APPRICOD

Assessing the Potential of Plastics Recycling in the Construction and Demolition Activities

Towards Sustainable Plastic Construction and Demolition Waste Management in Europe

Assessing the Potential of Plastic Recycling in Construction and Demolition Activities

With the contribution of
the Life financial instrument
of the European Commission

> The Project

The APPRICOD project aims to develop a partnership between various European actors to promote the selective collection of plastic waste from construction and demolition (C&D) activities.
It is co-funded by the European Commission's LIFE-Environment programme.

> Objectives

- To optimise the selective collection of plastic waste from C&D sites.
  To achieve this, a variety of sorting and selective collection scenarios were evaluated in pilot projects
- To evaluate the costs associated with the selective collection of plastic C&D waste
- To disseminate at European level examples of sustainable management of plastic C&D waste

> Partners

The project is coordinated by IBGE-BIM.
A varied and complementary range of partners are involved in the project.

Construction and demolition sector

- Belgian Building Research Institute - BBRI : www.bbri.be
- Brussels Confederation of Construction - CCB-C/CBB-H: www.cobobru.be
- European Demolition Association - EDA : www.eda-demolition.com

Local and regional authorities

- Agència de Residus de Catalunya - ARC: www.arc-cat.net
- Brussels Institute for the Management of the Environment - IBGE-BIM: www.ibgebim.be
- Provincia di Ancona: www.provincia.ancona.it
- Serviço Intermunicipalizado de Gestão de Resíduos do Grande Porto - LIPOR: www.lipor.pt
- Association of Cities and Regions for Recycling and sustainable Resource management - ACR+: www.acrplus.org

Plastics industry

- PlasticsEurope, formerly Association of Plastics Manufacturers in Europe - APME: www.plasticseurope.org
- European Council of Vinyl Manufacturers - ECVM: www.ecvm.org
- European Plastics Converters - EuPC: www.eupc.org
- European Plastics Recyclers - EuPR: www.eupr.org

BBRI
EDA
Confederatie Bouw Brussel-Hoofdstad
Confédération Construction Bruxelles-Capitale
IBGE - BIM
Lipor
ACR+
PlasticsEurope
ECVM
EUPC
EuPR

> Complementarity of the partnership

Each partner represents an important element of the recycling chain.
The links between them are crucial to the sustainable management of plastic C&D waste.

The C&D sector has scientific and technical know-how relating to C&D activities.

Local and regional authorities are in charge of public waste management. The European network of local and regional authorities (ACR+) has expertise on waste management and a large experience of exchanging and disseminating information on the matter.

Plastics industry has specialist skills relating to the technical aspects of recycling.

> Stages of the project

The project began with a benchmarking on plastic C&D waste management in the European Union. Based on the experience of four frontrunners countries - Germany, Austria, Denmark and the Netherlands - this study showed the importance of legal and financial frameworks that stimulate the implementation of voluntary agreements as well as collection and recycling systems. Some of the most innovative sorting and/or recycling systems were presented for different types of plastic products.

Pilot projects were then developed by the four local and regional authorities.
This approach encouraged a cooperation between: the C&D sector, the plastics industry and the public authorities.

Once the sorting and collection methods had been determined, the pilot projects were implemented and their outcomes were evaluated.

Conclusions and recommendations to local and regional authorities and to the C&D sector were drawn up.

A number of initiatives were used to disseminate this information:

- Four local workshops
- A European workshop
- A website: www.appricod.org
- A guide entitled *Towards Sustainable Plastic Construction and Demolition Waste Management in Europe*
- A toolbox for the C&D sector
- This leaflet which provides an overall summary of the project

> Statistics

The total weight of C&D waste generated within the European Union (EU-15) is estimated at 180 million tonnes per year. Plastics have been used on construction sites since the 1940s and more intensively since the 1960s.

With a 20% share of plastics consumption in Europe in 2004, the construction sector is the third largest plastics user, after the packaging and household applications. Given the impact that the production of plastics and the plastic waste management have on the environment, this is far from a negligible proportion.

Many of these plastics have an intended lifespan of several decades.

Forecasts predict that plastic waste from C&D will reach 1,3 million tonnes in 2010, as opposed to 0,84 million tonnes in 1995 !

> The challenge of plastic C&D waste management

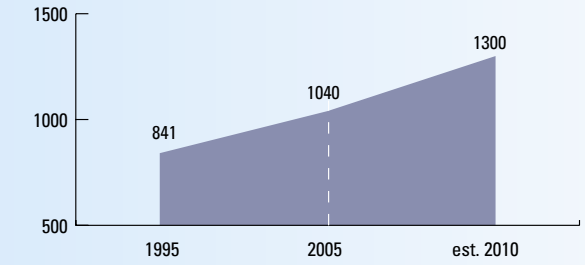
In line with national and European environmental legislation, more and more public authorities at local, regional and national level are paying special attention to the recycling and reuse of C&D waste.

However:

- There are few specific recommendations for the management of plastics in C&D waste
- There is little knowledge at local or regional level of local plastics recycling possibilities: the types of plastic that can be recycled, the collection and sorting methods available, recyclers' quality requirements, costs and technologies
- Cooperation between public authorities, the C&D sector and plastics recyclers is generally poor

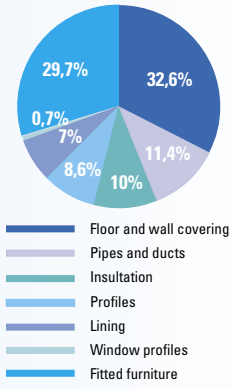
The result is that only 6% of plastic C&D waste is recycled in the European Union in 2003, 20% goes to energy recovery and 74% goes to landfill or is incinerated.

GROWTH OF PLASTIC WASTE IN THE C&D SECTOR - IN THOUSAND TONNES PER YEAR



Source : PlasticsEurope

PLASTIC C&D WASTE BY TYPE
PROJECTED QUANTITIES IN 1995 - IN WEIGHT



> Types of plastics used in the construction sector

Plastics consumption in the construction sector accounts for 8.7 million tonnes in 2004.

The dominant substance is PVC (poly vinyl chloride), which makes up 47% of the total weight of plastics used. PVC is used for pipes and ducts, floor and wall coverings, window frames, profiles, linings, wiring and cable insulation.

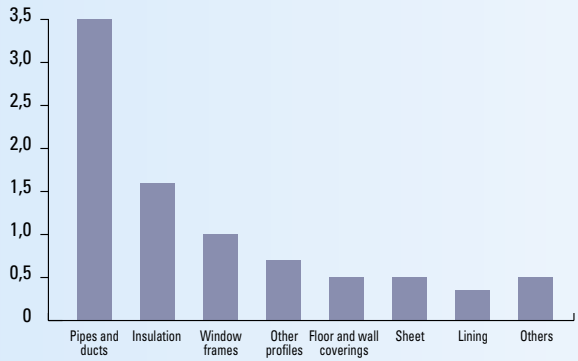
With EPS (expanded polystyrene), XPS (extruded polystyrene) and PU (polyurethane), the insulation market covers some 21% of this consumption.

A third major group includes HDPE (high density polyethylene) and LDPE (low density polyethylene), which account for 18% of consumption, a large part of which is used for pipes and ducts.

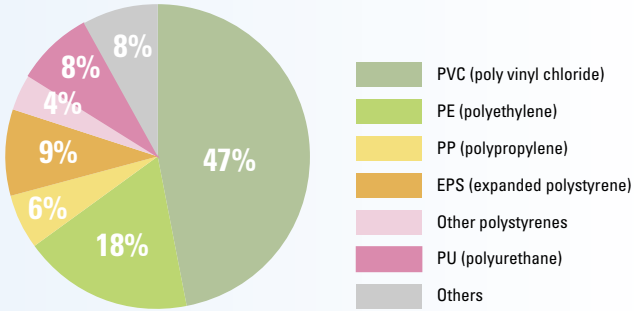
Alongside these specific applications, packaging plastics are another major component in the C&D sector. They make up around 25% by volume of packaging waste on construction sites.



Consumption of plastic products in the construction sector in 2004 – In million tonnes
(All plastic applications: 8.7 MT)



Plastic products used in construction in 2002, by polymer
(as a proportion of all polymers used for this application)



Source : PlasticsEurope

Catalonia

Brussels

Ancona

Porto

> Pilot projects

▪ Catalonia
Spain

Agència de Residus de Catalunya, ARC, has an established system for sorting C&D waste in three fractions but not the plastic fraction thereof.
One of the pilot projects, Hospital Igualada, focused on the sorting of plastic films, with the use of a vertical press. Rigid waste was collected with the light fraction. Then followed a second sorting in sorting centre to separate rigid plastics from the light fraction waste.
ARC estimated the costs and has put in evidence the financial need for the selective collection and recycling of plastics.
2.69 tonnes of waste plastics were collected out of 238 tonnes of C&D waste generated by the works.

▪ Brussels-Capital Region
Belgium

The sorting process needed to be compatible with the particular conditions of an urban region where little space and little time are available for C&D works.
Among the cases studied by the Brussels Institute for Management of the Environment (IBGE-BIM), the renovation of the Atomium was an example of soft plastics sorting and recycling.
2.16 tonnes of tarpaulins (used for the sandblasting of the Atomium) were collected and sorted manually. Sorting the tarpaulins on the site did not generate significant extra labour and the recycling costs were half as much as landfilling. However the extra transport costs to Germany caused a (non-economic) cost increase.

▪ Province of Ancona
Italy

Provincia di Ancona is in charge of waste policy in its region. The province had little experience of plastic C&D waste sorting.
The EDIL-GENGA renovation project is an example of the complex operation of sorting 3 plastic fractions (PVC, polyethylene and polypropylene) in containers divided into 3 sections, using a grouping point on the contractor's premises.
To ease plastics sorting operations, special posters with practical information and pictures were placed on each container.

▪ Region of Grand Porto
Portugal

LIPOR, Serviço Intermunicipalizado de Gestão de Resíduos do Grande Porto, demonstrated the benefits of implementing an integrated C&D waste management system based on existing instruments: Ecofone (collect on demand), drop-off sites, and the free collection of 'Big Bags'. This system was also remarkable as it was linked with a search for commercial outlets for the collected plastics, with high-level quality control of the plastics fraction, in order to offset LIPOR's collection and sorting costs.
One of the pilot projects was the construction/renovation of Porto International Airport at Sà Carneiro, where 14.7 tonnes of plastics were collected and recycled.

> Possible systems

Several systems are possible for the sorting and selective collection of plastics on construction sites:

- A mixed fraction of plastic, wood, glass and metal, separated from the inert fraction
- A mixed fraction of all types of plastics, separated from other types of waste
- Separation of soft plastics and hard plastics
- Separation of PVC, thermosets and thermoplastics
- Separation in function of the polymers

Example of a poster for plastics sorting in a pilot project

> First conclusions

- There is no ideal collection and sorting scenario
- A variety of collection scenarios should be available taking into account various parameters, namely:
  - space available on the site
  - the type of work (demolition, renovation, new building)
  - the stage of the work (more packaging is used in the finishing phase)
  - the number of subcontractors
- Training and communication are indispensable factors for success
- An integrated approach to the selective collection of all materials may be the path to follow, but specific support may be needed for plastics (due to their heterogeneous character)
- The existence of a C&D plastics recycling market is a necessary condition in developing selective collection of plastics from C&D waste, but the recycling market needs a regular, reliable and continuous supply before developing
- Transport costs are an issue, as is distance: collection points and grouping centres may be necessary in order to generate a critical mass and stimulate interest from recyclers. At the final stage of the process, recycling is generally cheaper than landfill
- The legal and financial provisions adopted by public authorities can create a favourable environment for the recycling of plastic C&D waste recycling as well as for voluntary agreements and public-private partnerships

> Environmental benefits of recycling plastic C&D waste

The selective collection and recycling of plastics may be part of a broader policy for the sustainable management of C&D waste (a multi-materials approach) that :

- avoids the wastage of resources and of energy
- saves these types of waste from landfill and incineration
- diminishes the need for new waste disposal facilities
- limits emissions of greenhouse gases
- contributes to making the C&D sector more environmentally sound

Sorting plastics improves the quality of the inert fraction, the largest and also the easiest to recycle. The recycling both of plastics and of the inert fraction thus allows a reduction in the volume of C&D waste to be landfilled.

> Further information

Further information on the APPRICOD Life project is available on the website **www.appricod.org**. This contains :

- A presentation of the APPRICOD project
- Information on the Life-Environment programme
- Information on partners of the APPRICOD project
- The proceedings of the European workshop held in Brussels on 24 April 2006
- The proceedings of the four local workshops held in Catalonia, Brussels, Ancona and Porto
- This brochure (downloadable in 7 languages - Catalan, Dutch, English, French, Italian, Portuguese and Spanish)
- A guide entitled *Towards Sustainable Plastic Construction and Demolition Waste Management in Europe*, presenting the results of the project, together with its conclusions and recommendations (downloadable in 6 languages - Catalan, Dutch, English, French, Italian, and Portuguese)
- The toolbox for the supervisors of the construction and demolition sector, which is intended to be used at the beginning of construction or demolition works in order to raise workers' awareness of plastic waste sorting on site

ACR+

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