

SURVEY OF THE ARISING AND USE OF AGGREGATES FROM CONSTRUCTION AND DEMOLITION WASTE, EXCAVATION WASTE, QUARRY WASTE AND DREDGING WASTE IN WALES IN 2005



Llywodraeth Cynulliad Cymru
Welsh Assembly Government

Executive Summary

The Research

This research project is to establish reliable estimates for the arising and use of aggregates from construction and demolition waste (C&D waste) in Wales during 2005. The research has been undertaken by Faber Maunsell Limited under contract to the Welsh Assembly Government and involved a series of eight related questionnaire surveys during the latter part of 2006 to establish the level of arisings and their use.

The Welsh Assembly Government carried out a similar survey in 2003 and an initial survey was undertaken for the Office of the Deputy Prime Minister (ODPM) covering both England and Wales for arisings in 2001.

The information generated will be used mainly for developing and monitoring planning policy for the provision of aggregates in Wales and will assist in the provision of data required by the European Union (EU) Waste Statistics Regulations 2002.

The Survey

The eight questionnaire surveys covered the following operators and sites:

- Crushers and screens.
- Licensed landfills – Pollution Prevention and Control (PPC) permitted landfills and Waste Management Licensed (WML) landfills.
- Registered exempt sites under Paragraph 9, 9A, 19, 19A and 24 of the Waste Management Licensing Regulations 1994 (as amended).
- Quarry sites.
- Pre-cast concrete manufacturers.
- Port and harbour operators.
- Rail ballast recyclers.
- Highways & utilities engineering contractors.

The following additional types of waste operator were included within the selected target groups identified above:

- Opencast mining sites.
- Road planing contractors.
- Exempt sites – Paragraph 13 of the Waste Management Licensing Regulations 1994 (as amended).
- Waste transfer station operators.
- Mobile plant operators with licenses to operate on contaminated land.

These questionnaires were designed to allow estimates to be generated for inert waste as the following:

- Recycled aggregate and soil.
- C&D waste used and disposed of at licensed landfills.
- C&D waste spread on registered exempt sites.
- Marine dredging wastes.
- Quarry wastes.

The questionnaires made a clear distinction between 'hard' C&D waste and excavation waste in order to identify not just the current rate of aggregate recycling, but also where there is potential for future aggregate recycling.

Response to the Survey

The overall response rate to the survey questionnaires (excluding Highways and Utilities) was 44%, which is slightly higher than the response rate achieved in the 2003 survey of 43% (excluding Highways and Utilities). However, these figures include all responses, even those not operating in 2005, those with no access to information and those refusing to participate. If those not operating in 2005 are excluded from the population size, then the actual response rate from sites and operators with data is 15%.

There were no questionnaire responses from the highways and utilities engineering contractors, due to the complexity of data collation and the size of the task involved for collating waste arising for each site as claimed by the operators.

The response rate of the questionnaires for landfill sites, registered exempt sites, quarry returns and crushers and screen operators has been affected by the requirement to register and in some cases provide returns to regulatory bodies and they do not feel inclined to complete another form which is not statutory. The response rate for the highways contractors has been further affected by the concurrent Survey of Construction and Demolition Waste Arising in Wales in 2005, which is being undertaken for the Welsh Assembly Government by the Environment Agency Wales. This affect has been verified by a number of questionnaire responses and communications, as well as from the Environment Agency.

Summary of Findings

The low response rate to the questionnaires, with data, has given a total figure for waste arising in Wales that cannot be regarded as wholly accurate. The grossing up of figures from the survey results was achieved by using the Combined Bootstrap and Monte Carlo Re-Sampling Estimates of Quantities to give the all Wales figures. The consequent uncertainty in these estimates relates to the sample size and the response rate of the data received. Without the complete data for each site in Wales, the method of grossing up does not allow for individual characteristics of those sites that did not return a completed questionnaire and as such the totals derived should be treated with caution.

Table 1 below shows the estimates for the C&D and excavation aggregate waste managed at crushers and screens, landfill sites and registered exempt sites. The total waste arisings has increased to 9.89 million tonnes in 2005, compared to 6.01 million tonnes in the 2003 survey and 5.02 million tonnes in the 2001 survey. The total waste arising used as recycled aggregates has increased to 4.46 million tonnes from 2.68 million tonnes in the 2003 survey and 1.55 million tonnes in the 2001 survey.

Table 1: C&D and Excavation Aggregate Wastes Managed at Crushers and Screens, Landfill Sites and Registered Exempt Sites for 2001, 2003 & 2005 (all figures are in millions of tonnes)

One of the responses from the registered exempt sites questionnaire group has been removed from the data set throughout the report, due to lack of confidence by the Steering Group in the data returned.

	Used as Recycled Aggregates	Used as Recycled Soil	Reused for Landfill Restoration and Engineering	Used to Backfill Quarries ***	Used at Registered Exempt Sites	Disposed of at Landfills	Total Arisings
2001	Crushers and Screens, Landfill Sites and Registered Exempt Sites Only – Data from 2001 Survey Report						
Metric tonnes	1.55	0.24	0.66	0.94	1.28	0.35	5.02
%	31%	5%	13%	19%	25%	7%	100%
2003	Crushers and Screens, Landfill Sites and Registered Exempt Sites Only – Data from 2003 Survey Report						
Metric tonnes	2.68	Combined with aggregates	0.64	Data included with the disposed of at landfills	2.12	0.56	6.01
%	45%		11%		35%	9%	100%
2005	Crushers and Screens, Landfill Sites and Registered Exempt Sites Only – Data from 2005 Survey						
Metric tonnes	4.46*	Combined with aggregates due to small amount	3.12**	Data included with the disposed of at landfills	1.71****	0.60*****	9.89
%	45%		32%		17%	6%	100%
90% confidence intervals	1.63 to 8.45		1.16 to 5.98		0.82 to 2.89	0.01 to 1.42	-

* Data is from the Crusher and Screens questionnaire only; it is the sum of the amount sold off site, amount used for landfill engineering and restoration and the amount spread on registered exempt sites from the Graded, Ungraded and Not Specified streams; it excludes the amount entering stock.

** Data is from the Landfill Sites questionnaire only; it is the amount used for landfill site engineering and restoration only from the Hard C&D Waste, Excavation Waste and Mixed Waste streams only. It excludes the amount-leaving site for re-use, which was not asked for in the 2005 survey. The data also excludes the amount entering stock from the Hard C&D Waste, Excavation Waste and Mixed Waste streams only.

*** Data is from the Landfill Sites questionnaire only, in 2003 and 2005. Landfill Sites were not asked about the amount used to backfill quarries, but were instead asked about the amount disposed of at landfills.

**** Data is from the Registered Exempt Sites questionnaire only; it is the amount received minus the amount resold.

***** Data is from the Landfill Sites questionnaire only; it is the amount disposed of as waste, which includes waste used to backfill quarries from the Hard C&D Waste, Excavation Waste and Mixed Waste streams only.

There was only data from the 2003 survey to compare with this survey for the Quarry Sites, Pre-cast Concrete Manufacturers and the Port and Harbour Authorities questionnaire groups. However, the survey responses for the Pre-cast Concrete Manufacturers and the Port and Harbour Authorities groups were too small for statistical analysis to be conducted on them with any certainty of their accuracy to gross up to an all Wales figure. The Quarry Sites questionnaire group only had sufficient data for statistical analysis to be conducted for the table headings Used as Recycled Aggregates and Reused for Landfill Restoration and Engineering, which have been reported for comparison.

There is no data to compare for Rail Ballast Recyclers or Highways and Utilities Engineering, since these were not included in the 2003 survey, although the 2005 data for the Rail Ballast Recyclers has been reported for future survey comparisons.

A random sample of highways and utilities engineering companies operating in Wales in 2005 were interviewed by telephone to assess the potential waste arising that may occur from what they consider to be a typical site for their company. Information was received from 6 companies; where on a typical site they state that where possible the majority of wastes from excavations for engineering works are reused on site, although when asked about a typical project in 2005 they stated that the percentage reused on site varied from 25% to 100%.

Recommendations for Future Surveys:

The current practice of surveying every 2 years through using a voluntary questionnaire does not generate a high enough response rate to achieve a satisfactory amount of data for statistical analysis. There is evidence of survey fatigue and future surveys, if undertaken in the same manner, are likely to obtain ever-decreasing amounts of data. In order to improve the response rate and data received in future, the following recommendations should be considered:

- Alternative means of obtaining the data required.
- Reducing the survey frequency.
- Aligning future survey work and requests for information with legislative reporting/recording requirements in consultation with relevant statutory and advisory bodies.
- Separate surveys to be conducted for each questionnaire group to be undertaken by relevant legislative bodies or advisory groups. These surveys should then be combined together for European Union reporting.
- Companies particularly from the Highways and Utilities questionnaire group should be contacted in advance so that they can record contemporaneous information in the required format during the pertinent year. It can be extremely difficult and time consuming for companies to retrieve retrospective information.
- Use personal interviews by visiting companies to gain the required information for the survey.

The Welsh Assembly Government is required to monitor and report to the European Union on the amount of recycled aggregate used within Wales. This requirement for reporting accurate figures is not best served by undertaking voluntary response questionnaires and would achieve more reliable results through a legislative requirement for information returns.

It is recommended that any future surveys should request the Ordinance Survey Grid References or Post Codes for each site to enable geographical representation on a site-by-site basis and enable easier data management. Ordinance Survey Grid References or Post Codes for each site will also enable the removal of data to eliminate double counting for registered exempt sites and landfill sites used by waste producers.