

Environmental Report ➤

Environment and Health & Safety

2010



General information

Name and address

Aalborg Portland A/S
Nordic Cement
Rørdalsvej 44
P.O. Box 165
9100 Aalborg
Denmark
Tel. +45 98 16 77 77
Fax +45 98 10 11 86
E-mail: cement@aalborgportland.com
Internet: www.aalborgportland.dk

Environmental supervisory authority

Danish Ministry of the Environment,
Environmental Protection Agency Aarhus.

Industrial sector

Raw materials processing.

Main activity

Production of cement for domestic and export markets.

List item

B 101. Cement plants (i) (s)

Company reg. no.

14 24 44 41

Production unit no.

1.002.952.999

NACE code

23.51 – Production of cement.

Land register title nos.

1a, 1k, 1l, 1m, 1n, 1p, 1o Rørdal, 9a Ø. Sundby and 9a, 10g, 11a, 16i, 17l, 21h, Utrup under Aalborg Jorde.

Significant secondary activities

K212. Facilities for storing, transshipment, repackaging or sorting of non-hazardous waste prior to use or disposal.

Ownership

Aalborg Portland A/S is 75% owned by Cementir España S.L., Madrid, Spain, and 25% owned by Globocem S.L., Spain. The ultimate owner is Caltagirone S.p.A., Italy.

Management

The Environment & Energy Group:
Kjeld Pedersen, Managing Director
Jesper Høstgaard-Jensen, Director – Production
Preben Andreasen, Environment & Energy Manager
Charlotte Birkholm Kristensen, Health & Safety Manager

Principal environmental approvals

19 November 2010

Use of tyre chips as fuel in Kiln 87.

7 April 2010

Use of meat and bone meal as fuel in Kiln 76.

18 December 2009

General environmental approval and review, covering environmental approval of expansion of activities at recycling site, and review of the company's older environmental approvals.

6 December 2006

Approval of transitional plan for on-site landfill.

6 December 2006

Approval of closure plan for tip.

5 November 2004

Permission to quarry chalk.

28 July 1992

Establishment of landfill site.

29 November 1991

Final permission for water recovery.

29 June 1990

Permission under the Danish Environmental Protection Act to send waste water to the municipal treatment plant.

31 August 1983

Approval of existing landfill site.

Aalborg Portland is not covered by the Danish Ministry of Environment's regulations for the safe storage, handling and transport of materials that can cause serious environmental hazard in the event of accident.

EMAS and ISO 14001

Aalborg Portland has been certified according to ISO 14001 since 3 July 1998 and EMAS registered since 2 March 2000.

Audit statement and EMAS registration

KPMG has issued an opinion with reasonable assurance on Environmental Report 2010 for Aalborg Portland A/S. The report has also been verified by Bureau Veritas according to the EMAS declaration, cf. page 32.

Brief qualitative description

The Environmental Report 2010 covers the parent company Aalborg Portland A/S situated at 44, Rørdalsvej, 9220 Aalborg Øst, Denmark.

Aalborg Portland is one of Denmark's leading industrial companies. The factory covers a total area of 320 ha, including the chalk pit of 200 ha. In addition to cement production facilities there are two on-site landfills, one of which is now full up and closed, and a recycling site.

The following cements are produced:

BASIS® cement, **RAPID®** cement, **AALBORG WHITE®** cement, **ELEMENT** cement and **LAVALKALI SULFATBESTANDIG** cement.

Additionally, other types of cement are produced for export.

Output in 2010 totalled 1.5 million tonnes, of which around 40% was exported. In the course of production, flue gases, waste materials, waste water, surface water and cooling water were released which impact the environment. For more details, see report sections "Principal environmental loads" and "Material flows".

The Environmental Report 2010 covers the period 1 January - 31 December 2010.

The next Environmental Report will be issued no later than April 2012.



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Environment and health & safety at Nordic Cement 2010

This report describes Aalborg Portland's activities and performance in the environmental and health & safety domain relating to cement production in Denmark in 2010.

Aalborg Portland's interaction with Danish society has developed over many years. Aalborg Portland is important to Denmark as a provider of jobs, including jobs with subcontractors. Among other things, value is added to the public realm through payment of taxes and employee purchasing power. As well as this purely economic dimension, however, Aalborg Portland also has a very important social dimension relating to environment and energy. For example, in 2010 district heating based on waste heat from cement production was supplied to 24,000 households in the city of Aalborg and chalk slurry from Aalborg Portland was exchanged for FGD gypsum from the power generator Vattenfall. Furthermore, waste was recycled by Aalborg Portland as alternative fuel – wherever possible carbon-neutral biofuel.

Using alternative fuel to replace coal and petcoke helps prolong the world's accessible stocks of fossil fuel and to utilise the waste produced by a modern welfare society. Using alternative fuel also supports the Danish Government's energy action plan.

Another year of low demand for cement meant that total production for 2010 was 1,534 million tonnes, a fall of 1.5% on 2009. Output was therefore still very low relative to available production capacity.

Owing to the decreased production and the use of CO₂ neutral alternative fuel, carbon dioxide emission was down by around 100,000 tonnes on 2009. However, specific emission per tonne of cement produced increased due to the changes necessitated in kiln operating methods. As the base load remains the same irrespective of the volume of cement produced, maintaining or reducing the specific energy consumption and the related emission of CO₂ etc. therefore presents a challenge.

Emission of NO_x (nitrogen oxide) has fallen by 75% from 8,170 tonnes in 2006 to 2,153 tonnes in 2010. This is due to reduced operation, optimised scrubbing and the use of alternative fuel. In addition to costs incurred from investment in scrubbing equipment, the fall in NO_x emission is also resulting in increased operating costs in production for the purchase of ammonia water.

Efforts to reduce factory power and fuel consumption continued in 2010. Since 2008 energy savings of 32.4 million KWh have been achieved, equal to the annual power consumption of 8,100 households.

As required under the terms of Aalborg Portland's revised General Environmental Approval, action plans and financial statements were submitted to the Danish Environmental Protection Agency Aarhus, which is the approval and supervisory authority for the Aalborg cement plant.

In addition, collaboration has begun with the planning and environmental authorities, the Danish Environmental Protection Agency, the Danish Nature Agency and Aalborg City Council, on implementing an Environmental Impact Assessment (EIA) for Aalborg Portland. Work is also under way to renew the quarrying permit for our chalk pit. As an element in this renewal, a rehabilitation plan that will make the quarry an attractive local amenity when quarrying is finished must also be presented.

In 2010, as in previous years, considerable focus was given to improving accident prevention. As a result of these efforts there were only 13 registered accidents in 2010, a 24% reduction on 2009. The trend is towards both a decrease in accidents and a decrease in accident severity as the number of working days lost per accident also fell.

Accident reduction remains a priority area that will play a significant part in the work of the Health & Safety Organisation in 2011.



In 2010 district heating based on waste heat from cement production was supplied to 24,000 households in the city of Aalborg



On 27 January 2011 a serious accident occurred in one of Aalborg Portland's cement grinding departments in which an electrician working for Intego, an outside contractor, died while servicing a travelling crane. While not the responsibility of Aalborg Portland this tragic accident has nevertheless prompted extensive additional inspection of work routines and safety measures aimed at preventing a repetition.

The activities, future areas of focus and goals of the Health & Safety Organisation are decided by the General Health & Safety Committee and discussed at the Organisation's annual meeting. Among the areas of focus for 2010 was the preparation of a Plant Protection Plan as an extension of the day-to-day contingency planning.

Kjeld Pedersen
Managing Director, Nordic Cement
April 2011

ENVIRONMENTAL REPORT 2010 – TARGET GROUP

Aalborg Portland's Environmental Report is intended to provide stakeholders with a straightforward insight into the company's principal environmental loads and health & safety work and initiatives taking place to implement ongoing improvements. The report also outlines the way in which the company's environmental management system is used and the direction in which it is moving. The Environmental Report 2010 conforms to the statutory regulations.

Our stakeholders are:

Customers, employees, suppliers, present and future investors, financial institutions, insurance companies, public authorities, neighbours, political groups and non-governmental organisations.

Financial highlights and social contribution

Parent company Aalborg Portland A/S

Financial highlights

EURm	2009*	2010
INCOME STATEMENT		
Net sales	155	151
Variable costs	41	50
Gross profit	114	100
Other production costs	56	56
Sales costs	5	5
Distribution costs	21	22
Administrative expenses	15	16
Other operating income	1	1
Earnings before interest and tax (EBIT)	18	3
Income from subsidiaries	0	1
Financial income	3	3
Financial expenses	3	1
Earnings before tax (EBT)	18	6
Tax	5	1
Profit for the year	13	5
BALANCE SHEET		
Intangible assets	10	9
Property, plant and equipment	159	148
Financial assets	143	148
Total non-current assets	313	305
Total current assets	109	102
Total assets	422	406
Equity	303	308
Non-current liabilities	77	29
Current liabilities	42	69
Total liabilities	422	406
FINANCIAL RATIOS		
Return on equity	4%	1.6%
Equity ratio	72%	76%
Number of employees at 31 December	373	363

The Environmental Report 2010 covers the Parent Company Aalborg Portland A/S situated at 44, Rordalsvej, 9220 Aalborg Øst, Denmark.

Reference is made to Aalborg Portland's Annual Report 2010 in relation to accounting principles.

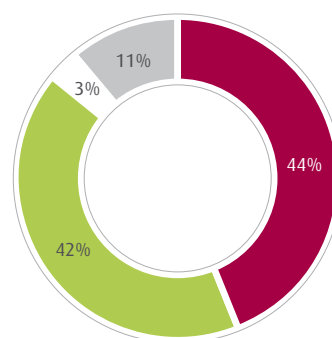
* Aalborg Portland A/S and CemMiljø A/S merged as at 1 January 2010 and the comparative figures for 2009 have been restated.

Social contribution

EURm	2010
Value added and Aalborg Portland's social contribution, by stakeholder	
Net sales	151
Spent on materials, services, depreciation etc.	106
Total value added for distribution	45
Distribution	
Society	20
Employees	19
Sources of funds	6
Distribution, total	45
Society	
VAT	3
Corporate tax	1
Employee tax	9
Green taxes	6
Other taxes	1
Society, total	20
Employees	
Wages, salaries, pensions after tax	19
Employees, total	19
Sources of funds	
Interest on loan capital	1
Provisions	5
Sources of funds, total	6

Social contribution

- Society
- Employees
- Interest on loan capital
- Provisions



Utility value and sustainable processes

Aalborg Portland works to promote sustainable development through extensive use of recycling of material flows from modern society in the production of cement.

Waste materials and homogenous by-products from other industries can be recycled and used as fuel and raw materials in cement production. In this way environmental load is reduced significantly.

Aalborg Portland started using fly ash, a waste product from power stations, as much as 30 years ago. Since then many further materials have been incorporated into the production process.

By recycling and using fuels and alternative raw materials in

the manufacture of cement, the wastes and by-products concerned are fully utilised. All the constituents are consumed and no new waste products are generated. High temperatures and special flow conditions mean that cement kilns are well suited to the use of alternative fuels and raw materials. In addition, filters and scrubbers inside the kiln system ensure efficient cleaning of flue gases, avoiding increased pollution from the factory.

In 2010 the Aalborg cement plant used 397,000 tonnes of alternative fuels and raw materials. This replaced an equal volume of raw materials and fossil fuels that would otherwise either have had to be excavated in Denmark or imported. Aalborg Portland has sufficient capacity to utilise 700,000 tonnes of alternative fuels and raw materials annually.

Sustainable processes



Manufacturer

Power stations
Navigation channels
Sulphuric acid – factory
Recycled paper – factory
Recycled aluminium – factory
Biomass-fired plants
Collection schemes
Daka Bio-Industries
Daka Biodiesel



Waste product

- Fly ash and desulphurisation gypsum
- Sand
- Iron oxide
- Paper sludge
- Aluminium-contain. by-products
- Dross
- Industry waste
- Meat and bone meal
- Glycerine



Cement production

- Alternative fuels and raw materials



Environmental benefit

- Recycling of alternative fuels and raw materials
- Utilisation of waste from other industrial production
- Lower emission of CO₂ and NO_x
- Fewer ultimate wastes and smaller quantities
- Lower overall environmental impact

Investments

in climate and environmental improvements



Aalborg Portland has continuously made large investments in climate and environmental improvements as well as in health & safety. In the period 2006-2010 a total of EUR 20m has been invested in a wide range of projects.

In 2010 Aalborg Portland invested a total of EUR 2.8m in climate and environmental improvements, including energy conservation projects, preventive safety measures and other health & safety initiatives.

Investment projects in 2010 included:

- Increased use of alternative fuel in Kiln 87
- New emission measuring equipment for kilns
- Reduction of water content in chalk slurry
- New economy lighting system in storage facility
- Use of preheated combustion air for auxiliary boiler for Coal Mill 7
- Central fire alarm system for rooms with electrical equipment, and replacement of Residual Current Circuit Breakers

A total of EUR 2.8m was also invested in maintenance of production plant. For example, dust emission is reduced by replacement of filters and energy consumption is improved by limiting false air intake during kiln operation. There is also considerable focus on production reliability. For example, replacing kiln lining bricks when necessary helps meet production targets.

Green taxes

Green taxes amounted to DKK 5.5m, principally relating to waste, electricity, PSO, raw materials, NO_x and SO₂.

Environment

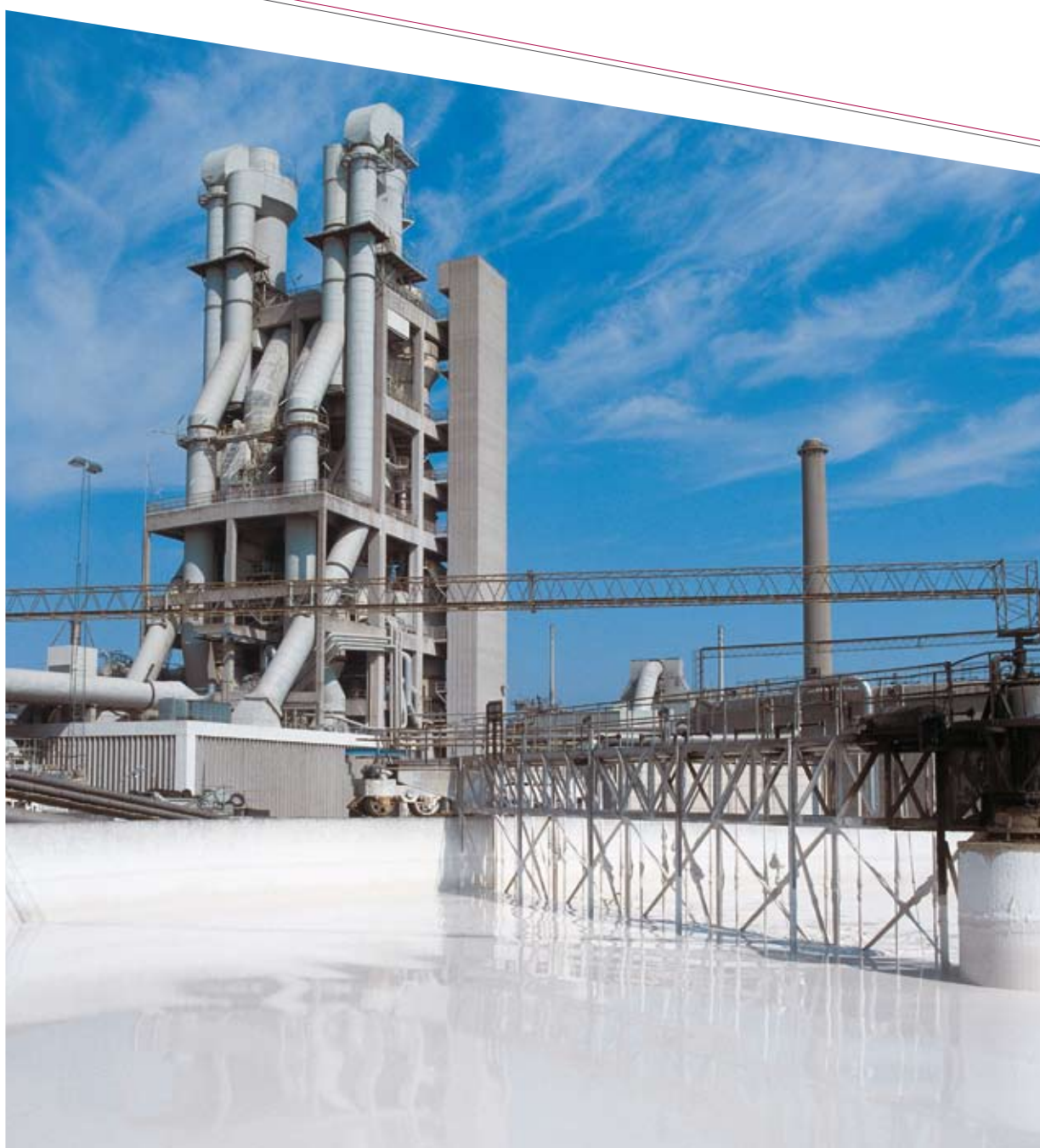
As well as paying for investments in environmental improvements, operating costs, green taxes and Health & Safety Organisation running costs, Aalborg Portland also pays the running costs for the Environment & Energy and Health & Safety sections. These operating costs totalled DKK 0.6m in 2010.





➤ Environmental vision

All companies belonging to Aalborg Portland A/S shall be responsible undertakings promoting sustainable development



Environmental and energy policy



This policy applies to the Aalborg Portland cement plant and to Danish storage terminals.

Aalborg Portland will:

- Respect statutory legislation and relevant official requirements.
- Inform the authorities if a limit is exceeded and prepare remedial action plans.
- Promote sustainable development and cleaner technology within the scope of economic feasibility.
- Set pro-active goals for future work and review the goals once a year at the management's seminar established for that purpose.
- Ensure that by developing and helping to develop sustainable cement and concrete products which improve the life cycle of concrete we support our customers in achieving their environmental goals.
- Protect the environment, among other things by using energy efficiency measures and energy management to reduce emissions and consumption of energy and raw materials per tonne of cement product.
- Inform our suppliers and subcontractors of relevant procedures and requirements.
- Adopt an active and open approach towards communication, knowledge and dialogue with customers, employees, authorities, neighbours, organisations and other relevant parties.
- Train and motivate our employees to ensure we meet the requirements of policies, goals and action plans.
- Oppose introduction of further anti-competitive green taxes and work for reduction in existing taxes.

To realise this policy we will:

- Maintain and develop an environmental management system covering environment, energy and CO₂. The system is certified according to ISO 14001, DS/EN 16001, and the Danish Energy Agency's supplementary requirements hereto, and is registered under the EMAS scheme.

- Publicise our policy, goals, action plans and results in the form of an annual Environmental Report.
- Formulate and utilise indicators as guidance mechanisms to achieve goals set.
- Assess our products, installations and major modification projects in relation to this policy.
- Be an active collaboration partner in Danish environmental and energy policy by utilising alternative raw materials and fuels.

SUSTAINABLE DEVELOPMENT

Aalborg Portland's commitment to promoting sustainable development is based on the following principles:

- Environment, including reduction of environmental footprint, shall be an integral part of the development in company activities.
- Environmental activities shall be effected through the participation of all employees and in dialogue with the community.
- Production and financial growth shall be accomplished without relative increase in consumption of energy, chemicals and other resources and without relative increase in emissions and wastes for the individual products.
- Environmental performance indicators shall reflect sustainable development.
- Efficient use of resources shall be promoted by means that include substitution of non-renewable resources and introduction of new technologies.
- The global perspective shall be included by means such as trading with CO₂ emission quotas, Joint Implementation and the Clean Development Mechanism.

Cement production and cement products

Cement is manufactured using the natural raw materials chalk and sand, the core ingredients in all cement produced at Aalborg Portland. The chalk is excavated from the company's on-site chalk pit, while the sand is dredged from Limfjorden at Hals Barre and Løgstør Rende, which also helps keep the fjord navigable.

Manufacture of cement

Aalborg Portland produces grey cement by the "semi-dry process". This starts with the chalk being processed in a slurry drum while the sand is ground in a sand mill. The two ingredients are then mixed to form a slurry which is injected into a dryer-crusher together with fly ash. In the dryer-crusher the material is converted with the help of hot flue gases into raw meal. This raw meal is conveyed via a separating cyclone to the cyclone preheaters where it is heated to 750° C.

In the calciners the raw meal is further heated to 900° C, releasing the carbon dioxide. The material then enters the 74-metre long rotary kiln where it is gradually heated to a temperature of 1500° C to form cement clinker. After cooling, the clinker is ground in the cement mill to a fine powder to which a few percent of gypsum is added.

In 2010 heat recovered from the flue gases during production of white cement was supplied to the city of Aalborg and was sufficient to meet the district heating requirements of 24,000 households.

A quality product

The finished product is cement, which is ready for use in building projects of all sizes worldwide. A quality product that is easy to use in concrete and mortar, and cement adds strength, stability and durability to buildings and structures.

Aalborg Portland's cement products

Aalborg Portland manufactures both white and grey cement of high quality. The products are distributed in bulk and in bags to both the domestic and export markets.

Cements manufactured for the Danish market include the following:

BASIS® AALBORG cement

Used as a binding agent in production of concrete or mortar and suitable for general concrete making. This is an environment-friendly product as it incorporates microfiller, which means that less energy per tonne of cement is used in production.

RAPID® AALBORG cement

Suitable for general concrete making, but ideal for floors and screeds. Also suitable for masonry mortars, including lime cement mortars used for rendering etc.

AALBORG WHITE® cement

Suitable for general concrete making, but the product of choice when the specification calls for particular whiteness or when a light colour is required for pigmentation.

MESTER® AALBORG cement

Specially developed for use as a binding agent in production of lime cement mortars and in masonry and rendering mortars.

LAVALKALI SULFATBESTANDIG cement

Specially developed for concrete used for civil engineering, including bridges etc. exposed to alkali-silica reactions and structures in contact with sulphate in groundwater.

ELEMENT cement

Suitable for general concrete making when sulphate resistance, extra low alkali content or whiteness is not required. Ideal for making concrete building components and dry mortars.



C. F. Møller Architects – Photographer Helene Høyer Mikkelsen

Aalborg waterfront

Climate targets 2011

Climate and energy – targets, initiatives and results

TARGETS 2010

Replace minimum 40% of the fuel energy used in grey cement production (Kiln 87) by alternative fuel that reduces CO₂ emission. Completion date for granted project is 2011.

The target for 2010 is 30%. The breakdown for Kiln 87 is:

CemMiljø fuel	22%
Meat and bone meal	1%
Glycerine	1.5%
Tyre chips	4%
Paper pulp	1.5%

Replace 9% of fuel energy in white cement kilns with meat and bone meal.

Continued focus on reduction of CO₂ emission via increased use of biofuel and later via development of new cements.

Reduce CO₂ emission from grey cement production by 1.5% in relation to 745 kg CO₂/tTCE in 2009.

Reduce CO₂ emission* from white cement production by 2% in relation to 1,197 kg CO₂/tTCE in 2009.

With experience from the FUTURECEM project the aim is to develop types of cement that in the long term may be able to be produced with lower energy consumption and, for some types, with up to 30% lower CO₂ emission.

The following will be initiated in 2010:


- Full-scale grinding trials with the new nano-clinker.
- Testing of the newly developed cement by customers with a view to verification of cement properties and acceptance among building sector players.


Continued low production is expected in 2010 with no change in base load. The 2010 target of a 6% reduction in specific electricity consumption against 131.4 kWh/tTCE in 2005 cannot be achieved. In 2010, put concrete focus on electricity economy measures and base load.


The target for 2010 is a saving of 1,000 MWh by electricity economy measures.

-  Target achieved
  Improvement target
  Target not achieved
  Activity target


STATUS 2010


 The outdoor storage facility has been completed. Investment has been approved for a larger waste handling facility, but the project is currently being reviewed due to changed market conditions.

 Target not achieved due to periods with smaller than planned supplies of CemMiljø fuel. 24.5% of the fuel energy for Kiln 87 has been replaced.


 Target not achieved due to periods of unstable kiln feed and shortages of meat and bone meal. 7.7% of the fuel energy for white cement kilns has been replaced.

CO₂ emission from production of grey and white cement was reduced by a total of 73,027 tonnes.


 CO₂ emission from production of grey cement was 809 kg CO₂/tTCE, an increase of 8.6% on 745 kg CO₂/tTCE in 2009. This was due to smaller sales of grey cement and resulting periods of reduced production on Kiln 87. The specific energy consumption at full production was therefore not achieved, which led to the specific CO₂ increase.


 Target not fully achieved due to smaller than planned consumption of CO₂ neutral meat and bone meal. CO₂ emission* from white cement production was 1,191 kg CO₂/tTCE, a fall of 0.5% in relation to 1,197 kg CO₂/tTCE in 2009.

Under a project funded by the Danish National Advanced Technology Foundation, Aalborg Portland together with F.L.Smidt, iNANO/Aarhus University and Energiteknik/Aalborg University will develop production equipment for new Supplementary Cement Materials (SCM).

 → Full-scale grinding trials with nano-clinker have been implemented with a view to producing a new version of grey cement.


 → Testing has not been carried out due to the building industry slowdown.


 Total electricity consumption fell by 8,109 MWh in relation to 2009. However, specific electricity consumption was 148.4 kWh/tTCE, an increase of 13% on the target for 2010. This was due to the factory's "base power load" which has not decreased in step with the fall in production from 2005.


 A number of power-saving projects were effected in 2010 which yielded an annual total saving of 1,438 MWh:

- 1,002 MWh/year (Reduction of water content in chalk slurry for grey cement production).
- 17 MWh/year (Optimised ventilation system for conference room in "A" wing).
- 175 MWh/year (Cooling of server room in central control room).
- 76 MWh/year (New lighting system in storage facilities).
- 62 MWh/year (Minimised false air intake on Kiln 87).
- 6 MWh/year (Energy-saving power strips fitted to IT and office equipment).


TARGETS 2011

 Replace minimum 40% of the fuel energy used in grey cement production (Kiln 87) by alternative fuel which reduces CO₂ emission. Work continues on the final form of the granted project with a view to flexible use of alternative fuel.

 In 2011 the target is to replace 33% of the fuel energy used for Kiln 87.

 Replace 9.4% of the fuel energy used in white cement production by means of meat and bone meal.

Continued focus on reduction of CO₂ emission by means of increased use of biofuel and later by development of new cements.


 Reduce CO₂ emission from grey cement production by 9% in relation to 809 kg CO₂/tTCE in 2010.

 Reduce CO₂ emission* from white cement production by 2% in relation to 1,191 kg CO₂/tTCE in 2010.


 The goal is to develop cements which in the long term consume less energy in production and in some cases produce up to 30% less CO₂ emission.


The goal in 2011 is to:

-  → Initiate the SCM project for new Supplementary Cement Materials
-  → Initiate and carry out documentation activities for the new cements and ensure market acceptance of these cements

 New strategy/objective for 2011-15 focused on power-saving measures and reducing base power load.

 The goal is to reduce specific variable power consumption by 2.5% by 2015 in relation to 118 kWh/tTCE in 2010.

 The goal is also to reduce the base power load by 5% in relation to 44,764 MWh in 2010.

 In 2011 the goal is to implement power-saving initiatives, including for equipment based on base load, in order to achieve a yearly power saving of 1,000 MWh.

* Adjusted for heat recovered and supplied to Aalborg City district heating system. The adjustment relating to CO₂ is based on the 200% thermal efficiency method for district heating.

Enhanced energy efficiency

Focus on compressed air

Aalborg Portland has been signing three-yearly energy efficiency agreements with the Danish Energy Agency since 1996. Since 2008 external energy consultants have verified the potential savings of good ideas for energy efficiencies suggested by employees in our Energy Focus units, after which these ideas have been successfully implemented. In the period 2008-2010 an annual energy saving of 32.4 million KWh, relating to both power and fuel, was achieved. This saving corresponds to the average annual power consumption of 8,100 households in a medium-sized Danish town.



In the period 2008-2010 Energicenter Aalborg has helped Aalborg Portland save the equivalent of the annual power consumption of 8,100 households.

In the pump room, from the left: Jan Mandrup and Preben Andreasen from Aalborg Portland and Jan Blæsberg from Energicenter Aalborg.

Focus on compressed air

Compressed air requires a great deal of energy to produce and is therefore an expensive resource. Even a small decrease in compressed air consumption can produce a significant power saving and thereby contribute to climate and environmental improvement. This article looks at Aalborg Portland's efforts in this area.

The work of reducing power consumption for production of compressed air is taking place in several stages.

Completed projects

Carried out in 2009, the first stage was to disconnect three compressors from the central air pressure system and reconnect them directly to the pneumatic systems carrying fly ash and supplying the cement mills.

The potential saving was estimated at 4,900,000 KWh per year based on planned cement production for 2009.

Subsequent measurement in 2010 showed a slightly smaller saving, which was solely due to actual cement production in 2009 being lower than initially forecast.

The next stage was to optimise control of the remaining compressors that feed the central air system. The result was an annual saving of 569,400 KWh.

Current projects

Current projects comprise the special studies agreed with the Danish Energy Agency for the period 2010-2012. One of these studies provides scope for further reduction in energy consumption for production of compressed air and is scheduled for completion in 2011.

This study consists of a number of components:

- A campaign aimed at creating awareness of what compressed air costs. The first part of the campaign, which ended in December, consisted of a competition in which employees could test their knowledge of compressed air. Using a test rig, the 35 participants were asked to estimate the amount of power wasted as the result of a leak in the air system the size of a pinhead. One person came up with the right answer, which was 4,000 KWh, equivalent to the annual power consumption of a medium-sized household. The message was that even tiny leaks increase power consumption for production of compressed air.

The second part of this initiative will take the form of a follow-up poster campaign in 2011.

- Minimise leaks by systematic inspection of the air pressure system and installations. This task is being performed by a firm of external specialists.
- A factory-wide survey of air consumption aimed at producing good general insight into inputs and outputs in the central air system and at identifying potential savings obtainable by installation changes. For example, mechanical agitation in silos instead of aeration.
- Elaborate proposals for more sustainable solutions than continuous use of compressed air, e.g. mechanical agitation in silos, and installation of air guns and pulse aeration instead of continuous aeration.
- Elaborate proposals for permanently installed flow gauges to identify major air consumption points and possible leaks.
- Elaborate proposals for an alternative compressor configuration as the existing configuration is best suited to applications with high air consumption.
- Investigate possibilities for reducing the pressure in the central air system.

Results

It will be most interesting to monitor the progress of this study and to identify the potential power savings achievable.

General

environmental action plan 2011

– targets, initiatives and results

TARGETS 2010

STATUS 2010

ENVIRONMENT AND ENERGY MANAGEMENT

Maintain certification under ISO 14001, EMAS, DS/EN 16001 (DS 2403), OHSAS 18001 and Working Environment Authority Executive Order 87.

😊 External audit of plant conducted on 25, 26 and 27 May 2010. Non-conformities have been closed and improvement proposals are being discussed.

Verify CO₂ emission so that necessary CO₂ quotas for 2009 can be cancelled in quota register by 30 April 2010.

😊 CO₂ audit performed by external verifier and CO₂ quotas for 2009 cancelled in quota register.

Renew energy efficiency agreement with the Danish Energy Agency for 2010-2012.

😊 New agreement signed for 2010-2012.

Continue focus on energy management by regular follow-up on KPI reporting.

😊 The KPI Team is determining the causes of any values found unacceptable. Production is focused on base load.

Continue environmental assessment of suppliers.

😊 Environment assessment has been performed for a number of suppliers. Compliance contracts have been signed and audits have been performed at the suppliers' premises.

ENVIRONMENT

Reduce specific NO_x emission to 2.2 kg/tCE in relation to 2.3 kg/tCE for 2009.

😊 Target achieved. Specific NO_x emission fell to 1.48 kg/tCE, a decrease of 35.6%, as a result of optimised scrubbing.

Increase use of filler by expanding product range.

😞 Target not achieved. 24,464 tonnes of waste were landfilled at Aalborg Portland, an increase of 28% in relation to 2009.

Thereby reduce on-site landfill volume by 6,580 tonnes in relation to 2009 (19,109 tonnes), a decrease of 34%.

HEALTH & SAFETY

By means of sick absence interviews, determine whether health & safety factors are a contributory cause of days lost. Incorporate Workplace Assessments (WA) in this.

😊 Ongoing follow-up was performed on WA action plans within the Health & Safety Organisation.

Ongoing update of WA forms. 75% of WA forms must be reviewed by 1 July 2010.

😊 Action plans completed for 76% of WA, and action plans prepared for 16% of WA.

Offer anti-smoking courses in 2010.

😊 Anti-smoking course implemented.

Urge employees to take part in external activities beneficial to health.

😊 7x5 employees took part in DHL relay race on 25 August.

Mount three dietary campaigns in collaboration with ISS and Canteen Committee.

😊 Canteen buffet introduced, enabling employees to put together a good and healthy diet. ISS mounted campaigns lasting 1-3 days.

Max. 3% absence in 2010 (excl. long-term sickness absence).

😊 Total sickness absence (incl. long-term sickness absence) was 2.8%.

Hold quarterly meetings with steering group for return to work and employee retention policy which formulates plans for necessary measures.

😊 Sick absence interviews were held. A meeting of the Sickness Absence Group is held immediately before meeting of the Cooperation Committee.

Aalborg Portland is committed to eliminating accidents. The target for 2010 is an 18% reduction on 2009 when there were 17 registered accidents.

😊 There were 13 registered accidents, a fall of 23.5% in relation to 2009. Exhaustive work on accidents continues in the Health & Safety Committees and in the General Health & Safety Committee.

Implement necessary campaigns in collaboration with General Safety Committee.

😊 Eight inspections were planned and held by the Environment, Health & Safety Group.

- 😊 Target achieved
- 😞 Target not achieved
- F Improvement target
- V Maintenance target
- A Activity target

Local environmental targets

In addition to the General Environmental Action Plan, all departments work to local targets.

In 2010, 18 of 25 targets were achieved, including climate targets on page 12.

TARGETS 2011

- A Maintain certification under ISO 14001, EMAS III, DS/EN 16001, OHSAS 18001 and Working Environment Authority Executive Order 87.
 - A Verify CO₂ emission so that necessary CO₂ quotas for 2010 can be cancelled in quota register by 30 April 2011.
 - A Perform three agreed special studies in the period 2010-2012 focused on power savings.
 - A Continue focus on energy management through performance of energy campaigns, and through bi-monthly follow-up by the KPI Team on energy indicators.
 - A Establish extended environmental collaboration with two key suppliers.
-
- F Reduce specific NO_x emission by 8% against 1.48 kg/tCE in 2010 by means of continued optimised NO_x scrubbing and by increased use of NO_x-reducing alternative fuel.
 - A Increase the application of filler material by use for construction work and by further-development of product programme.
 - F Thereby reduce landfill volume by 7,584 tonnes in relation to 2010 (24,464 tonnes), a reduction of 31%.
-
- A Determine by means of sick absence interviews whether health & safety factors are a contributory cause of days lost. Incorporate Workplace Assessments (WA).
 - F Ongoing update of WA action plans in IPL. 90% of WA action plans must be completed by 1 April 2011.
-
- A Participate in DHL relay race.
-
- V Max. 2.8% absence in 2011 (excl. due to long-term sickness).
 - A Hold quarterly meetings with the steering group for work absence and employee retention policy which formulates plans for necessary measures.
 - V Aalborg Portland is committed to avoiding accidents and does not want registered accidents to exceed the number of 2010.
 - A Implement necessary campaigns in collaboration with the General Health & Safety Committee.
 - A Systematic follow-up on and inspection of safety.
 - A Increased focus on near-misses.



Environment and energy and health & safety management



Aalborg Portland has an integrated process management system that defines the flows and procedures in all company processes. The system satisfies the requirements of the company's certification standards, which are currently:

DS/EN ISO 14001, EMAS (for the Aalborg Portland cement plant), OHSAS 18001 and Working Environment Authority Executive Order No. 87, DS/EN 16001, DS/EN 9001, Maritime Authority regulation no. 6 of 9 October 2002 on bulk vessels, Safety Technical Authority safety guidelines for quality control of electrical work and installation, ISPS regulations on protection of port facilities against terror, and DS/EN 197-1/-2 on cement product quality.

The integrated nature of the system is important for the individual employee as thought and action are "process-oriented" whatever the context: environment, energy, quality or health & safety. Based on the company's established policies, objectives are defined for the individual processes, and associated targets and action plans are determined.

The cornerstones of the system are policies, targets and action plans.

Management's assessment

The Environment & Energy Group performs ongoing managerial follow-up on the environmental and health & safety management system.

In June 2010 a seminar was held to review policy, targets and action plans for environment, climate, energy and health & safety in 2011.

In January 2011 the management performed its annual system assessment during which all significant events and activities in 2010 were discussed, including:

- Positive verification of Aalborg Portland's CO₂ emission in 2009 for quota reporting purposes in April 2010.
- Internal and external audit of the CO₂ monitoring plan for 2009-2012.
- Update and approval of the CO₂ monitoring plan for 2009-2012 by the Danish Energy Agency.

- Verification of EMAS registration in March. Environmental, energy and health & safety system audited by Bureau Veritas Certification in May.
- Seven meetings of the Environment & Energy Group held as part of follow-up on the environmental management system, including three progress follow-ups on targets.
- Progress follow-up on climate and environmental targets for 2010 in General Environmental Action Plan.

Energy management

Energy activities continued in 2010.

The Energy Savings Team reports to the Environment & Energy Group and is responsible for keeping the factory's energy mapping up to date so that focal areas for economies can be identified and assessed.

Recommendations may be submitted by Energy Focus units in the individual factory areas. The Energy Savings Team is also responsible for reporting energy data and results of special studies to the Danish Energy Agency.

An Energy KPI Team has been set up to record and monitor significant energy consumptions and performances for individual installations. Based on consumption data recorded, performance indicators are established for monitoring and follow-up.

Within the framework of 21 separate agreements entered into with Energicenter Aalborg, potential reductions in both power and fuel consumption have been investigated. 13 of these agreements have yielded an annual saving of 32.4 MWh, corresponding to the annual power consumption of 8,100 households.

A three-year agreement covering 2010-2012 has been established with the Danish Energy Agency under which efforts to find electricity efficiencies will continue.

In December 2010 BAT statements were prepared and submitted to Environmental Protection Agency Aarhus as an element in ongoing technological improvements. These statements setting out the best available technologies in cement manufacture describe technical and economic scope for reductions in NO_x, NH₃, SO₂, HCl and dust emissions.



Environmental dialogue

Environmental dialogue between Aalborg Portland and its stakeholders is currently being pursued and strengthened through the following principal initiatives:

- » Regular contact with central and local environmental authorities in Denmark and the EU as new proposals and regulations which will affect the company are continuously being developed.
- » Inclusion of environmental information from suppliers and subcontractors by means of revised contracts that specifically refer to environment.
- » Publication of Environmental Report 2010 in mid-April 2011.
- » Aalborg Portland received 65 parties of visitors, a total of 763 persons. An environmental briefing was provided and an opportunity was given to ask questions.
- » Aalborg Portland staff address external courses and meetings.
- » The environmental reports for 2010 and previous years are available on Aalborg Portland's website. The Danish and English versions were visited 746 times in the period May - December 2010 when the new electronic platform iPaper was implemented.
- » Staff from our departments participate in Energy and Environmental Focus Teams.

In 2010 cooperation continued with the Danish Ornithological Society (DOF) on planning the maintenance of the extensive area of countryside which is still factory land and includes former quarries. This cooperation, which draws on DOF's data obtained from annual bird counts etc. in the area, ensures that every consideration is given to both flora and fauna.

The company's Environmental Report is sent to many stakeholders nationally and internationally, including neighbours, owners, authorities, politicians, the Danish Society for Conservation of Nature, customers and suppliers. Some 600 copies are distributed in this way. The report is also available to all employees in the factory and is published on our website.

To optimise involvement and dialogue with internal and external stakeholders concerning our environmental activities we urge all parties to voice opinions and improvement suggests regarding our reporting.

Requirements to suppliers

Supplier environmental requirements are a challenging contemporary issue, and in conjunction with Aalborg Portland's internal reorganisation we have also reviewed our activities in this area. A section has been added to our general contracts with suppliers describing Aalborg Portland's systematic focus on environment, energy and health & safety, including certification of our management systems.

Aalborg Portland also makes clear that importance is given to collaboration with certified suppliers who are environmentally and socially aware. Aalborg Portland reserves the right to audit relevant environmental and health & safety aspects that relate to this collaboration.

Four supplier audits were performed in 2010 with focus on:

- » Internal transport at the factory.
- » Road tankers used for distribution of cement.
- » Supply of fly ash.
- » Technical consultancy services.

New suppliers are subject to an assessment prior to contract signature. This assessment includes compliance with material and fuel specifications.

In 2010 a new aluminium supplier was checked to ensure that:

- » The production plant was environmentally certified.
- » The cargo was safely stowed during transport by sea.
- » Specifications regarding heavy metal content were met.

In another case, an approach from a supplier of FGD gypsum from incineration plants did not lead to a working relationship as the content of heavy metals in the gypsum was too high.

Principal environmental loads



The manufacture of cement involves heavy consumption of raw materials and energy and therefore gives rise to a number of direct environmental loads in the form of emissions that include flue gases, waste products, noise and waste water.

Materiality criteria

Based on environmental mapping, these loads have been chosen according to the following criteria: Large quantities/large costs, spread and impact, conditions in General Environmental Approvals and consideration for neighbours. The point of departure is the PRTR Regulation's list of pollutants and emission thresholds for reporting to the European Pollutant Release and Transfer Register (PRTR). The materiality criteria form the basis for the paragraphs below and the material flows on pages 24-25.

Due to the nature of the production process and the fact that the cement plant is situated a long way from its closest neighbours, Aalborg Portland does not consider smell a relevant environmental reporting factor. No discharges are made to the ground.

Environmental approval

The environmental loads are regulated by the factory's environmental approvals and permits which stipulate terms of operation. These include:

- Terms of emission for all material sources of atmospheric pollution, comprising kilns, cement and coal mills, cooler stack and boiler plant.
- Terms of emission for factory noise.
- Handling and reporting requirements for serious operating irregularities and incidents.
- Operating requirements for raw material and fuel stores.
- Operating requirements for on-site landfills.
- Discharge of process waste water, cooling water, rainwater, etc.

Compliance with the requirements stipulated in the environmental approval, combined with the day-to-day environmental work at the plant, helps ensure that no significant nuisance is caused to neighbours.

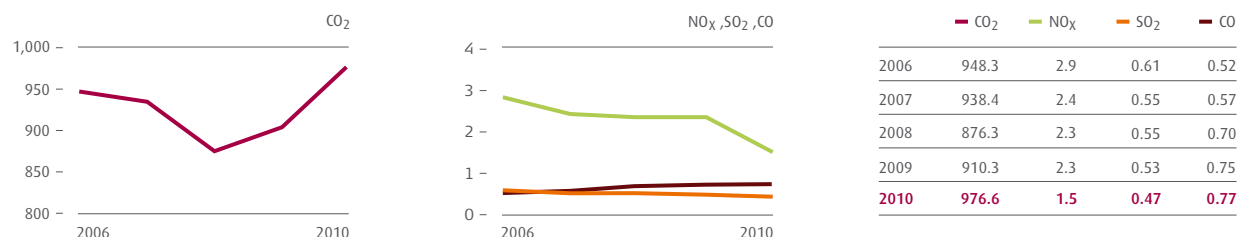
Selected key performance indicators

The table below shows key performance indicators for grey and white cement production. The indicators are relative terms, where consumption and emissions have been related to production. See also pages 24-25 "Material flows – key performance indicators and status 2010".

Key performance indicators	Unit	2006	2007	2008	2009	2010
Grey cement production						
Energy	GJ/tTCE	4.67	4.54	4.39	4.43	5.07
CO ₂	Kg/tTCE	824	800	769	745	809
NO _x	Kg/tTCE	2.39	1.97	2.01	2.14	0.97
White cement production						
Energy *	GJ/tTCE	7.17	7.15	6.59	6.86	7.12
CO ₂ *	Kg/tTCE	1,224	1,214	1,131	1,197	1,191
NO _x *	Kg/tTCE	4.10	3.36	3.26	2.75	2.44

* Adjusted for heat recovered and supplied to Aalborg City district heating system.
The adjustment relating to CO₂ and NO_x is based on the 200% thermal efficiency method for district heating.

Atmospheric emissions – kg/tTCE



Flue gases

Overall flue gas emissions are directly linked to volumes of cement produced. Total factory emission has therefore fallen in the past three years due to the slowdown in the building industry.

CO₂

Overall CO₂ emission volume decreased due to the low level of production. Emission increased in relative terms, primarily because low cement demand and reduced output result in changed kiln operating conditions.

NO_x

During the period 2004-2007 all kilns were fitted with newly developed NO_x scrubbing equipment to comply with emission limits. Relative emission has therefore fallen over the years and fell further in 2010 when optimised NO_x scrubbing was introduced on Kiln 87. The fall in absolute emission in 2010 was further due to the decrease in production.

SO₂

SO₂ emission decreased in absolute terms due to lower production. Relative emission decreased by more than 10% because:

- In April 2010 environmental approval was granted to fuel Kiln 76 with meat and bone meal with a sulphur content typically 90% lower than petcoke, which it partially replaces.
- Full SO₂ scrubbing capacity for the white cement kilns was available at lower production.

CO

CO emission fell in absolute terms due to lower production. In relative terms CO increased slightly compared to 2009. This was due to installation of NO_x-reducing equipment on the white cement kilns which are operated closer to the limit for CO formation.

Dust

Dust emission fell in absolute terms as a result of lower production. Relative emission was halved as precipitator capacity was fully utilised at reduced production. Complaints relating to dust leaks caused by operating problems are described on page 21.

Requirements relating to alternative fuels

As regards the use of alternative fuels Aalborg Portland conforms to the requirements for cement plants in the executive order on waste incineration, including dioxin.

The table below shows the five main sources of air pollution, the related emission limits, and Aalborg Portland's current average emission levels. Emissions of dust, NO_x and SO₂ are determined by averaging continuously recorded data. Limits stated are mean values per 24-hour period. For clarity the table shows the averaged daily level for the year. During 2010 the limits for NO_x, SO₂, CO and dust were exceeded in a small number of cases. These instances were notified to Environmental Protection Agency Aarhus in the monthly reporting routine.

Limits and levels during operation

All values are stated in mg/Nm³ dry flue gas at 10% oxygen content

	NO _x		SO ₂		Dust	
	Limit *	Averaged level 2010 **	Limit *	Averaged level 2010 **	Limit *	Averaged level 2010 **
Heat recovery kiln 73/79	800	234	500	105	30	0.3
Heat recovery kiln 74/78	800	400	500	302	30	0.3
Heat recovery kiln 76	500	400	500	74	30	6
Kiln 85 ***	800	797	500	71	50	11
Kiln 87	800	209	10	4	30	3

* Daily average according to environmental approval ** Yearly average *** Data relate to 2009

Waste

Waste is separated as close to source as possible by placement in bins, skips and oil and chemical collection points around the plant. The waste is recycled and incinerated according to Aalborg City Council regulations or landfilled on site at Aalborg Portland.

More than 99% of the waste is non-hazardous. The remainder is characterized as hazardous oil and chemical waste and mixed landfill waste.

Total waste volume increased compared with 2009 in both absolute and relative terms. The reason was that maximum circulation of microfiller from white cement kilns to grey cement kilns was not possible as the decrease in grey cement production was relatively greater than that of white cement. This led to increased on-site landfilling. The general fall in production meant that circulation of filler materials for blended cements also decreased.

Water supply

Water consumption has fallen to a new level in the past two years due to falling production. Due to the base consumption, i.e. consumption of water used for compressor and kiln cooling, relative consumption increased. Circulation of filtrate water from the heat recovery processes is now an integral part of the operating cycle and the volume of this water also decreased due to falling production.

In 2007 remediation wells were established to protect the factory water supply from contamination by trichloromethane and tetrachloromethane which probably originated from land formerly leased by the company to the Danish military. The polluted water is used for technical applications in the plant.

In 2008 findings showed that these wells were proving very effective, and analysis of water from nearby boreholes showed that trichloromethane and tetrachloromethane levels were now below the threshold values. This was still the case in 2010 but as the tetrachloromethane value was still above the permitted concentration of 1 µg/litre for drinking water, remediation pumping will continue as hitherto.

Aalborg City Council's inspection report on the factory's water supply was published in March 2010. As a result of the report, on-site wells have been provided with additional sealing protection designed to prevent contamination.

Waste water

Waste water volumes comprise washing water and sanitary effluent and have decreased over the past five years. This is partly due to the fall in production in 2009 and 2010, and partly because rainwater from an area near Kiln 87 is now discharged directly to the fjord rather than sent to the public sewage works.

Waste – amount in tonnes	2006	2007	2008	2009	2010
Total waste	40,561	41,411	23,919	23,714	28,937
Utilised non-hazardous waste	13,005	7,729	4,243	4,297	4,250
Recycling	12,523	7,302	3,629	3,800	3,670
Sand and grating material	-	1,313	1,443	2,441	2,366
Building waste	328	343	894	499	222
Metals	1,000	1,033	751	634	662
Paper and cardboard	7	6	2	4	11
Electronic scrap	4	5	4	3	5
Other recyclable	11,184	4,603	535	219	404
Incineration	482	427	614	497	580
Mixed combustible	453	395	581	471	561
Municipal collection	29	32	33	26	19
Utilised hazardous waste	186	447	224	274	125
Oil	184	444	220	271	124.3
Chemicals	2	3	4	3	0.4
Disposal of non-hazardous waste					
On-site landfill	26,995	32,798	19,357	19,109	24,464
Disposal of hazardous waste					
Off-site landfill	375	437	95	34	98

Noise

External noise mapping at Aalborg Portland was performed in 2006. All noise sources was determined by GPS, improving the data on which noise calculations are based.

Mapping performed in May 2008 with all kilns fully operational showed compliance with noise limits at all locations.

Noise readings performed at the Sølyst standard on-site measuring location are shown in the table below.

Noise	Values in dB(A)		
	Daytime	Evening	Nighttime
Permitted	52	50	50
Calculated	51.1	49.9	49.3

Factory noise is estimated to have decreased in 2010 due to the fall in production caused by the building industry slow-down. The noise map will be updated in 2011 to document continued compliance with noise limits.

Two noise complaints were received in 2010. These concerned chalk excavation activities.

Operating irregularities

The procedure for dealing with breakdowns and operating irregularities is described in the company's environmental management system and General Environmental Approval. The procedure ensures that all relevant authorities are consulted in problem solution.

14 dust complaints were received in 2010, the same as in 2009. These complaints usually follow precipitator problems.

External complaints about noise, dust, pollution etc.

	Dust	Noise	Limfjorden	Other
2006	12	0	1	1
2007	9	1	1	0
2008	19	2	0	0
2009	14	1	0	0
2010	14	2	1*	0

* This complaint concerned discharge of diesel oil into Limfjorden. The discharge was not the responsibility of Aalborg Portland and the relevant authorities in Aalborg were contacted.



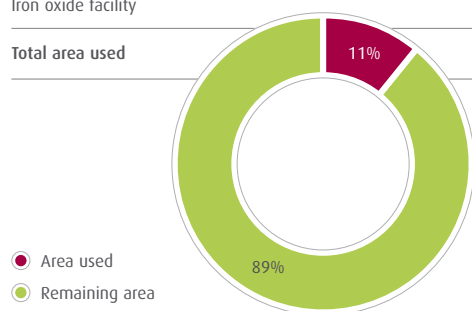


Land use and biodiversity

Sites at Aalborg Portland used for production, storage and land-fill are important to biodiversity elsewhere on company land.

Of Aalborg Portland's total land area of 1,800 ha, 205 ha is used for cement production. The remaining 1,595 ha is a mosaic of lakes, woods, meadows, salt marshes, fallow and farmland. 89% of the company's land therefore offers scope for biodiversity.

Aalborg Portland land (ha)	1,800
Factory	120
Active chalk quarry	69
Landfill site	12
Iron oxide facility	4
Total area used	205



Sustainable distribution

The distribution of cement from Aalborg Portland involves the handling and transport of some 1.5 million tonnes of cement and clinker to domestic and export markets. Our influence on distribution to export markets is chiefly limited to the choice of ship transport, and this part of distribution may therefore be designated an indirect environmental load.

In the domestic market, however, we have more control on the environmental loads caused by distribution in the form of exhaust emissions, road impact, etc. This means we are also responsible for effecting distribution in a sustainable manner.

All cement manufacture takes place in Aalborg from where most of the output produced is carried by ship to our eight Danish storage terminals strategically positioned nationwide. The cement is then conveyed by road to individual customers locally. The average distance from terminal to customer is just 65 km, which means that long-haul transport by heavy cement lorries is avoided.

Some haulage is contracted out to third parties. Customers in northern Jutland are supplied direct from the Aalborg factory. All bagged cement is also distributed from Aalborg.

Aalborg Portland's focus on alternative fuel represents an indirect CO₂ benefit as this is sourced locally and therefore transported a much shorter distance than coal, petcoke and oil.

Measurement and calculation of material flows

Material flows and key performance indicators 2010 Aalborg Portland cement plant

Aalborg Portland has published annual Environmental Reports since 1996. Material flows are shown for the period 2006-2010, enabling developments to be tracked over a five-year period.

The basic production activity at Aalborg Portland is the manufacture of cement using chalk, sand, water, alternative raw materials and fuels. The materials are processed, mixed and heated to high temperatures. This results in the production of cement together with various by-products. Some of these by-products, including water, dust and FGD gypsum, are recycled in production. The remainder are released in the form of flue gases, steam, cooling water, waste water and waste materials.

Material flows and key performance indicators

The input volume of materials in the manufacturing process is equal to the output volume in the form of cement and by-products. This balance is called the "flow of materials" and is actually an expression of the resources used by Aalborg Portland in producing cement, the volume of cement produced, and the emissions resulting from the production process.

The material flows for the Aalborg plant are shown in both absolute and relative terms as key performance indicators on pages 24 and 25. The absolute volumes are stated in tonnes in the wet state. The relative volumes are based on the quantity (kg) of materials in the wet state used to make one tonne of Total Cement Equivalent (tTCE). tTCE is a standard unit for output that is determined by calculating the equivalent cement tonnage if all the clinker had been processed into cement.

The relative values thus enable year-on-year comparison of the material flows independent of any variations in size of cement production, changes in clinker stocks and sales of clinker.

Significant changes in material flows at Aalborg Portland, 2006 - 2010:

- A marked decrease in production in 2009 and 2010 has led to a general fall in raw materials, power and fuel consumption as well as factory emissions.
- Clinker (which includes clinker sales and changes in clinker stocks) is shown as negative for 2006 and 2010 due to major changes in stocks of grey cement clinker.

Measurement and calculation of material flows

Data used in compiling this report are obtained from our environmental database, InfoSystem, cf. page 31. Measuring methods relating to data capture are described below.

- Raw Materials, recyclables and fuels are determined by flow meters and weighing devices installed in the production process.
- Water consumption is measured by water meters.
- Electricity consumption is measured by KWh meters.
- Packaging is calculated from inventory statements.
- CO₂ emission for 2006-2010 was determined according to the approved CO₂ emission plan for Aalborg Portland and verified externally.
- NO_x, SO₂, CO and dust emission from kilns is determined by continuous metering in exhaust stacks. The same applies to dust concentrations in discharges from cement and coal mills, while airflow from these sources is based on sampling.
- Hg quantity is calculated by continuous measurement of kiln air volumes and Hg concentration samples from yearly performance measurements.
- Products are determined by weighing and calculation. District heat production is measured by calorimeter.
- Waste is determined by weight on weighbridge and annual statements from external waste receivers.
- Cooling water is calculated on the "water balance principle" in which the following flow-metered outputs – steam, groundwater lowering at Kiln 76 and waste water (sanitation water and washing water) are deducted from measured inputs: water consumption, groundwater lowering and water content in materials and fuels.
- Combustion air is calculated indirectly by deducting the input side of the materials flow from the output side.
- Accidents and days lost are determined from data reported to the Danish Working Environment Authority.
- Noise calculation is performed by an accredited external firm based on measurement at source and subsequent computation.

Material flows and key performance indicators 2010

Aalborg Portland cement plant



INPUT

	Absolute figures – tonnes wet					Relative figures – kg wet /tCE				
	2006	2007	2008	2009	2010	2006	2007	2008	2009	2010
Combustion air (O ₂ , N etc.)	936,536	940,789	766,094	542,622	457,277	329.5	319.3	300.3	326.3	314.5
Raw materials										
Chalk	4,615,660	4,771,180	3,922,933	2,615,372	2,400,904	1,623.9	1,619.4	1,537.6	1,572.6	1,651.2
Water	3,553,005	3,706,023	3,256,522	2,664,025	2,688,259	1,250.1	1,257.9	1,276.4	1,601.8	1,848.8
Sand	158,647	178,219	130,133	111,416	110,626	55.8	60.5	51.0	67.0	76.1
Gypsum	45,143	54,443	46,389	32,951	21,646	15.9	18.5	18.2	19.8	14.9
Other	44,413	40,207	33,263	24,568	31,253	15.6	13.6	13.0	14.8	21.5
Packaging	2,308	2,389	1,720	1,169	1,091	0.8	0.8	0.7	0.7	0.8
Recyclables										
Fly ash	261,755	269,859	273,656	186,721	158,949	92.1	91.6	107.3	112.3	109.3
Sand	150,484	152,835	159,335	59,330	54,484	52.9	51.9	62.5	35.7	37.5
FGD gypsum	76,795	65,118	64,564	25,201	52,407	27.0	22.1	25.3	15.2	36.0
Paper pulp	39,828	48,568	49,537	25,619	17,897	14.0	16.5	19.4	15.4	12.3
Iron oxide	68,016	65,448	60,406	32,374	30,182	23.9	22.2	23.7	19.5	20.8
Other	71,550	72,799	54,905	33,143	15,318	25.2	24.7	21.5	19.9	10.5
Total	668,428	674,627	662,403	362,388	329,237	235.1	229.0	259.7	218.0	226.4
Fuels										
Coal	171,835	160,725	140,928	45,713	78,285	60.5	54.6	55.2	27.5	53.8
Petcoke	263,815	284,031	214,391	186,145	161,393	92.8	96.4	84.0	111.9	111.0
Fuel oil	24,048	26,281	12,681	6,239	8,435	8.5	8.9	5.0	3.8	5.8
Alternative	81,814	80,934	100,468	88,552	68,080	28.8	27.5	39.4	53.2	46.8
Total	541,512	551,971	468,468	326,649	316,193	190.6	187.4	183.6	196.4	217.4
	(MWh)	(MWh)	(MWh)	(MWh)	(MWh)	(KWh/tCE)	(KWh/tCE)	(KWh/tCE)	(KWh/tCE)	(KWh/tCE)
Electricity	368,369	374,924	323,733	224,528	216,419	129.6	127.3	126.9	135.0	148.8



INTERNAL CIRCULATION

	(Gj)	(Gj)	(Gj)	(Gj)	(Gj)	(MJ/tCE)	(MJ/tCE)	(MJ/tCE)	(MJ/tCE)	(MJ/tCE)
District heating from heat recovery	28,541	27,351	26,947	26,779	28,992	10.0	9.3	10.6	16.1	19.9
Microfiller	152,310	160,238	181,737	122,810	95,768	53.6	54.4	71.2	73.8	65.9
Water	470,558	521,912	432,575	332,336	301,468	165.6	177.1	169.5	199.8	207.3
Own FGD gypsum	30,227	36,177	28,086	24,366	29,947	10.6	12.3	11.0	14.7	20.6
Recycling of clinker/raw meal	67,561	97,597	74,729	33,229	14,715	23.8	33.1	29.3	20.0	10.1
Recycling of cement from silo cleaning	599	901	1,142	736	1,311	0.2	0.3	0.4	0.4	0.9



OUTPUT →

Absolute figures – tonnes wet

Relative figures – kg wet /tTCE

	2006	2007	2008	2009	2010	2006	2007	2008	2009	2010
Flue gases										
CO ₂	2,695,400	2,764,907	2,235,680	1,513,917	1,420,067	948.3	938.4	876.3	910.3	976.6
NO _x	8,170	7,080	5,876	3,881	2,153	2.9	2.4	2.3	2.3	1.5
SO ₂	1,741	1,622	1,397	877	680	0.61	0.55	0.55	0.53	0.47
CO	1,475	1,676	1,792	1,244	1,113	0.52	0.57	0.70	0.75	0.77
Dust	191	177	175	69	35	0.07	0.06	0.07	0.04	0.02
HCl	33	34	31	10	13	0.012	0.012	0.012	0.006	0.009
Hg	0.10	0.19	0.15	0.07	0.03	0.000035	0.000063	0.000057	0.000045	0.000022
Products										
Cement	2,844,499	2,854,457	2,494,021	1,575,211	1,553,003	1,000.8	968.8	977.5	947.1	1,068.1
Clinker *	-2,770	84,736	52,862	76,267	-87,935	-1.0	28.8	20.7	45.9	-60.5
Filler *	1,739	965	-353	1,881	-149	0.6	0.3	-0.1	1.1	-0.1
Chalk slurry to power station (Nordjyllandsværket)	12,909	17,556	6,004	13,847	16,203	4.5	6.0	2.4	8.3	11.1
Total	2,856,377	2,957,714	2,552,534	1,667,206	1,481,122	1,004.9	1,003.9	1,000.5	1,002.4	1,018.6
Adjustment	-	-	-	-	-	-4.9	-3.9	-0.5	-2.4	-18.6
Total Cement Equivalent	2,842,282	2,946,294	2,551,346	1,663,126	1,454,043	1,000.0	1,000.0	1,000.0	1,000.0	1,000.0
Packaging	2,308	2,389	1,720	1,169	1,091	0.8	0.8	0.7	0.7	0.8
Water										
Steam	1,470,362	1,507,750	1,366,972	984,264	1,149,406	517.3	511.7	535.8	591.8	790.5
Cooling water, incl. Kiln 85 groundwater	3,168,894	3,298,857	2,848,735	2,311,365	2,086,319	1,114.9	1,119.7	1,116.6	1,389.8	1,434.8
Groundwater lowering (Kiln 76)	219,679	275,085	204,824	135,067	157,937	77.3	93.4	80.3	81.2	108.6
Waste water	100,464	61,145	44,271	38,377	27,612	35.3	20.8	17.4	23.1	19.0
Heat recovery for district heating	(GJ)	(GJ)	(GJ)	(GJ)	(GJ)	(MJ/tTCE)	(MJ/tTCE)	(MJ/tTCE)	(MJ/tTCE)	(MJ/tTCE)
	1,455,358	1,781,063	1,432,350	1,139,729	1,177,344	512.0	604.5	561.4	685.3	809.7
Waste **										
Recycling	12,523	7,302	3,629	3,800	3,670	4.4	2.5	1.4	2.3	2.5
Incineration	482	427	614	497	580	0.2	0.1	0.2	0.3	0.4
Landfill	27,370	33,235	19,452	19,143	24,562	9.6	11.3	7.6	11.5	16.9
Oil and chemical waste	186	447	224	274	125	0.1	0.2	0.1	0.2	0.1
Total	40,561	41,411	23,919	23,714	28,937	14.3	14.1	9.3	14.3	19.9

* Incl. sales and change in stocks

** Waste quantities are separated into hazardous and non-hazardous types on page 20, stating whether the waste is utilised or disposed of.

Health & Safety report

At Aalborg Portland health & safety is an integral part of daily working and the Health & Safety Organisation is constantly striving for improvements.

The Environment, Health & Safety Group works together with the rest of the Health & Safety Organisation to maintain focus and promote continuous development in this key area.

Health & safety policy

Health & safety is accorded high priority and is an integral part of day-to-day working. Ongoing efforts are made across the company to improve conditions in the workplace, and initiatives are implemented in selected focus areas to promote health & safety for all employees.

This policy applies to the Aalborg Portland cement plant and to the company's Danish storage terminals.

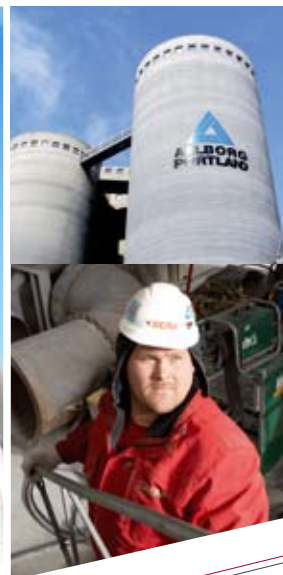
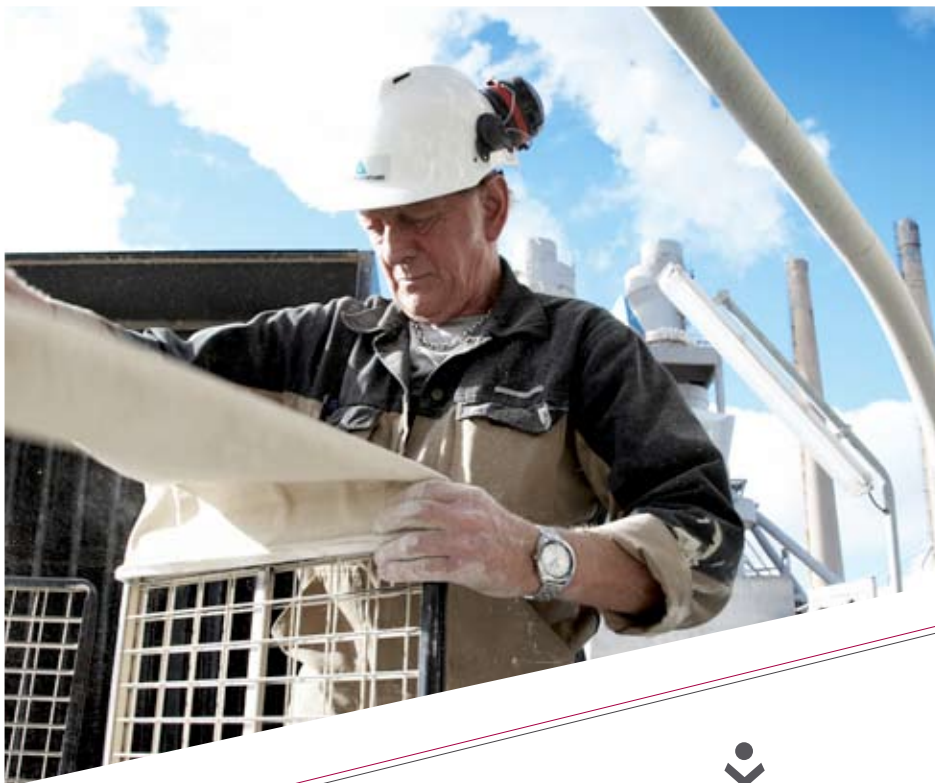
Aalborg Portland is committed to:

- Meeting or exceed the requirements of existing statutory legislation.
- Maintaining and improving an environmental management system certified according to OHSAS 18001 and Danish Working Environment Authority Regulation no. 87.
- Working to prevent accidents and damage to health – including occupational diseases – through Workplace Assessments (WA), workplace mapping and action plans, and follow-up on accidents, near-misses etc.
- Promoting a safe and healthy working environment within the scope of technical and economic feasibility.
- Adopting an active and open approach towards communication, knowledge and dialogue with customers, employees, authorities, neighbours, organisations and other relevant parties.
- Setting pro-active goals for future work and reviewing these goals annually.
- Assessing the principle health & safety influences and streamlining our activities in order to create the necessary overview to formulate relevant new goals.

- Assessing our products, facilities and important modification projects in relation to this policy.
- Contributing to the inclusive market through our personnel policy.
- Training and motivating our people to ensure we fulfil policies, action plans and objectives.
- Publicising our environmental policy, goals, action plans and results in the form of an annual Environmental Report.

Our health & safety policy is regularly reviewed.





At Aalborg Portland health & safety is accorded high priority and is an integral part of day-to-day working

The Health & Safety Organisation

2010 was the year when "safety" became "health & safety" – also at Aalborg Portland.

Newly created titles are: Health & Safety Representative, Health & Safety Group, Health & Safety Supervisor and General Health & Safety Committee, and the year ended with the annual meeting of the Health & Safety Organisation.

The meeting agenda included a review of 2010 in terms of activities generally and accidents particularly. Statistics were presented detailing cause, type and time of accident and the seniority of the victims. After detailed examination and discussion, work groups were established to draw up proposals for areas of focus in 2011.

The Health & Safety Representatives continue to work on a variety of tasks such as Workplace Assessments, accident prevention, inspection rounds, tidying up, campaigns, legislation, safety improvements, chemicals and substitution. Their tasks are therefore unchanged.

The increased focus on health & safety is improving employee attitudes and behaviour with regard to safety, and in time this will reduce the number of accidents further.

Environment, Health & Safety Group

The Environment, Health & Safety Group is a small team consisting of two supervisors, two Health & Safety Representatives and the Health & Safety Manager.

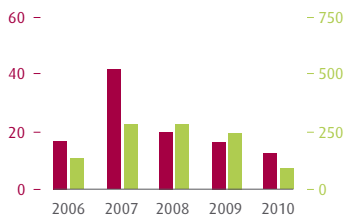
The Group carries out inspections that span the entire plant over a three-year period and identify safety deficiencies and aspects needing improvement.

Eight health & safety inspections and eight follow-ups were performed in 2010.

The Group also assesses personal protection equipment together with the Procurement Department to ensure that the factory is always equipped with the best and most user-friendly products.

Personal protection equipment received particular focus in 2010. The result was a change in practice whereby all such equipment is now ordered through one dealer.

Accidents reported to health & safety authority



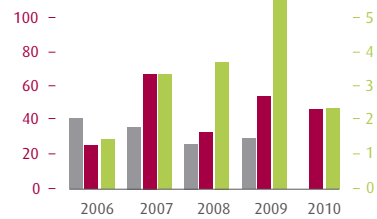
● Number of reported accidents
● Number of days lost

**Accident frequency / Hours lost
Hourly-paid workers and salaried employees**



● Accident frequency – accidents per mil. working hrs.
● Hours lost per 1,000 working hours

**Accident frequency / Hours lost
Hourly-paid workers**



● Accident frequency in the stone, clay and glass industries
● Accident frequency – accidents per million working hours
● Hours lost per 1,000 working hours

Accidents and prevention

Aalborg Portland placed strong focus on accident reduction in 2010, the ultimate goal being to eliminate accidents entirely.

In 2010, there were 13 registered accidents, the lowest number for several years. This was due to increased awareness on the part of the Health & Safety Organisation and to intensified prevention work that also included greater awareness of near-misses, 25 of which were recorded in 2010. Near-misses will again be targeted in 2011 when the aim is to increase the number of incidents recorded and to document all ongoing preventive measures.

Accident frequency (number of accidents per million working hours) was approximately 21, expressed as an average for the year as a whole. 7.8 was the lowest and 24.4 the highest. This was a clear improvement on 2009 when mean accident frequency was around 27.

Accident breakdown by location was thus: factory (10), dock (2) and administration (1). All accidents are dealt with by the Health & Safety Organisation and the necessary measures are taken to avoid a repetition.

A total of 87 days were lost to accidents, including 19 days from one particular incident. The trend is towards not only fewer but also less serious accidents as the number of days lost per accident is also falling.

An average of just one day per accident was lost in 2010 against 2.9 days in 2009.

Continued strong efforts are needed to maintain the fine results for 2010 and to further reduce accident levels.

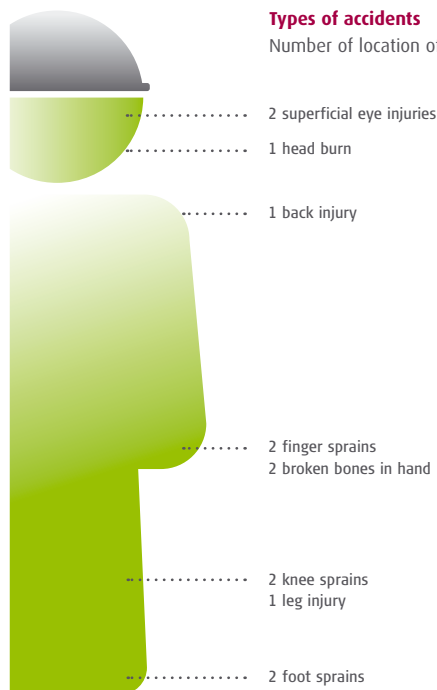
Injury statistics

Total 2010

Total injuries	31
Of which reported to Working Environment Authority	13
Total days lost	87
Days lost due to long-term injury	19
Near-misses	25

Types of accidents

Number of location of injuries





Plant Protection Scheme

A Plant Protection Scheme was introduced at Aalborg Portland in 2010. The related plan, which was prepared in collaboration with Falck, parallels the existing Contingency Manual.

Final implementation of the plant protection plan is expected at the start of 2011 when various courses will be held.

Drills are also planned for the next three years.

Safety and chemical instructions

Safety instructions are employee guidelines on how to perform day-to-day maintenance, repair and cleaning task in a safe and healthy manner.

The number of safety instructions was minimised during 2010, and in the course of the revision work a new reader-friendly layout was introduced.

Work on updating the chemicals database with details of the chemicals used at Aalborg Portland was kept to a minimum in 2010. The reason was that considerable effort has gone into selecting a more practical and user-friendly alternative to the present database.

The new system will be introduced in the first half of 2011.

Workplace Assessments

Work continues on updating Workplace Assessments (WA) in the web-based tool IPL. WA mapping and follow-up on action plans are done by the Health & Safety Groups, progress on action plans then being presented at the quarterly meetings of the Departmental Health & Safety Committees. Similarly, progress on Workplace Assessment work is discussed at the meetings of the General Health & Safety Committee.

Collaboration between HR and the Health & Safety Organisation on the WA issue of workplace-related sick absence continues as intended. Through our absence and retention policy we possess an effective dialogue tool that enables us to address and deal with workplace-related sick absence.

External contractors

Before starting work at Aalborg Portland external contractors are required to view our safety film, affix a sticker to their safety helmets as visible proof that they have seen it, and sign a form certifying that safety information has been received. The completed form can be referenced on Aalborg Portland's intranet so that the safety status of relevant individuals can always be checked.

External contractors also receive a folder setting out the most important rules and regulations.

Close contact is maintained with external contractors regarding coordination of safety work during kiln shutdowns. During recent kiln shutdowns much focus has been placed on the visibility of the "kiln shutdown safety organisation" and on the planning of safety work – including inspections.

Aalborg Portland personnel and external contractors alike have expressed strong satisfaction with this arrangement, and many situations have been "nipped in the bud" before potentially developing into accidents or near-misses. Many improvement recommendations have also been voiced during inspections and safety meetings and there has been useful dialogue.



Hot work

New regulations on "hot work" were introduced at Aalborg Portland in 2008. Hot work is defined as work involving welding, cutting, grinding, soldering and pipe thawing – in other words, all activities involving use of heat and naked flames.

Three categories of fire risk have been introduced covering all parts of Aalborg Portland.

All relevant employees and external contractors (principally metalworkers) remain very mindful of the rules for hot work, and the register of personnel authorised to carry out hot work at Aalborg Portland is continuously updated.

REACH

A great deal of work took place towards the end of 2009 concerning registration of pre-registered substances under the EU chemicals directive, REACH. The deadline for registration was 30 November 2010 and was met.

Health promotion

Aalborg Portland is committed to continuously motivating its employees to adopt a healthy lifestyle with regard to diet, exercise and smoking. All employees working three shifts continue to be offered a health check by their doctor – but now every two instead of every three years. They are issued with a questionnaire on general health, working environment and ergonomics which they can present to their doctor at the time of the health check.

Fitness

Aalborg Portland's fitness club has well-appointed facilities that are used by many employees and their families. Help is also available from an instructor and, on request, from a physiotherapist.

There are also badminton courts which likewise are very popular.

Aalborg Portland urges employees to participate in activities that support healthy living, and in August 2010 seven teams from Aalborg Portland took part in the local DHL relay race.

Diet

In spring 2010 the company canteen introduced a new buffet arrangement which gives each employee an opportunity to compose a healthy meal of their own choice. Campaigns of 1-3 days' duration on a variety of themes have also been held.

Smoking

Smoking is prohibited on indoors company premises and anti-smoking courses are available to all employees.

Inclusive labour market

Aalborg Portland makes considerable effort to retain its good and able people.

Our policy on sick absence and retention interviews is closely adhered to. This policy ensures that employees who are absent frequently or for prolonged periods are contacted, and enables us to retain people who for any reason are forced to take long-term leave.

Performance reviews were held with both salaried staff and hourly-paid employees in 2010. Topics discussed included well-being, working environment, and training needs designed to provide new skills and proficiency.

Environmental InfoSystem



Environmental InfoSystem is a database established by Aalborg Portland for gathering and reporting environmental data from cement production and provides the basis for the material flows shown on pages 24-25. Use of the database means:

- High data quality. The database contributed clear audit trails and documentation for the independent review of this Environmental Report.
- A standard framework for efficient collection and processing of data and easy access for data analysis.
- Identical data form the basis for a wide variety of reporting, such as follow-up on action plans, calculation of CO₂ and SO₂, and environmental labels and declarations.

Key to chart and text

Data warehouse

A network server storing data that can be downloaded for purposes such as input to the environmental database.

Environmental InfoSystem

Information system handling environmental data relating to cement production – see also Hyperion.

Hyperion

Name of program modules used for data input, processing, storage and reporting.

SAP

ERP [Enterprise Reporting Processor] system supporting functions such as production, purchasing, inventory control, etc.

SDR

IT system for process control in cement manufacturing, including collection of process data and reporting.

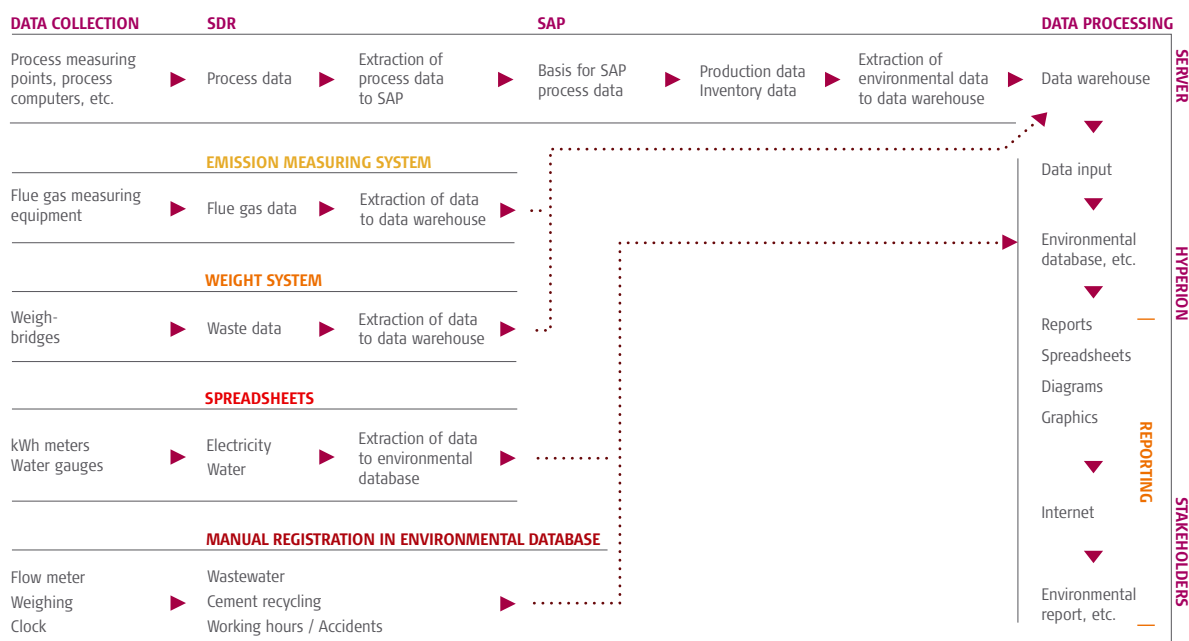
Server

A central computer in a network system.

Stakeholders

Customers, employees, neighbours, present and future investors, authorities, financial institutions, insurance companies, political groups and non-governmental organisations.

Environmental InfoSystem



Independent auditors' report

To the stakeholders of Aalborg Portland A/S

We have performed an assessment of Environmental Report 2010 presented by the Management for the activities of Aalborg Portland A/S in Aalborg, which is prepared in accordance with the statutory regulations on environmental reports and the disclosure requirements in the European Environmental Management Standard (EMAS).

The Management of Aalborg Portland A/S is responsible for the Environmental Report 2010. Our responsibility is to express an opinion on the Environmental Report 2010 based on our assessment.

Basis of opinion

We have conducted our work in accordance with the Danish Standard on Assurance Engagements (RS 3000) with the aim of expressing an opinion with a reasonable level of assurance.

Based on an assessment of materiality and risk, our work has comprised analyses, inquiries to the Management and accredited certification company, spot checks of systems, data and underlying documentation, including checks on whether the stated guidelines for recording and measuring data have been applied. We have assessed whether the accounting policies chosen by the Management are appropriate and whether the estimates made by the Management are reasonable, and we have assessed the overall presentation of the Environmental Report, including compliance with the statutory regulations on environmental reports and the disclosure requirements in the European Environmental Management Standard (EMAS).

We utilised audit as well as environmental specialists in the performance of our work. We believe that the work performed gives an adequate basis for our opinion.

Opinion

In our opinion the Environmental Report 2010 for the activities of Aalborg Portland A/S in Aalborg is presented in accordance with the statutory regulations on environmental reports and the disclosure requirements in the European Environmental Management Standard (EMAS), and in accordance with the accounting policies described.

Aalborg, 15 April 2011

KPMG

Statsautoriseret Revisionspartnerselskab



Hans B. Vistisen

State Authorised Public Accountant



Charlotte Enkebolle Nielsen

State Authorised Public Accountant

EMAS registration



Verifier

Bureau Veritas Certification

Accreditation no.

DANAK DK-V Reg. 6002

Report verification date

31 March 2011

Terminology

Alkali

Alkalis used at Aalborg Portland are sodium and potassium compounds.

Alternative fuels

Burnable organic waste products that replace fossil fuels. Homogeneous fuels produced for Aalborg Portland consisting of a reprocessed fuel product, meat and bone meal, and dried sewage sludge.

Biofuels

Organic fuels considered CO₂ neutral.

Cement clinker

Intermediate product that results from the burning of slurry in kilns and is ground to produce cement.

Cement mill

Grinds cement clinker into cement.

CO

Carbon monoxide. A result of incomplete burning of fossil fuel. Converted in the atmosphere to CO₂.

CO₂

Carbon dioxide. Formed by burning of fuel and calcining of chalk. CO₂ emission is calculated according to EU guidelines.

dB(A)

Noise is measured in dB(A) which is a logarithmic scale. For example, the noise from leaves rustling in the wind is around 20 dB(A). The noise level in an ordinary living room is around 40 dB(A), in offices 60-65 dB(A), on a street with normal traffic 80-85 dB(A) and from a pneumatic drill approximately 100 dB(A).

DS/EN 16001

Standard dealing with guidelines for establishing energy management systems.

EMAS

Joint European Environmental Management and Auditing Scheme established by EU regulation.

Emission

Release of noise or gas. In flue gas emission the quantities released are metered continuously, except for CO₂ – see under CO₂.

Filtrate water

Waste water generated in the heat exchangers of the heat recovery facility by condensation of vapour from flue gases.

Flue gas desulphurisation gypsum (FDG)

Gypsum formed by the desulphurisation of flue gases.

Fly ash

Material generated from the cleaning of flue gases in an electrostatic precipitator.

Fossil fuel

Coal, petcoke, oil and natural gas.

GJ

Gigajoule = 1,000 MJ.

HCl

Hydrogen chloride.

Hg

Mercury.

IPL

System for handling Workplace Assessments (WA) at Aalborg Portland.

Iron oxides

Iron-containing by-products from production of sulphuric acid and steel.

ISO 14001

Standard issued by the International Standards Organisation that contains guidelines for designing and maintaining environmental management systems.

Life Cycle Analysis (LCA)

Method for assessing the environmental and other impacts of a product on its surroundings, from extraction of raw materials until final disposal.

Microfiller

Specially produced filler material with particle size < 50 µm

NH₃

Ammonia

NO_x

Nitrogen oxides. Formed by combustion of fossil fuel. Contributory cause of acid rain.

OHSAS 18001

International guideline for development and maintenance of health & safety management systems.

Petcoke

A low-ash coke by-product from the refining of crude oil into petrol.

Process management system

The system at Aalborg Portland that ensures that all environmental, energy, quality and health & safety issues in the company are dealt with consistently and in accordance with company policy, targets, guidelines and rules.

PRTR

European Pollutant Release and Transfer Register.

PSO charge

Levy obligating purchase of green electricity.

Pyrite ash

See iron oxides.

Raw meal

Cement clinker and incompletely burned raw materials. May result from e.g. kiln stoppage.

SO₂

Sulphur dioxide. Formed by combustion of fossil fuel. Contributory cause of acid rain.

Substitution

Replacement of a raw material by a waste product. For example, fly ash substituted for clay.

tTCE

tonne Total Cement Equivalent. A standard unit for production output, obtained by calculating the equivalent cement tonnage if all the clinker had been processed into cement.

WA

Workplace assesment.

Environmental Report 2010

Environment and Health & Safety

Edited and published by
Aalborg Portland A/S
Environment & Energy

Responsible under Danish press law

Preben Andreasen,
Manager, Environment & Energy
Tel. +45 99 33 79 33

The Environmental Report 2010 is
printed on CO₂ neutral paper produced
from sustainable forestry (PEFC).

Design and production: www.hegnet.dk

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Aalborg Portland A/S

Rørdalsvej 44

P.O. Box 165

9100 Aalborg

Denmark

Tel. +45 98 16 77 77

Fax +45 98 10 11 86

cement@aalborgportland.com

www.aalborgportland.com