

## **Reference Framework for the reutilization of waste in contact with soil in the Basque Country (Spain)**

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### **Introduction**

The strategy of the European Union in relation to the prevention and recycling of waste pursues to reduce the impact on the environment due to the excessive use of resources in general. For that reason it is proposed to prevent waste generation, to promote the recycling, to increase the efficiency in the use of resources and to reduce the negative environmental impact derivative of the incorrect reutilization of waste. In order to make these objectives real, it is necessary to elaborate and to pass rigorous environmental standards of reference that facilitate the recycling and the reuse of the new obtained products.

Based on these objectives, the Basque Environmental Strategy for a Sustainable Development 2002-2020 opts for prevention, increase of recycling and the reduction of the deposition of waste in landfilling.

In the present situation of the Basque Country are existing several barriers of legal, legislative, technical and economic nature, which prevent the best use and reasonable reuse of waste. Often, the only solution for this kind of materials is their elimination in landfilling sites, although there is an annual demand in the Basque Country of 18.000.000 tons of aggregates. The use of recycled aggregates could cover the 15 % of this aggregate demand. Even though there exist a legislation for the reuse of black slag's, the recycling market has not been developed as expected, it is why IHOBE, public Environmental Agency for the Basque Government, together with the own Department of the Basque Government has selected IDOM to develop a framework to regulate the environmental assessment and control of the use of waste in contact with soil, always leaning in the development of the legal part in the MAS company lawyers.

Using this type of waste generally implies a contact between the aggregate and the soil, and therefore once the technical provisions for the material have been confirmed, it is necessary to ensure a minimum impact on the environment. For these reasons the scope of this investigation is to formulate minimum quality standards for recycled materials and to pretend to increase their demand and acceptability. Besides to stimulate the flow of materials towards the recycling, tools and instruments for the development of the recycling market will be implemented. The so defined project is inserted within the action programme of the Plan for Contaminated Soils of the Basque Country 2007-2012, an instrument of the soil policy of the Autonomous Community of the Basque Country, established in the Law 1/2005 for the prevention and correction of soil pollution.

### **Methodology**

The types of waste identified in the Basque Country are as follows: construction and demolition waste (C&D), black slag coming from electric arc furnaces (EAF), slag from the Waelz furnace, foundry sand and slags of the incineration of municipal solid waste (MSW).

The scope of the work includes aspects related to the prospective study at a European level regarding the different selected types of waste, focusing on Germany, The Flemish Region, The Netherlands, Denmark and the United Kingdom. The identified stakeholders in the 5 assigned countries have been contacted, visited and interviewed to gather useful information with respect to the management and the reusability of the waste.

First of all the investigation is focused on collecting information about the destinies of the waste (their future application), on possible techniques of pre-treatment, on criteria for the environmental and technical acceptability, on control parameters, on regulated uses, on the conditions and characteristics of the receiving environment, on the regulations for the environmental control and on applicable tools for the evaluation of recycled materials.

Also, the description of the leaching behaviour of the different waste materials has been carried out through the realization of leaching tests under determined application conditions, having in account different application scenarios, to establish the environmental conditions or requirements for the protection of soil and surface / ground waters. The acceptable maximum for immission and emission values will be determined for the different application scenarios by long term leaching modelling.

These results are the basis for drawing up a reference framework for the use of recycled waste in construction applications. The definition of this general framework considers the environmental criteria of acceptability, the control parameters, the regulated uses, the conditions related to the environmental characteristics, the regulations for the environmental control and the applicable tools for the evaluation of exceptional cases.

## **Results**

The prospective study at European level has revealed the following results:

### *Netherlands*

In the past the Dutch Building Materials Decree has been the main tool for the regulation of the application of the recycled materials. Although at a first glance the system seems to be simple, but the quantity of protocols and procedures that regulate the environmental application of the recycling materials, makes it too complex to be used in an agile way. This is why the Dutch Government started to enhance a new recycling methodology.

Nowadays the Dutch model accounts for a pioneering and very mature methodology. It is why many other European countries have taken the Netherlands as an example, to develop their own model. Furthermore the Dutch system introduces environmental certificates at all stages of the life cycle.

Another advantage of the system is that all the information, necessary to fulfil the legislation, is published on the webpage of the Dutch Ministry of Housing, Spatial Planning and the Environment (VROM), so that transport companies, producers, managers, recyclers and contractors can easily accede to this information. In the Netherlands, the recycling is subsidised economically by the income of the landfill tax. A favourable market for recycling products is, without a doubt, one of the keys factors to achieve the aim of 100% recycling.

### *United Kingdom*

In the United Kingdom, a legislative framework for inert mineral waste exists that has been transformed into a very important management tool. Additionally the creation of different governmental organizations which observe the suitable use of the outstanding Internet tool "Aggregain", as well as its update, provokes a very intense and interacting way to bring all stakeholders together. The tool encourages the self-management of these stakeholders and plays an important role in replacing primary materials by recycling products.

### *Denmark*

In Denmark, a reference framework for the regulation of waste in contact with the soil exists, but the reuse of recycled materials has not been made a standard practice in construction applications. The Danish policy is decentralised and for that reason the municipalities play a decisive role in the collection, analysis, management and recycling of waste.

### *Flemish Region – Belgium*

In Flanders a general reference framework for the regulation of waste in contact with the soil exists that is divided in two parts: VLAREA and VLAREBO. The first one defines the general reuse of waste as recycled material and the second one regulates the application of contaminated soil. This general formulation of the regulating framework is considered a significant advantage of the model. In the Flemish framework, prices of materials are entirely driven by supply and demand. The Flemish legal framework does not consider the implementation of economic instruments of incentives for stimulating the market of recycled materials.

### *Germany*

In Germany every lander establishes its own legislative regulation of waste in contact with the soil due to the lack of a valid framework, but currently a federal reference framework is discussed. Germany has a lot of experience in waste recycling, precisely because they developed a lot of concepts to protect the environment. It is expected that the new federal framework keeps in mind the old experience and will introduce new management practises beginning with an easier evaluation methodology and clear application procedures.

Analyzing the results of the investigated countries (Germany, Flanders, the Netherlands, Denmark and United Kingdom) and keeping in mind the personal interviews, a mixed model is created, gathering the experiences obtained in the 5 countries and fitting the proposed model to the necessities of the Basque Country.

### *Environmental Evaluation*

The applied methodology for the environmental evaluation of the waste in different applications is based, among others, on the Dutch methodology, which has been developed for the Dutch Building Materials Decree. The composition and leaching of 96 samples were analyzed with several tests of the Dutch norm in order to calculate the immission and emission values. The granular material was examined with the column test NEN 7373 and the monolithic materials with the Tank test NEN 7375.

The analyzed parameters of the composition included heavy metals and organic compounds (as well as halogenated ones). Supplementary to these parameters, the eluate of the leaching was also tested for Cyanide, Chloride, Fluoride, Sulphate, Bromide, Phenols and Mineral oils. Furthermore the different waste types were studied according to the Council Decision 2003/33/EC of 19 December 2002, establishing criteria and procedures for the acceptance of waste at landfills, with the aim to combine the results of the Dutch methodology with those of the European Council and to derive reference values for the leaching test DIN-EN 12457-4.

The Dutch environmental evaluation methodology was used to simulate the emission of the different waste types over 100 years for defined application scenarios and to calculate the Immission values of each substance taking into account the thickness of the application, the bulk density of the applied material and the amount of infiltrated rainwater. These calculated Immission values were compared with the maximum acceptable Immission values to make sure that the reused materials fulfil the environmental control parameters.

The final evaluation and the derivation of the reference values are not finished yet and will be expected by the end of 2008.

#### *gModel*

The designed model looks for an agile and simple implementation, establishing a system with a continuous control and monitoring of the recycling plants, being able to obtain certified aggregates for each specific application.

The model is based on the accomplishment of 2 exhaustive Audits: A Process audit inside the installations and a yearly Product audit. In case that the recycling installation passes the 2 audits, the environmental certificate VAURCOS will be emitted, that guarantees the environmental quality of products in specified applications in contact with the soil in the Basque Country. The purpose of the Process audit is to revise the recycling process inside the treatment facilities and to guarantee innocuous facilities for the environment. The audit includes a compliance of an extensive check-list, a review of the authorization conditions of the facility and the comprobation of eventually implemented remedial measures. If the recycling plant is already an authorized recycler and has established an environmental management system like EMAS o ISO 14001, the Process audit will be simplified considerably. On the other hand there is the Product audit which controls the compilation of registers, the protocols of the intern sampling procedure and the analytic results of the leaching tests carried out during the year by an accredited laboratory based on ISO 17025. Throughout the annual Product Audit an accredited entity (ISO 17020) will also take samples and send them to an accredited laboratory. After receiving the analytic results and if the recycling facility fulfils al check points of the Product audit and together with the already passed Process audit, it obtains the certificate VAURCOS.

Finally we organized several Workshops with the involved Stakeholders to discuss the first draft version of the Reference Framework. The participation of the Stakeholders in the formulation of the final version of the Reference Framework is the best way to increase the acceptability and to improve the Reference Framework with the proposed changes and contributions.

It is foreseen that by the time of implementing the present Reference Framework, other complementary instruments will need to be put into practice to enhance its efficiency. Though yet not developed in the Basque Country, such instruments will need to take into consideration aspects such as financial guarantees, certification systems for construction, demolition (promotion of selective demolition), recycling and transportation companies. Green procurement in the administration sector will certainly play an increased role in the future so that the market of the reuse of materials will rise up to the objectives set in the waste management plans of the autonomous community of the Basque Country.