Solutions for the Thermal Power Industry

[www.fosroc.com](http://www.fosroc.com)





# 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.

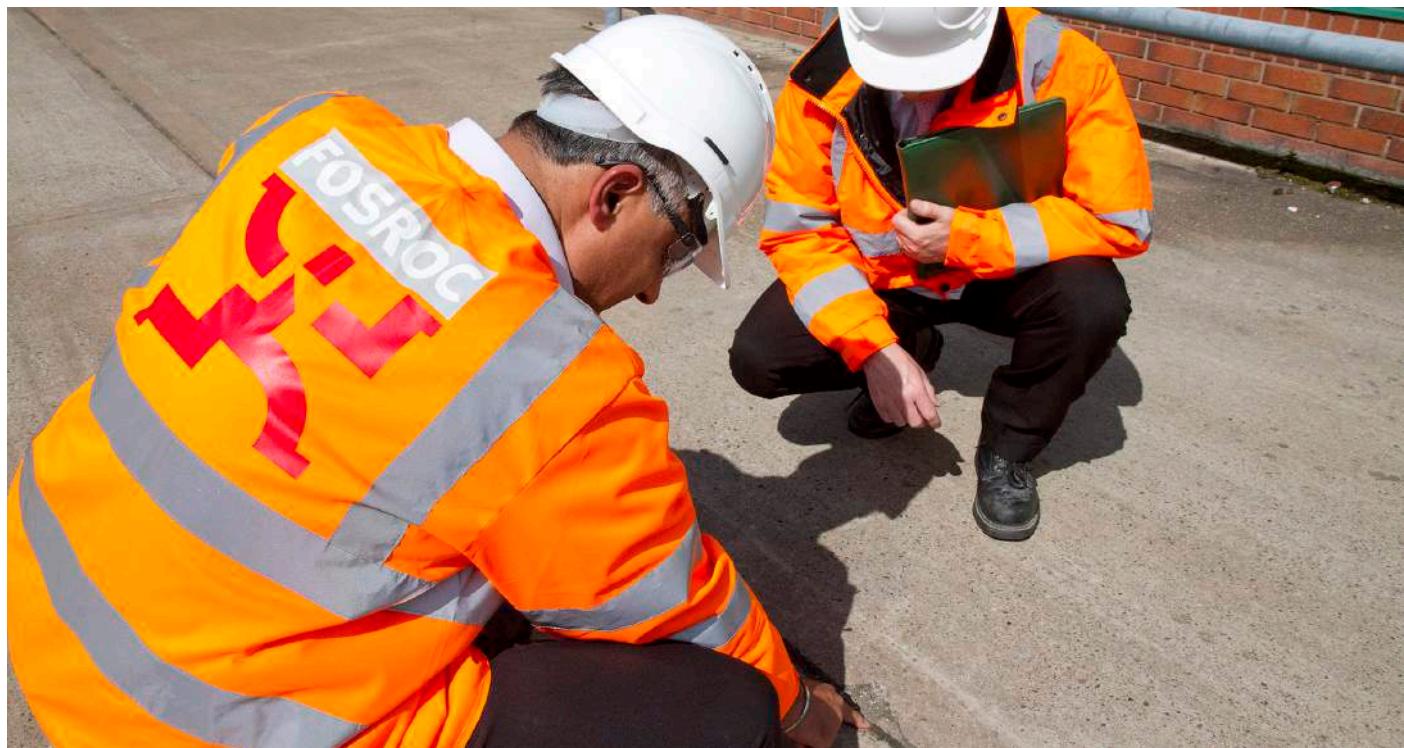
Fosroc has an extensive network of offices and manufacturing locations across Europe, the Middle East, India, North and South Asia, and is further represented in other regions across the world by distributor and licensee partners.

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:

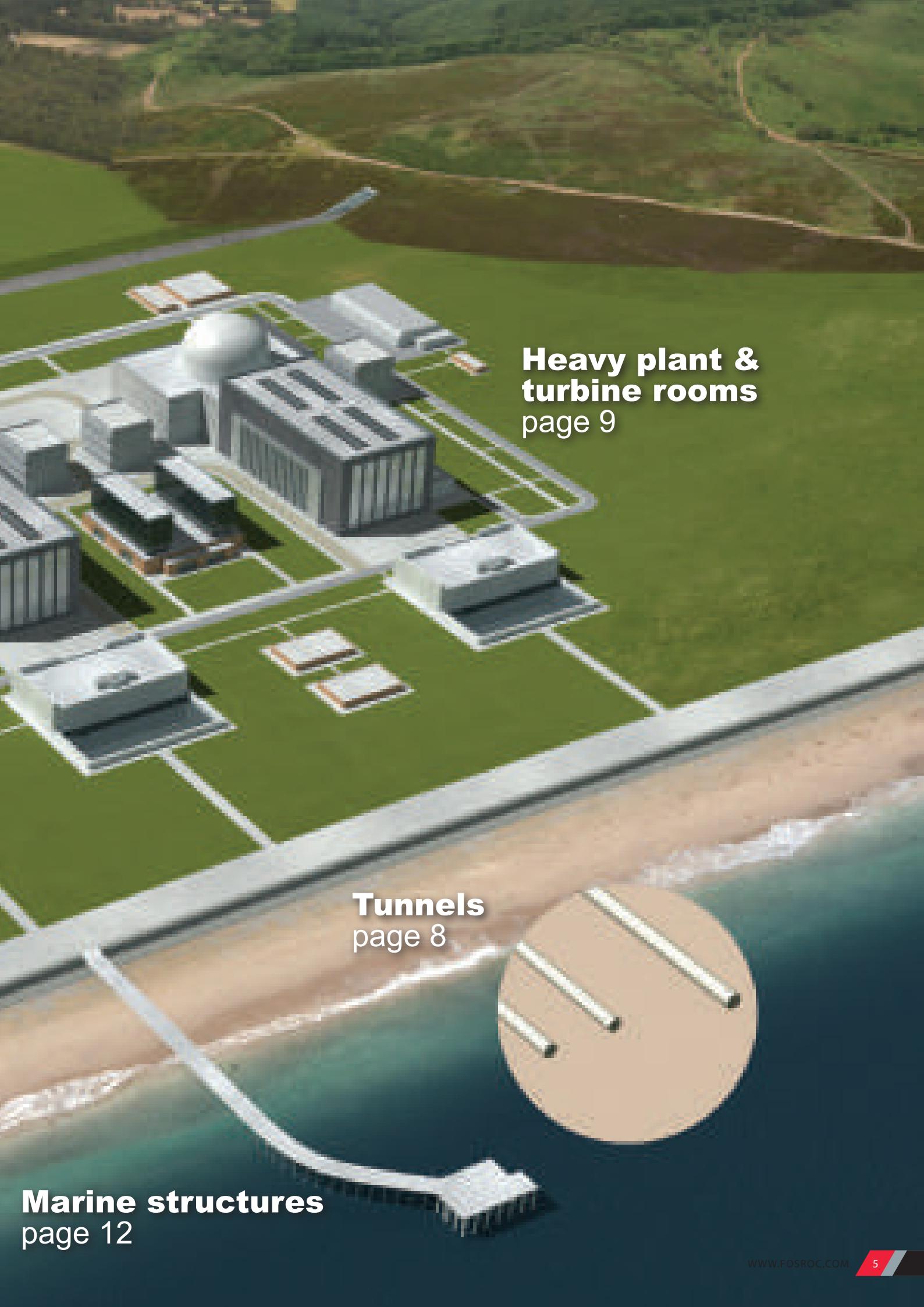
- Combined Cycle Gas Turbine
- Energy from Waste
- Biomass
- Clean Coal

## **Support buildings, car parks and bridge solutions**

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## **Concrete structures, Nuclear power plants**

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**Heavy plant &  
turbine rooms**  
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# 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

Paveroc 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  
Combextra PM structural grout for gaps in precast units  
Combextra 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



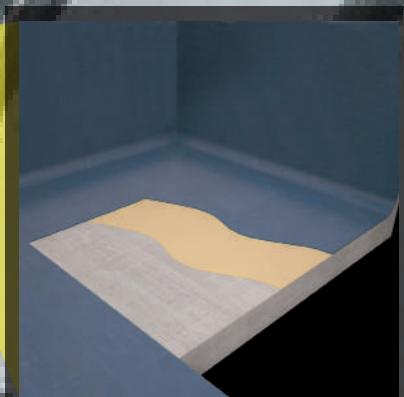
## Concrete repairs and coatings

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



## Below ground and tank structures

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



## Floor, bund and tank coatings

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

# Tunnel solutions

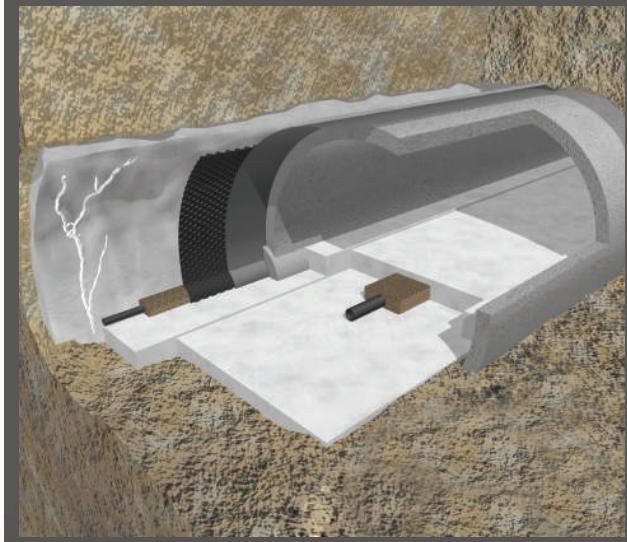
Access routes such as road, rail and pathways may have to be constructed below ground. Tunnels are also used for cable routes, power transmission and for supplying water to cooling systems. Due to limited access, tunnels require durable and low maintenance construction solutions.

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



- 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, Combextra and Lokfix grouts

## Cut and cover



# 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

- Galvafroid 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

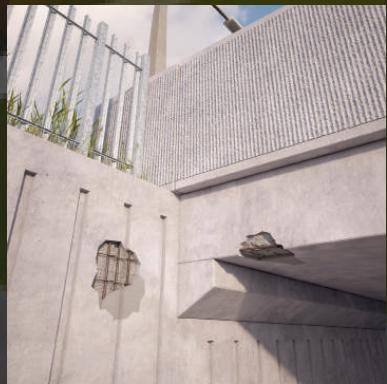
- Fosroc® XR rapid setting bedding mortars for repairs, bedding-in ironwork and installing stone setts, paving and block paviours
- Conbextra and Lokfix grouts for fixing ironwork handrails and bollards

## 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



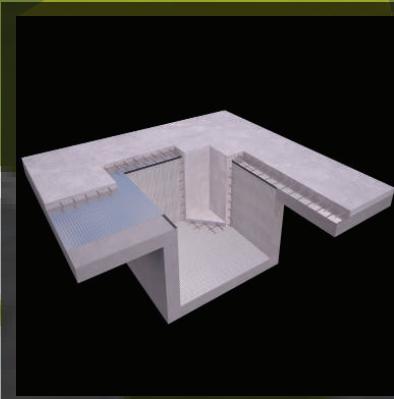
## Stair and lift well

### 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
- Combextra 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

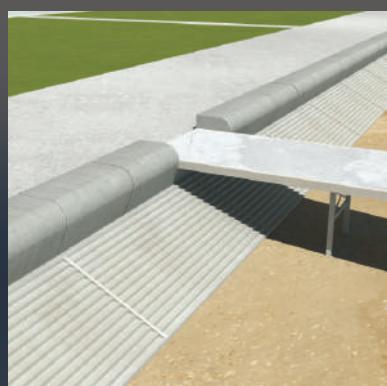
### Repairs to existing structure

- 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

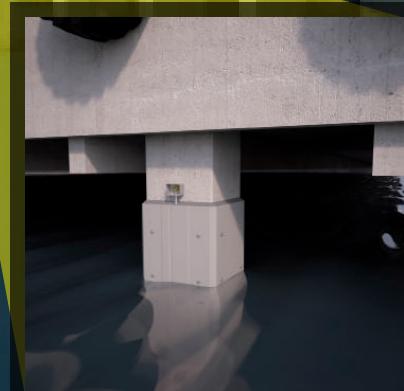
Renderoc repair and water-stopping mortars

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

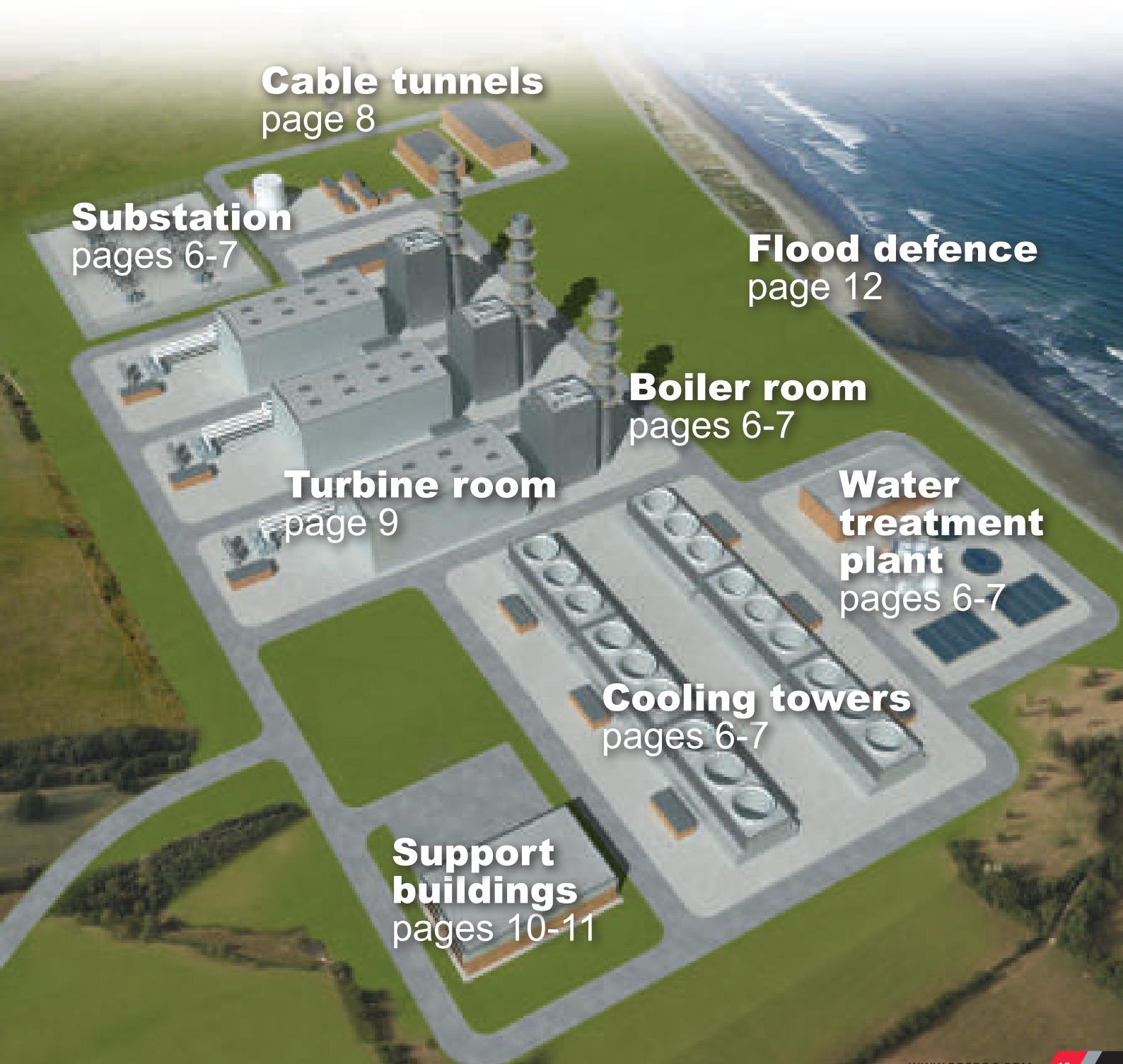
Conbextra underwater grout

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)

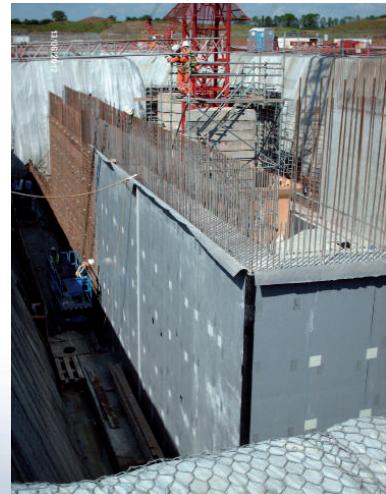


# Energy from waste plant



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)

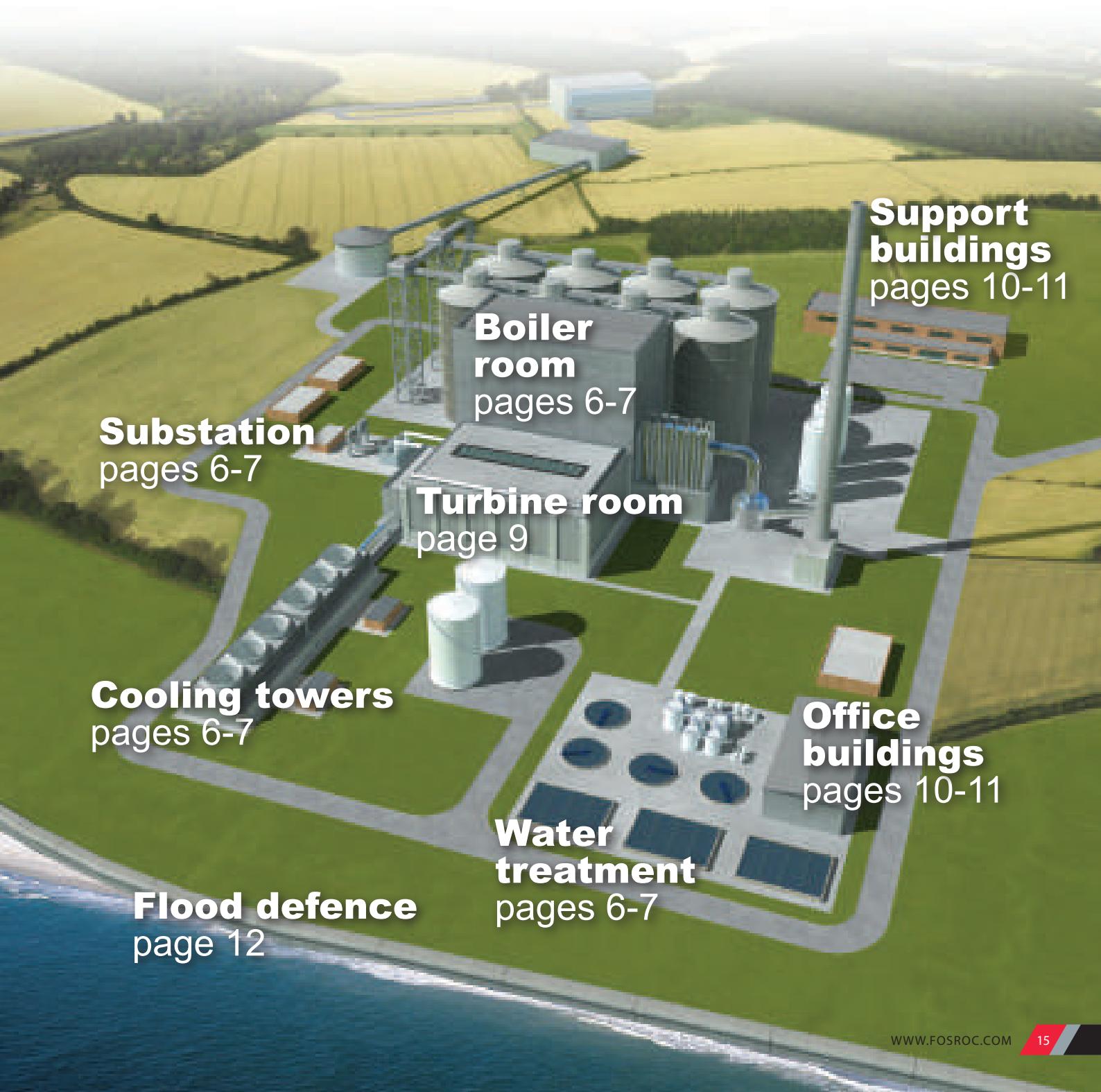


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turbine room**  
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# Biomass plant

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.



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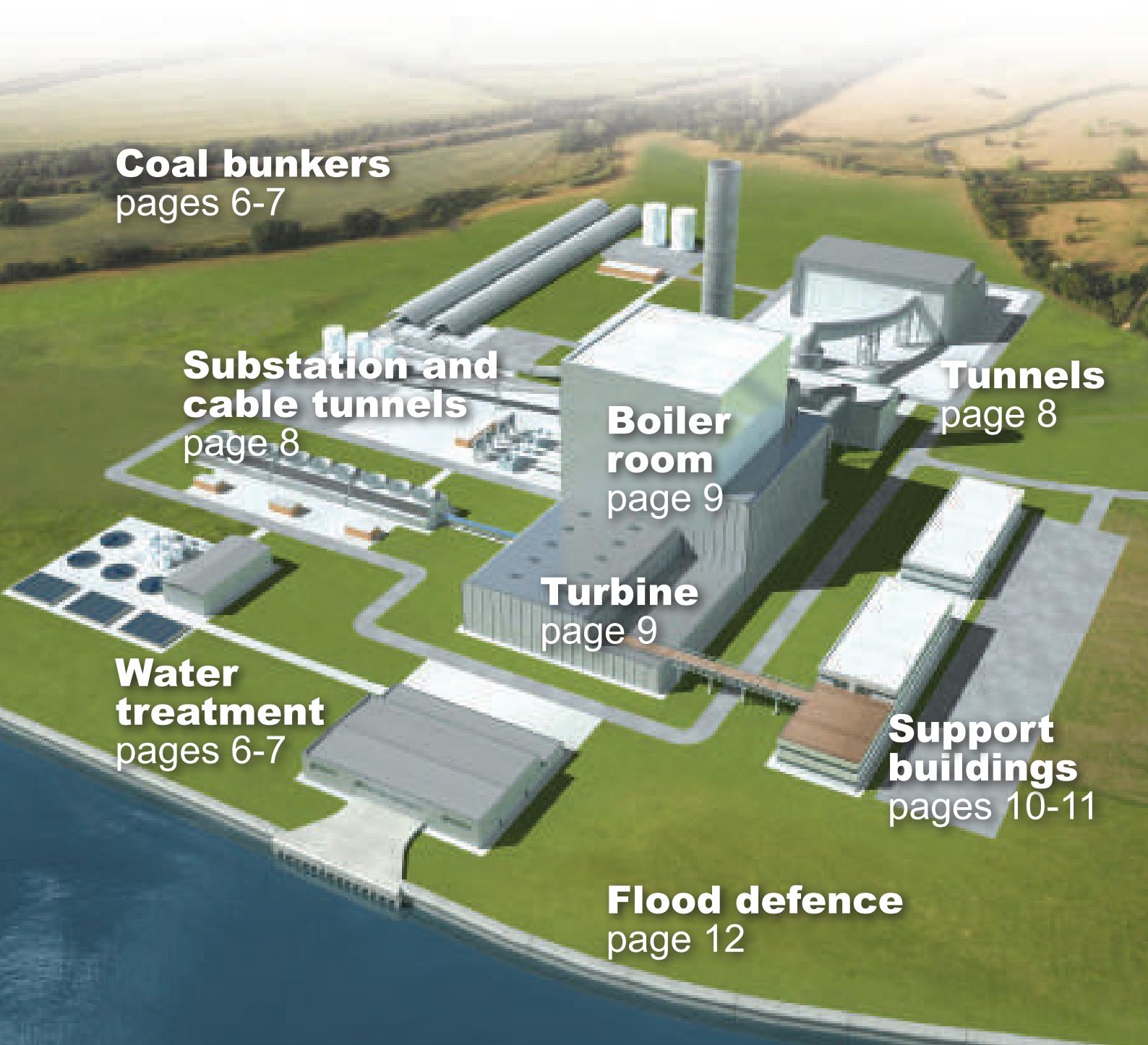
**Turbine room**  
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**Office  
buildings**  
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# Clean coal plant

The new generation clean coal plants are more efficient and generate lower CO<sub>2</sub> 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.



# 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 47,000m<sup>2</sup> 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.

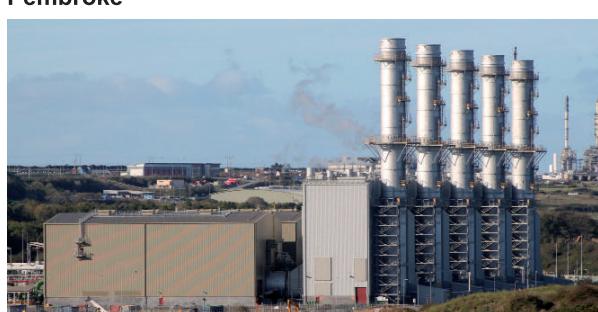
**Proofex Engage:** chemically resistant basement barrier  
**Supercast SW20:** used to reinforce the floor to wall joint

**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 14,000m<sup>2</sup>, 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 convertor 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.

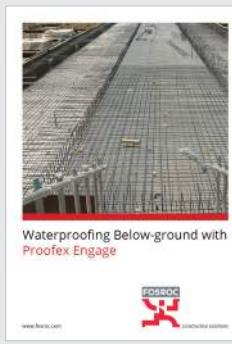
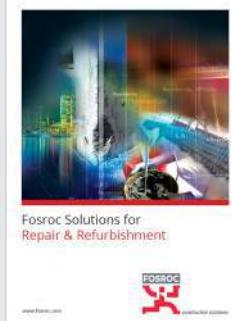
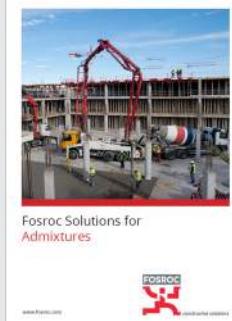
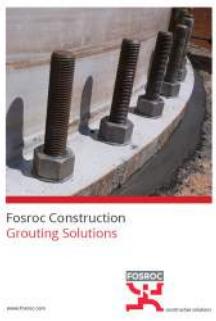
**Thioflex 600:** oil resistant sealant for substructure joints

**Renderoc FC and Renderoc ST05:** concrete repairs

# Fosroc product group offer

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

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