

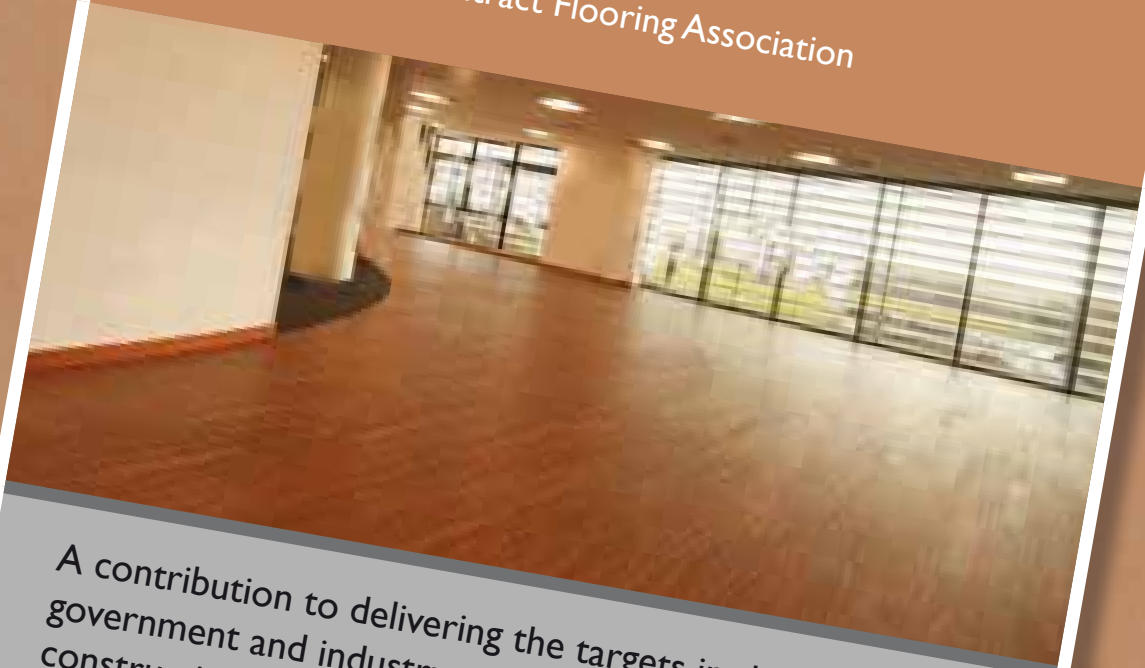
REPORT 003

FLOORING: Towards a Resource Efficiency Plan

September 2009

A SCOPING STUDY

Prepared by Peter Thomas
on behalf of the Contract Flooring Association



A contribution to delivering the targets in the joint
government and industry strategy for sustainable
construction.



FLOORING: Towards a Resource Efficiency Plan A Scoping Study

This study forms part of series of outputs aimed at supporting the delivery of the targets within the Strategy for Sustainable Construction, a joint industry and government strategy published in June 2008.

<http://www.berr.gov.uk/whatwedo/sectors/construction/sustainability/page13691.html>

The study was funded by the Construction Resource and Waste Platform (CRWP) as part of its 2007/2008 delivery programme. Katherine Adams of CRWP was the project manager .

<http://www.crwplatform.co.uk/conwaste/>

The study was requested by the Contract Flooring Association (CFA)

<http://www.cfa.org.uk/>

Members of the Contract Flooring Association include Flooring Contractors, Manufacturers, Distributors and Consultants across a wide range of flooring finishes including carpets, underlays, vinyls, rubber, timber, adhesives and flooring accessories

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The Delivering the Strategy Targets series was initiated by Jane Thornback of the Construction Products Association, as part of delivering the Association's commitments to the Strategy for Sustainable Construction. The Association is the umbrella body for construction product manufacturers and suppliers.

<http://www.constructionproducts.org.uk>

EXECUTIVE SUMMARY

This short scoping study, carried out between January and March 2009, looked at the issues of waste and resource efficiency as they relate currently to floor surfaces used in the UK. Eight different surfaces were considered: carpets, vinyls, linoleum, rubber, ceramic, resin flooring, wood and laminate. Interviews were conducted with trade associations and with individual companies throughout the supply chain to assess the scale of the waste issue at each stage. Overall, based on estimates from manufacturers and installers, it is estimated that a total of 583,000 tonnes of flooring material is disposed of every year, of which probably less than 1% is thought to be recycled, a little goes to incineration but the vast majority, perhaps 90%, goes to landfill. Clearly there is much opportunity in the flooring sector to improve this situation.

The study was initiated by the Construction Products Association on behalf of one of its members; the Contract Flooring Association (CFA). CFA represents contractors who install a wide range of flooring materials in both commercial and domestic situations and who are faced with the increasing problem of how to dispose of the old flooring that their clients request them to remove. The study was funded and managed by DEFRA's Construction Resource and Waste Platform (CRWP) and carried out by Pete Thomas Environmental on behalf of the CFA.

The study found that there is a large number of small recycling schemes, some of which are very effective at ensuring materials are recycled or reused. Most of these schemes however relate to materials from a specific supplier or from a specific end user. In some cases reasonably good recycling rates are being achieved.

The principal waste problem identified by the study is that end of life flooring materials have a limited value due to their frequently complex make up, high level of contamination and low incidence in the waste stream. This results in manufacturers and recyclers being unwilling to invest in either equipment, or products that utilise a high volume of post use flooring waste, since there is no regular supply of material. In turn, collectors will not collect as there is no regular outlet. Furthermore, for some flooring sectors there is conflict between regulatory waste policies which encourage recycling and European Chemical Legislation (REACH) which can virtually exclude it.

The scoping study makes a number of recommendations, including the need for a much larger in-depth project involving the whole supply chain to identify the obstacles to recovering flooring and the necessary actions needed to overcome these barriers. In addition, a pilot scheme is recommended involving a commercial Materials Recovery Facility (MRF) and a wide range of owners of flooring waste to look at the issues surrounding co-mingled collection and subsequent sorting of all of the recyclable waste associated with flooring installation.

Whilst this scoping study focused primarily on what happens to the resultant waste streams emanating from the flooring sector, any future resource efficiency plan will also need to consider whether there are any opportunities for waste reduction by designing out waste in the first instance or changing procurement practices.

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 Carpets
 Vinyl
 Linoleum
 Ceramics
 Wood
 Laminate
 Rubber
 Resin

Annex 2: Legislation, guidance and government

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I. Introduction

- 1.1 Members of the Contract Flooring Association (CFA), which includes contractors who install a wide range of flooring materials in both commercial and domestic situations, are faced with the increasing problem of how and where to dispose of the old flooring that their clients request them to remove and recycle. To assist them in resolving this problem, the CFA turned to its umbrella trade body, the Construction Products Association which was able to facilitate funding and technical support from DEFRA's Construction Resource and Waste Platform (CRWP). This short scoping study is the result. It examines the issues surrounding the manufacture, installation and end of life disposal of eight flooring materials in the UK. The work was carried out between January and April 2009. The scoping study is a precursor to a much needed resource efficiency plan for flooring which would involve the whole supply chain in identifying and implementing the actions needed to increase the efficient use of materials and decrease wastage at all stages. Additional funds will be needed to prepare such a plan.
- 1.2 The scoping study represents part of the delivery of a target within the 2008 joint government and industry Strategy for Sustainable Construction; namely for the Construction Products Association to assist product manufacturing sectors to improve their resource efficiency.

2. Objectives of the scoping study

- 2.1 The aim of this short scoping study is:
 - To quantify the waste problem faced by those in the flooring sector supply chain
 - For each of eight designated materials to describe the industry in terms of size, type, value, imports and exports and how the waste is currently managed
 - To explore the resource efficiency of current and future disposal routes
 - To identify relevant stakeholders – both within the flooring industry and externally
 - To make initial recommendations and proposed actions with timescales
 - To identify the possible parameters of a resource plan for flooring and identify a potential funding source

3. Scope of the study

- 3.1 The study examined waste disposal methods for flooring in the UK. This included the flooring waste generated from a UK manufacturer but which might then be sent overseas for recycling, as well as the waste generated in the UK from flooring made overseas and imported into the UK. The study did not evaluate the waste generated at source by manufacturers based outside of the UK such as carpet manufacturers in Belgium.

4. Definitions

Soft strip

- 4.1 The use of a specialist contractor to remove all non structural materials from a building prior to its redevelopment or demolition.

Co-mingled collection

- 4.2 The collection of waste which may be selected but will require further sorting into separate waste streams.

Civic amenity site (CA)

- 4.3 A facility provided by the Waste Disposal Authority that is available to the public to deposit waste which cannot be collected by the normal household waste collection round.

Materials Recovery Facilities (MRF)

- 4.4 Facilities that will use equipment to segregate mixed recyclable material into re-useable waste streams.

5. Market sectors

- 5.1 The flooring market is divided into the domestic market and the contract market. Both were considered in the scoping study.

Domestic market

- 5.2 Is normally considered to be the material installed in single occupancy housing. In the majority of cases the occupier is the person specifying the product to be used.

Contract market

- 5.3 Refers to all other situations and includes schools, hospitals, shops, offices, public building and leisure, as well as housing controlled by local authorities or housing associations.

6. Flooring materials considered by the study

- 6.1 The scoping study considered eight flooring materials. For each it reviewed the current situation regarding production, waste and disposal and recommended appropriate actions. Data sheets for each of the following eight materials can be found in Annex I. The flooring materials were:
- Carpets
 - Vinyl
 - Linoleum
 - Ceramics
 - Wood
 - Laminate
 - Rubber
 - Resin

7. Policy and legislative framework

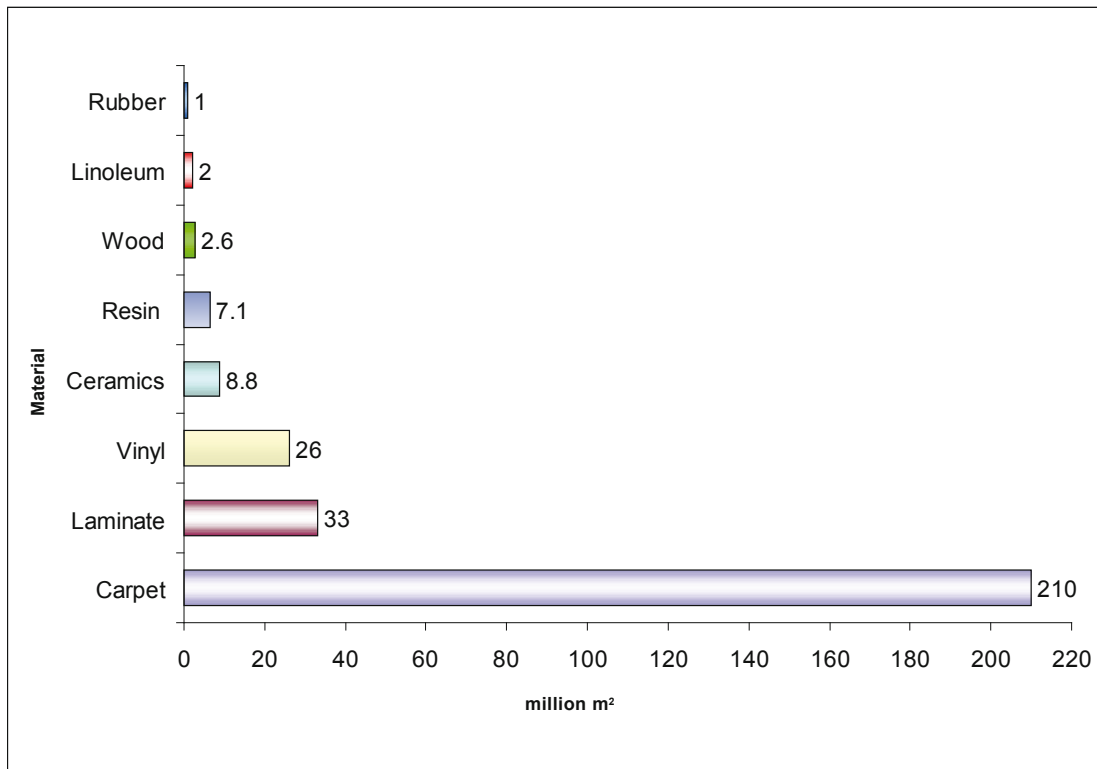
7.1 Legislation and waste policy have in recent years been instrumental in prompting the flooring industry to consider its impact on the environment. These and a number of industry initiatives aimed at minimising and improving the life-cycle impact of flooring through effective management of the waste materials, are summarised in Annex 2.

8. An overview of the UK flooring industry

Market size

8.1 The UK flooring sector is currently estimated to produce 290 million m² of material (Figure 1). The sector is dominated by demand for carpet which accounts for 210 million m² (73%) of the total volume. Laminate and vinyl account for 33 million m² (11%) and 26 million m² (9%) respectively. The remaining 21.3 million m² (7%) is distributed between ceramics 8.8 million m² (3%), resin 7.1 million m² (2%), wood 2.6 million m² (1%), linoleum 2 million m² (1%), and rubber 1 million.

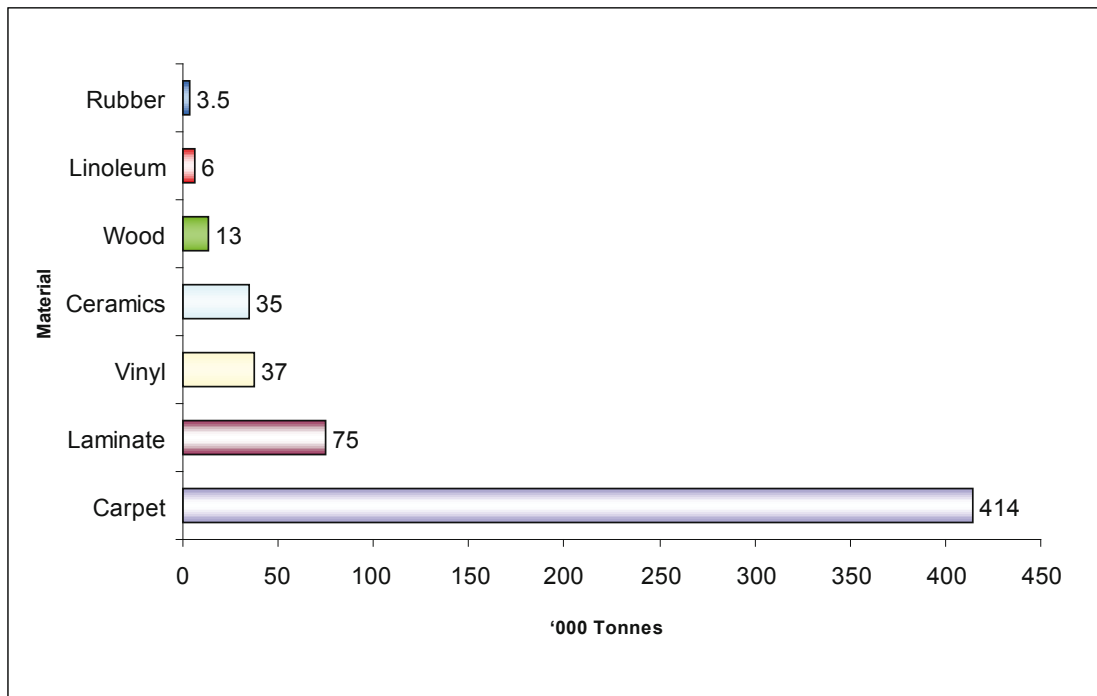
Figure 1: Market size of UK flooring sector (million m²)



Flooring waste generated

8.2 The UK flooring sector is estimated to produce 583,000 tonnes of flooring waste per year (Figure 2). The majority of which is carpet which produces almost 414,000 tonnes of waste or 71% of the total; this is comprised of 386,000 tonnes from uplifting of carpet and 28,000 tonnes originating from the installation of new carpet. Laminate produces 75,000 tonnes (13%) of total volume. Vinyl generates 37,000 tonnes (6%), of which 5,000 tonnes is post installation and 32,000 originates from post use. Ceramic waste accounts for 35,000 tonnes (6%), of which 8,000 tonnes is post installation and 27,000 tonnes from uplifting. Wood waste generates 13,000 tonnes (2%) from uplifting of old flooring. Waste from linoleum is approximately 6,000 tonnes (1%) of which, 5,700 tonnes is post consumer waste. Rubber waste is 3,500 tonnes (<1%). Figures for resin waste are unavailable due to the difficulty of assessment. These figures are based on sales volumes with estimated replacement rates based on discussions with relevant experts.

Figure 2: Total volume of waste generated pa. in tonnes



Volume of waste sent to landfill

8.3 The vast majority of flooring waste is sent to landfill; indeed possibly more than 90% of the total flooring waste generated per annum, especially end of life waste, is sent to landfill. This would mean more that almost 525,000 tonnes of flooring waste may go to landfill. This figure excludes ceramic and wood waste for which reliable evidence of disposal methods is not available. The chart below shows the total flooring waste by flooring type sent to landfill. Carpet waste accounts for more than 64%; laminate waste is approximately 11%; vinyl 5% with linoleum and rubber less than 1% of the total flooring waste generated. Some manufacturers have set up processes to enable manufacturing waste to be reused in their processes, or have developed take-back schemes for installation waste. These are all small scale. Some end of life waste may not be suitable for recovery due to contamination and the presence of hazardous materials.

Figure 3: Percentage of waste generated being sent to landfill

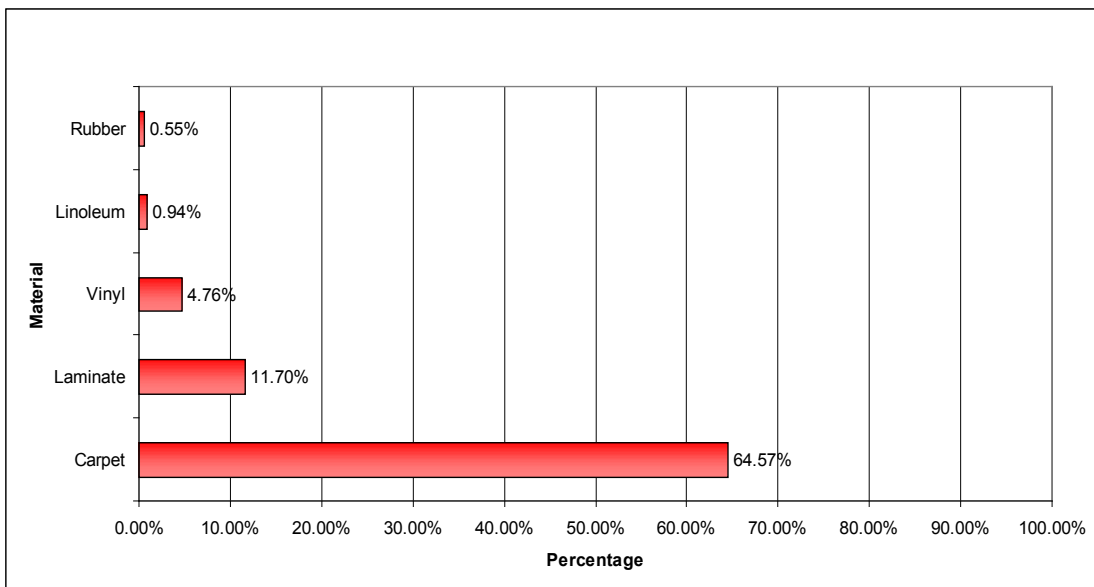
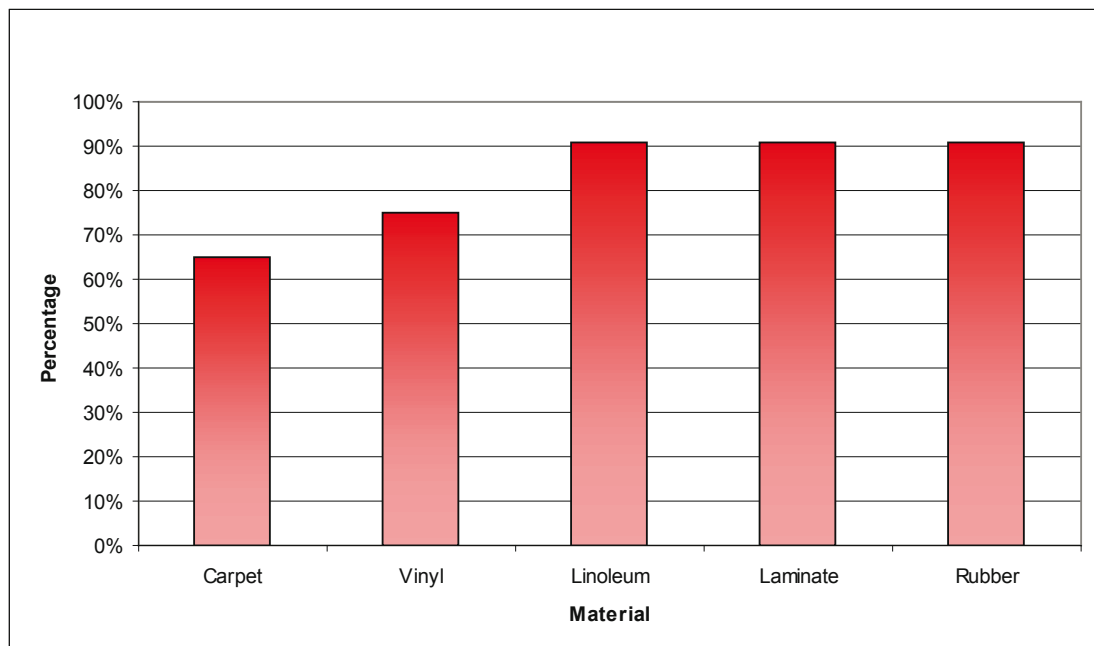


Figure 4: Percentage of waste to landfill



Summary of the UK Flooring Sector in the UK and its generation of waste

	Estimated market size per annum (million m²)	Estimated total volume of waste generated per annum (tonnes)	Current waste disposal route
Carpets	210	414,000	Landfill / Incineration
Laminate	33	75,000	Landfill / Incineration
Vinyl	26	37,000	Landfill / Incineration / Recycling
Ceramics	8.8	35,000	Hardcore / Inert fill
Resin	7.1	n/a	Landfill / Secondary aggregate
Wood	2.6	13,000	Recycled / Landfill / Incineration
Linoleum	2	6,000	Landfill / Incineration
Rubber	1	3,500	Landfill / Incineration

Note: All figures are based on independent market data and discussions with relevant bodies. No single set of data covers the whole of the sector. Due to the lack of a classification of waste flooring it is difficult to arrive at an estimate of material actually thrown away.

9. An overview of waste practices within the flooring supply chain

Raw materials

- 9.1 Some raw material manufacturers have encouraged the resource efficiency and recycling of products made from their materials. Two good examples are the PVC Industry Voluntary Commitment¹ and the Wools of New Zealand Fernmark². These schemes are clearly intended to maintain the raw materials market share but accept that evidence of sustainability such as recycling is necessary to continue to sell their material.

Manufacturing

- 9.2 Most flooring manufacturers are now aware of the cost savings that are possible by increasing resource efficiency, especially by reducing the level of manufactured waste and the re-use of the remainder back into the flooring.

Distribution

- 9.3 The distribution chain is extremely efficient and cost effective at getting materials from the manufacturers to the installer. In the vast majority of cases this is the limit of their interest. Because of their excellent distribution networks it has been suggested that they could act to collect flooring offcuts and waste flooring from their customers, by back-hauling and produce bulk loads at their depots, reducing transport costs.

Installation

- 9.4 The flooring installers vary in size from DIY installation and one man operations to multi million pound operations employing dozens of fitters. The larger companies are able to organise waste collection. Smaller jobs can be managed by taking waste back to the contractor's base. With larger contracts they often face the problem that the fitters do not work out of a central base. Flooring may be delivered direct to site by the distributor. At best the fitter will have a van to transport tools and other materials and will normally be looking to dispose of waste to the site skips. If there is a collection scheme then it will normally require collection from the site.
- 9.5 For the smaller operator, who is frequently working in the domestic market, they will endeavour to leave both uplifted material and any installation offcuts and associated waste with the householder. This is then disposed of through the municipal waste or household waste recycling site. If they can be persuaded to dispose of the waste, this will go to a trade waste site which is prepared to accept small loads delivered by van.

Uplift / removal

- 9.6 Uplift of flooring can occur at various times depending on the flooring. In the domestic market the decision to change the flooring is frequently a fashion driven decision rather than the flooring being worn out. The same can occur in the retail sector where stores will change flooring as part of their current branding. Recent studies have shown that on average a retail store floor is changed every seven years.³ Within an office or school the flooring is usually changed when it is worn out which could be up to 25 years.
- 9.7 The end of life of the flooring is the area where most waste is generated. It is also the area where the flooring is likely to be in the worst condition for recycling.

1 http://www.vinyl2010.org/Home/Home/Our_Voluntary_Commitment/

2 http://www.fernmark.com/en_uk/index.asp

3 BRE Green Guide 2008

- 9.8 There are three ways that flooring is removed:
- The flooring contractor who is going to lay the new floor removes the old and takes ownership of the whole process. Common in domestic situations and small scale commercial refurbishment. Frequently leaves waste with householder
 - The main contractor employs a specialist soft strip company to remove all interior fittings including flooring, partitions, ceilings and electrical. Used in larger scale refurbishments. There is some scope for waste segregation either on site or at a Materials Recovery Facility
 - Demolition of the building. The flooring may be salvaged from the rubble but in general it will be contaminated by the other wastes. May be used in conjunction with waste segregation through a Materials Recovery Facility

Waste disposal

- 9.9 There is little incentive for waste management companies to extract flooring from the waste stream as at present there is no large scale clearly defined market for the separated material. Where such a market can be shown then the waste companies can be persuaded to segregate the flooring stream. This has been shown by the collection scheme operating in 20 household waste recycling sites in the West of England which are feeding into Greenback Recycling's operation in Wiltshire⁴ and the Vinyl Flooring Collection Scheme⁵ which is receiving material from waste transfer stations.
- 9.10 At the present time the only incentive to remove flooring waste from the waste stream is to avoid the cost of disposal to landfill. This does open up the possibility of a gate fee being charged for the collection of material for recycling or recovery which may prove attractive if it is less than the cost of disposal including landfill tax.

10. Findings of the scoping study

- 10.1 Whilst there is a number of initiatives being discussed to improve the rate of recycling of a range of floorings, these are making little impact on the total amount of flooring waste going to landfill. Based on the data collated for this scoping study less than 1% of flooring waste arising is re-used or recycled, with the vast majority, more than 90%, being sent to landfill.
- 10.2 The biggest obstacle is that there is no major cost driver to encourage anyone in the supply chain to set up a profitable recycling operation, i.e. there is no business case to be made. The main obstacles are:
- Flooring materials after they have been used may have limited value due to contamination
 - Flooring materials are frequently of complex composition
 - The cost of processing the flooring waste is high in relation to its value
 - The quantity of flooring material is low in comparison to other major waste streams
 - Flooring waste that is generated is widely dispersed across the country
 - The cost of transporting small quantities of waste flooring around the country soon exceeds the value of the material
 - Potential central collection points are at locations which are not licensed to receive waste
 - The individual waste streams are contaminants for each other so require segregation for most applications
 - Flooring which has been mixed with general waste is difficult to get clean enough to reprocess

⁴ <http://www.greenback-recycling.co.uk/>

⁵ <http://www.axionrecycling.com/>

- 10.3 There are a few isolated examples of best practice which could in theory be extended to the whole industry, but in general these exist because they have overcome at least one of the above obstacles.
- 10.4 At present, in general, there is no incentive to develop processes to recycle flooring products as there is no guaranteed source of waste materials and because there are no active collection schemes. In turn, there are no collection schemes because there is no defined end market for the material collected. Unless this cycle is broken there will be no incentive to handle flooring waste.
- 10.5 However, with pressure coming from building owners and main contractors, some companies are now beginning to develop collection and recycling schemes because they see the commercial advantages. Such schemes at present tend to focus on a company's own products and, whilst they may offer a sales advantage and an impact on an individual project, they as yet do not make any major impact on the total amount of flooring waste going to landfill.
- 10.6 The major disposal route for flooring is via either municipal waste collections or trade waste sites, but there are very poor estimates of the actual quantities of flooring arising in these waste streams. All the estimates in this scoping study relate to sales volumes with estimated replacement rates based on discussions with experts from the various industries. Some of this data should be verified against what is actually ending up in the landfills via the various routes.
- 10.7 Flooring contractors, and other owners of flooring waste, find a proliferation of schemes confusing and impossible to use. Most are SMEs and have very limited space at their own sites. This means that they are unable to have separate containers for different materials such as carpet, vinyl, wood, laminate and general waste. From a logistics perspective, it would appear logical to have one easily identified container for all non aggregate recyclable waste and one for general non recyclable waste. The recyclables' container could then be sent to a Materials Recovery Facility specialising in this type of material which would then be able to segregate the flooring into useable streams. It may be feasible to extend this collection to include the usual industrial recyclables such as cardboard, cores, plastic wrap and pallets.
- 10.8 Currently, there are parts of the supply chain which are not involved in any recycling process. The majority of flooring installed is supplied through distributors. These distributors are the primary point of contact for the flooring contractors who generate a large percentage of the flooring waste. One possible option to minimise the cost and impact of transporting small quantities of waste would be to use the already existing distribution network to back-haul the waste to central locations. At these locations sufficient material could be collected to allow full vehicle collections to be made. However, there are serious issues to overcome of dirty waste flooring being transported on the same vehicle used to distribute clean, expensive carpet and other floorings, not to mention issues of waste licensing both during transport and on site.
- 10.9 To deliver the improvements that are required, stakeholders from the entire supply chain need to become involved and help to develop a national flooring resource efficiency strategy. This is because the practices of each different part of the chain impact on other parts of the chain. For instance, the raw materials used in the manufacture of flooring will determine what recycling options may be possible at the end of its life; the installation method used will determine whether recovery and reuse is an option; and the supply of sufficient types of waste materials will influence whether there is an economically viable reprocessing choice. Key stakeholders who will need to be engaged in the development of such a strategy are listed in Annex 2.

I I. Recommendations

- I I.1 Seek project support from DEFRA / WRAP / CRWP to develop a much needed resource efficiency plan for flooring which should involve the whole supply chain in identifying and implementing the actions needed, both vertically by supply chain segment and horizontally by product type, to increase the efficient use of materials and decrease wastage at all stages. This scoping study has been a precursor to such a larger project.
- I I.2 Create a One Stop Shop for flooring recyclers which would allow anyone with flooring waste to contact someone who is able to recycle or reuse the material.
- I I.3 Discuss with manufacturers, re-processors and research organisations potential uses for waste streams. Provide support including start up funding and access to sources of material.
- I I.4 Survey each product type and its associated supply chain to better understand the price currently being paid for disposing of waste and what people would be willing to pay to have the product recycled.
- I I.5 Enter into discussions with the flooring distributors regarding the use of their distribution system to collect the waste.
- I I.6 Develop a clean handling system that would allow contaminated end of life flooring to be transported on clean distribution vehicles.
- I I.7 Confirm that carpet waste, whether originating from the domestic or commercial sector, should be considered as a construction waste.
- I I.8 Outline the specification for the various material streams arising from flooring allowing them to be reused as materials rather than waste, i.e. carry out a Quality Protocol Project with the Environment Agency.
- I I.9 Develop a Resource Efficiency Programme with the UK carpet manufacturers to reduce the amount of manufacturing waste generated and to look at possible routes to make their products easier to recycle at the end of life.
- I I.10 Implement in conjunction with a commercial Materials Recovery Facility, flooring contractors, distributors and other sources of waste flooring, a pilot mixed flooring collection and segregation scheme to cover all recyclable materials that a flooring installer could generate.
- I I.11 Where members of an individual flooring material sector can see advantages of working together then voluntary agreements between them should be encouraged and research and financial assistance sought to demonstrate feasibility. (UK carpet manufacturers already have a voluntary agreement through Carpet Recycling UK (CRUK) but need additional funding for end-use developments).
- I I.12 Ensure that any wood and laminate flooring solutions proposed are fully integrated with those being proposed by the British Woodworking Federation project on joinery resource efficiency.
- I I.13 Undertake research to determine whether wastage rates can be lowered when ordering and installing flooring.
- I I.14 Investigate the opportunities for waste reduction from designing out waste in the first instance, as well as whether there are opportunities for waste reduction from changing existing procurement practices.

Annex I - Flooring materials data sheets

Carpets

Product description

Carpet is still the most common floorcovering in the UK and is available as rolls or tiles. Carpet is made from two major components: the fibre which forms the surface and a backing which holds the fibres together. A wide range of natural and synthetic materials can be used in both components. The surface fibre can be wool, nylon, polypropylene, polyester, sisal or jute, amongst others. The principal backing components include polypropylene, jute, rubber latex, glassfibre, PVC or bitumen.

The top surface of the carpet can be produced by a range of techniques including tufting, weaving, needle punch and thermal bonding. In the domestic market tufting dominates usually with polypropylene or nylon fibre, but in the contract market woven carpet with a wool / synthetic blend is more common.

Market size

There are wide variations in the estimated market size for carpet. The main variation is in the amount of carpet sold into the domestic sector, with estimates varying between 120 million m² to 170 million m². A further 40 million m² is sold into the contract market.

Number of manufacturers

There are at least 15 large manufacturers of carpet in the UK and in addition many smaller specialised companies.

Import penetration

Currently, between 60% and 70% of carpets sold in the UK are imported, with a large percentage coming from the Netherlands and Belgium. The majority of imported carpet is manufactured from polypropylene or nylon, with little wool imported.

UK exports

Specific legislative drivers – there are no specific legislative drivers for carpet waste. Many carpets are wool blends with synthetic polymers such as nylon or polypropylene. This causes problems if the waste is to be used as a soil conditioner due to restrictions on the use of textiles containing synthetic polymers as soil conditioners.

Sources of waste

Manufacturing waste – the majority of UK weavers are still disposing of their waste to landfill. This is estimated to cost the industry in excess of £1 million pa. In the UK, the mixed nature of the waste which includes a large percentage of wool in the mix is a problem, especially the shearing waste stream which produces a short (1-2mm) fibre. When this waste was pure wool it could be used as a soil improver; but today with the almost universal blending of polypropylene or nylon with the wool this is no longer permitted and the waste now goes to landfill.

Several larger companies recycle their manufacturing waste back into their own production, resulting in no waste going to landfill. This material usually results in the down grading of the surface yarn by incorporating it into the backing. Technology is available to shear the fibre from carpet tiles. The resultant fibre can be re-pelletized and re-extruded as new fibre while the backing is recycled as normal.

Installation waste – in domestic installation it is common for the installation offcuts to be left with the householder. This material will be collected either via the municipal waste collection or taken to the local household waste recycling site. In the case of contract installations, the majority of waste goes in the site skips. This may then be sorted at a construction Materials Recovery Facility, but as there is no commercial outlet for the carpet waste it will normally be sent to landfill.

In addition to the actual carpet waste there will be other associated wastes such as underlayment, gripper, nosings and adhesive containers which require disposal. This will contaminate the actual carpet and requires segregation.

Carpet is usually supplied wrapped on a cardboard core with a protective plastic end bung. The roll is then wrapped with either a paper or polyethylene covering. Carpet tiles are supplied in cardboard boxes or with cardboard protection and a polythene shrink wrap. For large contracts, tiles can be supplied loose, stacked on pallets and then stretch wrapped. Packaging waste is therefore an issue.

End of life material – in the domestic situation this is normally considered the responsibility of the householder and, as with the installation offcuts, will be disposed of through the municipal waste collection or to a household waste recycling site. Fly tipping of old carpet is a continuing problem; analysis of the Environment Agency's Flycapture database shows that carpet makes up nearly 8% of fly tipped material.

In contract installations, some carpet tile is collected for reuse through schemes such as the Interface and Milliken Refurbishment Processes mentioned below. Some broadloom material is collected and shredded for use in equestrian surfaces and small scale felting operations although there are restrictions on the use of carpet in equestrian surfaces due to its definition as a waste. This can restrict the options of where the shredded material can be used and increases the bureaucracy involved. Attempts are being made to obtain a Quality Protocol from the Environment Agency which would allow the material once processed to be treated as a raw material not a waste. This would certainly widen the opportunities where the material could be used.

Some polypropylene needle felt designed for exhibition use is being collected and reprocessed back into new carpet.

There are socially responsible enterprise run schemes, usually in urban areas, where used but serviceable carpet is collected, sorted and distributed at low cost. They are usually offering employment in disadvantaged areas. The volume processed through this route is however very small at less than 100 tonnes per year.

Several suppliers of carpet tiles will take back tiles for resale. The two major suppliers are Interface and Milliken. They have the facility to collect, sort, clean and re-supply tiles. It is estimated that the total volumes involved are approximately 1000 tonnes per annum.

Volume of waste

Assuming an installation wastage factor of 8% this will result in 13 million m² of carpet being generated. Based on an estimated average weight of 2kg / m² this will be approximately 28,000 tonnes.

At the end of life virtually all carpet is uplifted as it is rarely possible to overlay. Based on a conservative estimate of market size of 175 million m² and assuming that an equivalent area is uplifted then it is estimated that 386,000 tonnes of used carpet will be produced annually giving a total of 414,000 tonnes of carpet waste being generated every year.

Current disposal route

Currently, the vast majority of carpet is disposed to landfill. As a large proportion will be disposed of via the municipal waste route then it can be considered that a proportion of the waste goes to incineration for energy recovery. The only people driving any collection and recycling of carpet waste are currently some manufacturers, a limited number of main contractors and some large property owners. The flooring contractors are involved as they are usually creating the waste but the distributors in general do not consider it part of their problem.

Considerable effort and expertise is being put into encouraging carpet recycling by Carpet Recycling UK (CRUK) which is a trade association of carpet manufacturers, raw material suppliers and recyclers. CRUK is dedicated to achieving a UK carpet industry which is recovering all its carpet waste using the best environmental technologies⁶.

Future actions required

- Information is needed on how much carpet and of what types, actually goes through the various disposal routes
- Specifications are needed for the individual carpet waste streams that could be recyclable
- A collection system is needed that can cope with the various disposal routes including municipal waste, household waste recycling sites and trade waste sites
- A system is required for easily identifying the composition of carpet waste
- A route is needed for disposing of a large volume of mixed fibre waste

⁶ <http://www.carpetrecyclinguk.com/>

Vinyl

Product description

Vinyl flooring is supplied in either sheet or tile form. It is produced by heating together PVC resin with plasticisers to give flexibility, pigments to provide colour, stabilisers to ensure stability to heat and light and mineral fillers to improve the properties and reduce the cost. There are two predominant methods of manufacture.

Calendering - where the raw materials are heated together during a mixing process and then formed into a uniformed decorative sheet by heat and pressure. The material produced is usually homogeneous throughout its thickness.

Coating - relies on using a PVC resin which when mixed forms a liquid. This is coated onto a substrate such as glassfibre tissue to give dimensional stability before being heated to cure the sheet. This allows multiple layers to be applied with a wide range of decorative effects.

The majority of the material used in the domestic market is produced by coating and is sold in widths up to four metres wide. Contract material may be produced by both methods and is usually supplied in tile form or rolls up to two metres wide.

Safety flooring - has a slip resistant surface usually produced by the application of highly abrasion resistant particles to the top coating. This produces a product which provides improved slip resistance as well as exceptional wear resistance. It also produces a problem as the resulting flooring is very difficult to reprocess due to the abrasive particles. Widespread use of safety floor is unique to the UK market.

Market size

In 2007, the estimated market size for vinyl was approximately 26 million m² of which 42% is considered domestic and 58% contract. Of the contract market, 62% is believed to be safety flooring. The total value of the market was estimated at £271 million.

Number of manufacturers

There are five manufacturers of vinyl flooring in the UK, with a further 13 manufacturers in Europe, several of which have selling organisations in the UK⁷.

Import penetration

Exact figures are difficult to obtain as flooring is not a separate category within the trade classifications. The domestic market for vinyl is dominated by imports. This applies to both the cushioned vinyl market which is dominated by imports from Belgium and decorative tiles where the Far East dominates.

Within the contract sector the majority of product is manufactured in the UK although in recent years import penetration has increased following the transference by one supplier of manufacturing to other plants in Europe.

⁷ ERFMI - <http://www.erfmi.com/>

UK exports

All the UK manufacturers are major exporters with the major market being Europe, North America, Middle and Far East.

Overall the UK is a net exporter of vinyl flooring.

Legislative drivers

There are no restrictions on the disposal of vinyl either to landfill or incineration / energy recovery. There are potential issues with substances of very high concern (SHVCs) which could be present in uplifted flooring.

Sources of waste

Manufacturing waste - within a calendaring operation it is normal for all manufacturing offcuts to be reused within the process. Many process plants are designed for this to occur on a continuous basis.

Coating operations cannot directly incorporate their waste back into the process. The major sources of waste are edge trims, process joins and sub grade materials. This can vary from 2% to 10% depending on the efficiency of the operation. Each manufacture deals with this waste in different ways. It can be processed through an off-line operation to allow incorporation into a coated flooring or it is sold to a secondary manufacturer who can use it for a range of heavy duty items such as road cone bases, sleeping policemen and kerbstones.

One manufacturer of safety flooring has installed suitable equipment to allow the reprocessing of their trims and offcuts back into new safety flooring. Other manufacturers are looking at similar investments due to the value of the material if it can be reused.

Installation waste - post installation waste, especially non safety flooring, can be easily recycled back into new flooring. In the UK there has been some collection of offcuts from large installations for some years and in 2007 a WRAP sponsored collection scheme was started. This has been administered by Axion Recycling on behalf of four flooring companies. This has seen a major increase in the number of sites which are collecting offcuts. The material is collected by the flooring manufacturers and reused back into new flooring.

Sheet vinyl is supplied wrapped on a cardboard core with a protective plastic end bung. The roll is then wrapped with either a paper or polyethylene covering. Tiles are supplied in cardboard boxes with either adhesive tape or hot melt sealing.

End of life material - at the end of its life it is estimated that 50% of the vinyl flooring is unavailable for recovery. This is most commonly because it has been covered by the new flooring or it is contaminated by asbestos. In the domestic situation the old flooring is frequently left with the house owner for disposal which will result in it being introduced into the municipal waste stream. In the contract market the flooring may be either uplifted by the contractor laying the new flooring or in the case of larger contracts by soft strip specialists. At present the Axion collection scheme will collect uplifted flooring but the current scheme is not entirely satisfactory as it relies on the individual manufacturers to collect and take back. This can cause problems as waste handling is not the major business of any of these companies. This problem is exacerbated as collection volumes increase.

There are potential complications to the use of post use vinyl flooring which may have been manufactured up to 25 years ago. At that time raw materials such as cadmium, lead, chlorinated paraffin and DEHP (Di Ethyl Hexyl Phthalate) were in common use. These products are no longer used in the manufacture of vinyl flooring but they are controlled under the European Chemical Legislation (REACH). There is considerable confusion over whether it is possible to use flooring waste which may contain this type of product in new vinyl flooring. This is a situation where two different parts of EU legislation, REACH and the Waste Directive, appear to be in direct conflict.

Volume of waste

It is estimated that there are more than 5,000 tonnes of post installation flooring waste and 32,000 tonnes of post use flooring are produced each year.

Current disposal route

At present approximately 300 tonnes of material is sent for recycling. The remainder goes for disposal, either to landfill or incineration.

Future actions required

- Continuation of the current collection scheme
- Extension to the use of post use vinyl flooring
- An infrastructure that allows continuous collection and sorting of both installation offcuts and end of life flooring
- Development of flooring capable of using high level of post use flooring
- A system that will handle post use safety flooring waste economically
- Specifications for individual flooring wastes to allow easy trading between waste producers and recyclers
- Ease of identification of vinyl waste to allow segregation of the waste stream
- Information as to how much vinyl flooring actually goes through the various disposal routes

Linoleum

Product description

Linoleum is a resilient, usually sheet flooring, manufactured from a mixture of linseed oil, natural resins, cork, wood flour, ground limestone and pigments mixed together and supported on a jute fabric. The manufacturing process causes the linseed oil to oxidise which results in an abrasion resistant, flexible, thermoset flooring.

Market size

The current market for linoleum in the UK is approximately two million m² of which 1.3 million m² are installed in contract situation and the remainder in domestic areas.

Number of manufacturers

There are three manufacturers of linoleum worldwide with only one having manufacturing facilities in the UK.

Import penetration

Even though the total UK production volume exceeds the total UK sales the level of import penetration in the UK is high due to the level of exports from the sole UK plant.

UK exports

High from sole UK plant.

Legislative drivers

There are no specific legislative drivers controlling the recycling or disposal of linoleum.

Sources of waste

Manufacturing waste – arises in the UK. The majority of manufacturing waste generated in the UK is recycled back into new linoleum at the sole UK plant. As there is only one manufacturer in the UK it would not be appropriate to publish details of quantities.

Installation waste – until recently the only post installation waste recycled has been from a trial run by one manufacturer. The total volume was small and highlighted the issues of logistics and the quality of the waste. Very recently the collection and recycling of post installation offcuts on very large jobs has been offered. This material will be exported for processing back into linoleum at a European plant. Linoleum is supplied wrapped on a cardboard core with a protective plastic end bung. The roll is then wrapped with either a paper or polyethylene covering.

End of life material – the volume of material that is available is low. The quality of the linoleum waste from end of life is very variable but because linoleum is always adhered with a high performance adhesive it is likely to be contaminated by not only the adhesive but also the subfloor to which it was adhered. This may be wood or cement based.

Volume of waste

At the only UK manufacturer, the majority of manufacturing waste is recycled on site. Due to commercial confidentiality no specific volumes are available.

For post installation offcuts, based on an average weight per square metre of 2.88 kg/m² and an average installation loss of 6%⁸ approximately 345 tonnes of offcuts will be produced. This will be widely spread across the country in quantities ranging from a few kilos in a domestic installation to several tonnes at a major hospital. For post consumer waste it is possible that up to 5,700 tonnes of linoleum could be being sent to landfill each year. In practice it is likely that up to 50% of this is not removed from its location and new flooring is installed directly over it, while another amount is removed during the initial strip out or demolition and mixed with the concrete and other hardcore.

Current disposal route

The majority of linoleum will be disposed of through normal trade waste sites and can therefore be considered to show the same average profile of landfill and incineration. Where installations take place in domestic situations the flooring waste (both offcuts and uplifted material) will frequently be left with the householder for disposal. This material is therefore likely to be disposed of via the local household waste recycling centre. There is however no segregated collection at any centre.

Linoleum is in theory considered biodegradable because of its composition but evidence would suggest that it is likely to take a long time.

Linoleum has a high calorific value so will burn well in an incinerator. There will be a certain ash content from the limestone filler which may comprise up to 30% of the product.

Future actions required

- Trials on the biodegradability of linoleum to establish how long it takes to biodegrade
- Study on possible processing routes to allow co processing with other resilient flooring

Ceramics

Product description

Ceramic tiles cover a range of products all with the basic characteristic of being produced from some type of clay and subsequently fired at high temperature to produce a hard resistant tile. The surface may be glazed or unglazed resulting in different absorbency and wear properties.

Market size

The contract tile market is currently 2.4 million m² with the domestic market amounting to approximately 6.4 million m².

Number of manufacturers

There are currently three manufacturers of ceramic tiles in the UK, although only one manufactures wall tiles in the UK, importing their floor tiles from Europe.

Import penetration

This is estimated to be very high with in excess of 90% of material being imported, with the majority coming from Spain and Italy.

Legislative drivers

There are no specific legislative drivers controlling the recycling or disposal of ceramic tiles. They are normally considered as inert waste.

Sources of waste

Manufacturing waste – some arises from the UK manufacturing and is all ground to <3mm and recycled back into new tiles. The industry also receives, when it is available, ceramic waste from other industries such as tableware manufacturing. Floor tiles need to go back into floor tile production as they are coloured and cannot be incorporated into the thinner wall tiles where the base layer needs to be a consistent white colour. The material has a substitution value of between £30 and £50 / tonne.

Installation waste – installation waste which is free from adhesive could be recycled with the same caveat about the issue of colour. At present, these will normally go into the site skip for large contracts. Depending on the arrangement from the main contractor this may be sorted via a MRF or go direct to landfill. Domestic installations may be collected with normal municipal waste or taken to the household waste recycling centre where it should be directed to the inert fraction. In both cases the best outcome is for the material to be used as hardcore unless it can be re-used as a tile. The tiles are usually supplied in cardboard boxes on pallets. These are both recyclable through normal recycling routes.

End of life material – ceramic floor tiles will normally be removed due to fashion or change of use reasons rather than because the tiles have worn out. All of this material will be contaminated with adhesive and is likely to be damaged during removal. This means that the only route for disposal currently available is as hardcore or inert fill.

Volume of waste

Based on a budgeted wastage factor of 5% to 7.5% dependent on the size of the tile, it is estimated that between 5,000 and 8,000 tonnes per year of post installation waste are produced

It is difficult to make an accurate assessment of the total volume of tiles uplifted each year as a percentage of tiles will not be removed but covered with new flooring. If an uplift rate of 25% is taken then it is estimated that approximately 27,000 tonnes of ceramic waste is generated. The total waste from the use of ceramic tiles is therefore of the order of 35,000 tonnes.

Current disposal route

The only route for disposal currently available is as hardcore or inert fill.

Future actions required

Wood

Product description

There are two broad types of wood flooring.

Solid wood – where the whole plank of flooring is manufactured from one piece of wood. This is the simplest type and is frequently nailed or stuck to the floor. More modern varieties are available with *clic* connection which allows glue free installation.

Engineered wood – where veneers of the chosen wood are produced which are then laminated either to further layers of veneer from a cheaper source or to a MDF backing. These are in general more stable and are normally produced with a glue free fixing system.

Market size

The total market for wood is estimated at 2.6 million m², of this the major part is through the contract sector.

Number of manufacturers

There are estimated to be 10 to 12 small manufacturers in the UK with the larger manufacturers based in Europe especially Scandinavia and Eastern Europe.

Import penetration

The level of import penetration is high but no specific data is available. Estimates are in excess of 70%.

Legislative drivers

There are limitations on engineered woods in some recycling operations as they are defined as treated. There may be issues with some surface treatments but in general the quantity is low enough not to be a problem.

Sources of waste

Manufacturing waste – waste is generated by the various machining operations. The generation and treatment of these losses in the general timber industry is being addressed under the parallel study into the timber industry funded by DEFRA's Construction Resource and Waste Platform (CRWP). It is difficult to assess the size of the problem for flooring as there are no separate records for wood flooring production in the UK.

Installation waste – waste from installation is comparatively low with approximately 800 tonnes being produced. This will usually go into the site skip. If this is being sorted then it will go through the normal recycling routes. Otherwise it will go to landfill. The flooring is usually supplied with cardboard protection and shrunk wrapped polyethylene wrapping. This material is all recyclable through normal recycling routes.

End of life material – at the end of life a small amount of material may be re-useable. This is particularly the case with solid hardwood flooring where there is a well defined market for reclaimed flooring. Newer glueless fixing methods are making it easier to uplift and reuse flooring but the quantities are small. The remainder of the uplifted flooring can be assimilated into the normal wood recycling chain as the volume does not justify a specific scheme to handle it.

Volume of waste

It is estimated that for each square metre of wood flooring laid only half a square metre is uplifted. This is because of the long life of the flooring and the current trend to replace carpet by hard flooring. This would suggest that the total of 13,000 tonnes of old flooring will be uplifted.

Current disposal route

Between 2,000 to 3,000 tonnes will be reclaimed for use as flooring and the remainder either recycled or disposed of to landfill. There are differences in recycling routes between solid and laminated floorings. The solid wood can be used in animal bedding, particle board, and landscaping depending on the surface treatment. Laminated or engineered flooring is considered to be treated timber and has a narrower range of options of which the most economic is energy from waste. More details are available from www.recyclewood.org.uk.

Future actions required

- Clearly defined recycling route at all stages in the product cycle
- Efficient collection scheme

Laminate

Product description

Laminate flooring has a design printed onto to paper which is then laminated to a high density fibreboard base layer. The surface is then coated with an abrasion resistant transparent coating. The material is then cut into boards. The boards have specially designed edge profiles that allow them to lock together giving a glueless installation process. Laminate is usually installed over a foam or woodfibre base layer to reduce noise and to eliminate any unevenness in the substrate. Because of the ease of installation laminate has become extremely popular in the domestic market with large penetration into both the carpet retailers and the DIY sheds. Large amounts of laminate are being installed in replacement of carpet and vinyl.

Market Size

Figures from the European Producers of Laminate Flooring indicate that there were 33 million m² sold in the UK in 2008 of which the vast majority is installed in domestic situations.

Number of manufacturers

There are 20 European based manufacturers of laminate most of whom are importing into the UK. Several have manufacturing plants in the UK but it is difficult to establish how many of these operations are manufacturing flooring as many make a range of timber and laminate based products, not just flooring.

Import penetration

It is difficult to get exact statistics as there is no separate data for laminate flooring but it is believed to be in excess of 90%.

Legislative drivers

From a recycling point of view laminate would be considered as treated which restricts its usage.

Sources of waste

Manufacturing waste – in general this is not a problem in the UK. Most manufacturers are able to recycle their direct manufacturing waste back into their operations.

Installation waste – the wastage factor for the installation of laminate flooring is low at about 3% giving an estimate of approximately 6000 tonnes of waste. This material mainly arises in the domestic situation and will end up in the domestic waste stream. There is no easy route for this material back to the manufacturers for reuse. The flooring is usually supplied with cardboard protection and shrink wrapped polyethylene wrapping. This material is all recyclable through normal recycling routes.

End of life material – the amount of laminate being uplifted at present is low compared to the sales as there has been a very rapid increase in the use of laminate over the last ten years which means the majority of flooring installed is still in use. Over the next five years it is to be expected that the volume of laminate being removed will approach 50% of that being installed.

Volume of waste

At the present time it is estimated that the total amount of waste laminate will be of the order of 75,000 tonnes rising to more than 100,000 tonnes.

Current disposal route

Because of its construction, laminate flooring cannot be recycled through the normal wood recycling processes; the majority of material is therefore disposed of to landfill. If it enters the wood recycling stream then the only disposal route is likely to be energy from waste.

Future actions required

- Clear definition of the recycling routes that are possible
- Access to energy from waste plant
- Collection scheme for post use laminate flooring

Rubber

Product description

A sheet or tile product manufactured from a blend of natural and synthetic rubbers with mineral fillers and pigments. The materials are blended and then made into a sheet which is held under heat and pressure to vulcanise the material which converts it into a thermoset material. The resulting material is hard wearing with good resistance to burns. It can be produced with a smooth surface or with a profiled surface for improved slip resistance in very heavy traffic areas.

Market size

The overall market size is between 800,000 and one million m². At least 90% is sold into contract applications⁹.

Number of manufacturers

There are three major manufacturers of rubber flooring in Europe with several small companies making tiles. There are also suppliers in the Far East supplying limited quantities.

Import penetration

Essentially 100% of rubber flooring used in the UK is imported.

UK exports

No major UK manufacturer of rubber flooring exports.

Sources of waste

Manufacturing waste – not relevant in the UK but in general all pre-vulcanisation waste is reused in the process while other waste is reground and reused in other rubber products.

Installation waste – as predominantly a sheet product, the installation loss is considered as 6%¹⁰. This results in approximately 200 tonnes of waste. This can be reground and either used in ground stabilisation or as horse stabling. The major issue is the collection logistics as the volume from any one installation is very small. Rubber sheet is supplied wrapped on a cardboard core with a protective plastic end bung. The roll is then wrapped with either a paper or polyethylene covering. Tile flooring is packed in cardboard boxes on pallets.

End of life material – rubber is specified as a very long life product and it is likely that only an amount equivalent to 50% of the installed volume will be uplifted and disposed of. This material in theory can be reused in the same way as the offcuts but more commonly it can be sent to energy from waste plants due to its high calorific value.

Volume of waste

The majority of rubber flooring has a long life and it is likely that only an equivalent of 50% of the total installed will enter the waste stream. This results in an estimated total of 3,500 tonnes.

⁹ Personal communication with manufacturers

¹⁰ ERFMI LCA Study 2008

Current disposal route

At present it is likely that, except for special cases where the building owner or main contractor request it, rubber flooring will be sent to landfill via the commercial waste stream.

Future actions required

- Information on the amount of waste being produced through each waste route
- Means of easily identifying rubber flooring in a mixed waste stream

Resin

Product description

Produced by the application of a blend of polyurethane, epoxy or acrylate resins blended with aggregate fillers and pigments. The resin components allow the mixture to be applied as a thin uniform coat before curing to give a hard durable coating.

Market size

The total UK market is 7.1 million m² across a wide range of specifications.

Number of manufacturers

There are 11 manufacturers of resin systems in the country and more than 40 contractors who install the systems.

Import penetration

Not known

UK exports

Specific legislative drivers

Sources of waste

Manufacturing waste – the manufacturing operation is essentially blending, with no major losses.

Installation waste – the major source of waste during installation is the packaging from the individual components which are blended on site.

End of life material – at the end of its life, the resin flooring is frequently not removed. It may be either overlaid with either new resin or a different type of flooring. When it is removed it is frequently mixed with the screed to which it has been applied. This material is normally used as secondary aggregate.

Volume of waste

It can be difficult to assess the total volume of waste produced over the lifetime of a resin floor.

Current disposal route

Packaging waste may be contaminated with other materials and needs to be disposed of in a safe manner. Removed material will go to either secondary aggregate or to landfill.

Future actions required

Annex 2 - Legislation, guidance and government policy

National Waste Strategy (England) 2007

The Strategy provides targets for future waste management in England and details the government's ten year plan to promote recycling and re-use and to reduce the country's dependency on landfill. The Waste Strategy introduced the waste hierarchy that puts waste management options into a ranking system based on order of environmental preference (ie reduce, re-use, recycle, recover and disposal).

The Strategy has greater focus on the construction sector than previously, with a target to halve the amount of construction, demolition and excavation waste going to landfill by 2012.

The Landfill (England and Wales) (Amendment) Regulations 2005

Landfills are classified as hazardous, non-hazardous or inert. Traditional co-disposal methods can no longer be used. From 30 October 2007, all waste has to be pre-treated (physically, chemically or thermally) before acceptance into landfill (previously only hazardous waste required pre-treatment). Physical treatments include segregation and volume reduction.

Most waste from floor coverings is currently disposed of to landfill. With the reclassification of landfills, fewer landfills are available and disposal costs continue to increase.

European Hazardous Waste Directive 91/689/EC (HWD)

A precise and uniform definition of hazardous waste is provided by the Hazardous Waste Directive (91/689/EC). Fourteen distinct hazardous property classifications are listed, along with the concentration limits that constitute them as hazardous or non-hazardous. The List of Wastes (England) Regulations 2005 classifies materials as hazardous or non-hazardous in accordance with the procedure defined in the European Waste Catalogue (EWC). Property thresholds for hazardous wastes and a system of assigning codes to the wastes are provided in the document.

Environmental Protection Act, 1990

This regulates the depositing, treatment or disposal of waste. Waste must be disposed of in accordance with a waste management licence. It also highlights the Duty of Care requirements, stating that the owner is ultimately responsible for the waste and must take reasonable actions to keep it safe.

Producer Responsibility Obligations (Packaging Waste) Regulations 2005

These regulations set out the responsibility of companies that produce or handle packaging waste to deal with their own packaging material waste. All businesses with an annual turnover of £2 million or more, or that handle at least 50 tonnes of packaging each year, must comply with the Regulations. Shared producer responsibility is applied whereby all parts of the UK packaging supply chain contribute towards meeting the recycling and recovery targets.

Building Regulations

The Building Regulations promote minimum standards for most aspects of a building's construction, including its structure, fire safety, sound insulation, drainage, ventilation and electrical safety. They also consider the energy efficiency of buildings.

Part L requires energy performance targets in buildings to be met. This may lead to a requirement for higher specification floor coverings in the future.

Part M and the Disability Discrimination Act aim to improve the access to and use of buildings, particularly for those with disabilities. This may lead to increased demand for slip resistant/ safety flooring and the reduction of patterned products that may be mistaken for steps by partially sighted people for example.

Site Waste Management Plans (SWMPs)

Since April 2008, SWMPs have become a legal requirement for all construction projects in England over £300,000, with a more detailed plan required for projects of more than £500,000.

Their purpose is to identify waste materials likely to arise during a project from the outset and how these will be managed. These plans are designed to encourage better waste management practices, improve environmental performance, reduce the cost of waste disposal and reduce waste crime such as fly-tipping.

Local authorities and the Environment Agency have the power to enforce SWMP implementation and the Code for Sustainable Homes specifies the mandatory use of a SWMP for all new homes.

A number of tools has been set up for the industry to help them meet these regulations such as BRE's SMARTWaste Plan¹¹, a free software tool for preparing, implementing and reviewing a SWMP with an integrated waste measurement tool.

REACH

REACH is a new European Community Regulation on chemicals and their safe use (EC 1907/2006). It deals with the **R**egistration, **E**valuation, **A**uthorisation and Restriction of **C**hemical substances. The new law came into force on 1 June 2007 to streamline and improve the former legislative framework on chemicals of the European Union (EU). REACH places greater responsibility on industry to manage the risks that chemicals may pose to the health and the environment.

The aim of REACH is to improve the protection of human health and the environment through the better and earlier identification of the intrinsic properties of chemical substances.

In principle, REACH applies to all chemicals: not only chemicals used in industrial processes but also in our day-to-day life, for example in cleaning products and paints, as well as in articles such as clothes, furniture and electrical appliances.

Benefits, from the recycling point of view, come from the registration of information on the content of various materials into a database that will allow substances to be checked for their effect on human health and the environment. This should reduce the possibility of including undesirable substances into recycled products.

BREEAM and the Code for Sustainable Homes (CSH)

The BRE Environmental Assessment Method (BREEAM) and the government's Code for Sustainable Homes rate the performance of buildings and domestic dwellings respectively, against a series of environmental and sustainability criteria. In England and Wales it is a requirement of public procurement that minimum BREEAM and CSH standards are met. The purpose of this is to encourage the construction industry towards more sustainable practices. Reduced energy consumption and responsible use of materials are a primary focus of BREEAM and the CSH, which encourage building performance over and above the requirements of the Building

¹¹ www.smartwaste.co.uk/swmp

Regulations, while ensuring that the materials used themselves have minimum environmental impact.

Within the CSH, materials and waste have minimum standards at the entry level of the code only. Details of these are given in the table below. It is also possible to obtain credits for using reused and/or recycled materials under responsible sourcing sections.

Minimum standards within the entry level of the code	
Materials	Waste
Environmental impact	Site waste management
<p>At least three of the following five key elements of construction are specified to achieve a BRE Green Guide 2006 rating of at least D</p> <ul style="list-style-type: none"> – Roof structure and finishes – External walls – Upper floor – Internal walls – Windows and doors 	<p>Ensure there is a site waste management plan in operation which requires the monitoring of waste on site and the setting of targets to promote resource efficiency</p>

BRE Green Guide to Specification

BRE's Green Guide assesses building materials and components in terms of their environmental impact across their entire life-cycle – from cradle-to-grave within comparable specifications. This is based on a methodology known as Environmental Profiles. A rating is given from A+ to E. Floor finishes are included.

Strategy for Sustainable Construction

This Strategy is a joint industry and government initiative to promote leadership and behavioural change to deliver benefits to the construction industry and the wider economy.

Within the Strategy, the waste target has been set to reduce the amount of construction, demolition and excavation waste sent to landfill by half by 2012 based on a 2008 baseline. Other commitments include starting sector resource plans and a target to reduce packaging waste. This scoping study is part of the commitment to start a resource plan.

The 2008 strategy highlights the many mechanisms in place to bring about these changes, such as amendments to the Building Regulations, the introduction of Energy Performance Certificates in line with the EU EPBD (above), the Code for Sustainable Homes, the 2007 Waste Strategy.

Vinyl 2010

Vinyl 2010 is the European PVC industry's voluntary commitment to sustainability and is subscribed to by 23,000 companies. It involves a ten year plan to enhance the industry's sustainability profile by improving production processes and products, investing in technology, minimising emissions and waste and boosting collection and recycling. The scheme has a research and development programme on new recycling and recovery technologies, including feedstock recycling and solvent-based technology and promotes best practice and pilot recycling schemes at a local level.

Commitments of the group include:

- The recycling of 200,000 tonnes of post-consumer PVC waste in 2010
- The recycling of 50% of the available collectable PVC flooring waste by 2008.

Waste Protocols

The Environment Agency and WRAP have been undertaking a waste protocol project on various waste streams. The aim is to produce a technical report for the waste streams that would enable the subsequent development of a Quality Protocol, setting out the process and controls necessary to determine at what point the processing of the waste gives a product that will:

- Not cause harm to human health or the environment
- Meet a defined standard and requires no further processing
- Have a market, giving certainty of use

International buy-back and reclamation programmes

Several International schemes have been identified that promote buy-back or reclamation of products so they can be recycled:

- **FLOORE carpet buy-back program (USA)** - an American company takes back (purchases) carpets that have been removed prior to fitting of their new flooring product and guarantees 100% of it will be recycled into new floor covering
- **Antron® reclamation program (USA)** - created in 1991 to provide alternatives for commercial carpet disposal through local flooring dealers. Used carpets have been reclaimed and recycled back into carpets with recycled content
- **Vinyloop (Italy)** - a solvent-based extraction technique that enables the PVC from contaminated PVC-based floor covering products to be recovered is used. Currently using mainly cable waste, it has been shown to be suitable for all except safety flooring
- **Evergreen nylon recycling plant (USA)** - a new technology developed by Honeywell/Allied Signal and DSM Chemicals allows nylon manufacturers to recover and re-use caprolactam (monomer), the raw material used to make nylon 6. Whole carpets can be fed into the process and the nylon carpet converted back into virgin-quality caprolactam
- **GUT (Association for eco-friendly carpeting) (EU)** - European carpet manufacturers joined together with the aim of ensuring environmental friendliness and consumer protection at every stage of a carpet's life-cycle. The GUT standard imposes strict criteria for both the production process and the finished product. Oxic substances are prohibited and emission restrictions are constantly tightened. GUT has launched the RECAM project and created Carpet Recycling Europe (CRE).
- **AgPR initiative** - part of Vinyl 2010, dealing with the recycling of products. The major stumbling block is the logistics of collection.

Annex 3 - Stakeholders

Raw material suppliers	
Trade associations	
BPF – British Plastics Federation	http://www.bpf.co.uk/
Wools of New Zealand	http://www.fernmark.com/en_uk/index.asp
Manufacturers	
Flooring manufacturers	
Trade associations	
UKRFA United Kingdom Resilient Floorcovering Association	
FERFA The Resin Flooring Association	http://www.ferfa.org.uk/html/index.html
Tile Association	http://www.tiles.org.uk/
Carpet Foundation	http://www.carpetfoundation.com/
NFTMMS – National Federation of Terrazzo, Marble and Mosaic Specialists	http://www.nftmms.co.uk/terrazzo.php
Users of recycled materials	
Distributors	
Major flooring distributors	
Headlams	http://www.headlam.com/company/index.asp
Landsdon	http://www.landsdon.co.uk/index.html
Independent flooring distributors	
IFDA – Independent Flooring Distributors Association	http://www.ifda.co.uk/
National retail chains	
Carpetright	http://www.carpetright.co.uk/
Allied Carpets	http://www.alliedcarpets.com/
B & Q	http://www.diy.com/
Independent retail outlets	
Carpet Foundation	http://www.carpetfoundation.com/
Contractors	
Main contractors	
UK Contractors Group	http://www.ukcg.org.uk/
Flooring contractors	
CFA Contract Flooring Association	http://www.cfa.org.uk/
Tile Association	http://www.tiles.org.uk/
Tyndale	http://www.tyndaleflooring.co.uk/
Axiom	http://www.axiomflooring.com/
WB Simpson Group	http://www.wbsimpsonsons.co.uk/

Demolition contractors	
General demolition	
NFDC National Federation of Demolition Contractors	http://www.demolition-nfdc.com/
Soft strip specialists	
Waste contractors	
National groups	
ESA – Environmental Services Association	http://www.esauk.org/
Skip hire companies	
National Skip Hire Association	http://www.nsha-uk.co.uk/
Local authorities	
LARAC – Local Authority Recycling Advisory Committee	http://www.larac.org.uk/
Trade waste sites	
Chartered Institute of Waste Management:	http://www.ciwm.co.uk/
Material re-processors	
Wood Recyclers Association	http://www.woodrecyclers.org/
CRUK – Carpet Recycling UK	http://www.carpetrecyclinguk.com/
BPF Recycling Council	http://www.bpf.co.uk/About_the_BPF/BPF_Recycling_Council.aspx
Axion	http://www.axionrecycling.com/
Recovynyl	http://recovynyl.com/
Building owners	
English Partnerships	http://www.englishpartnerships.co.uk/
Property developers	
Retail chains	
British Retail Consortium	http://www.brc.org.uk
Housing associations	
Building Housing Group	http://www.brhg.org.uk/index.htm
Local authorities	
Specifiers	
Architects	
RIBA – Royal Institute of British Architects	http://www.architecture.com/
CIAT The Chartered Institute of Architectural Technologists	http://www.ciat.org.uk/
Interior designers	
BIDA British Interior Design Association	http://www.bida.org/

Government agencies	
WRAP – Waste Resources and Action Programme	http://www.wrap.org.uk/
DEFRA Department for Environment, Food and Rural Affairs	http://www.defra.gov.uk/
BIS – Department for Business Enterprise and Regulatory Reform	http://www.berr.gov.uk/
CLG – Communities and Local Government	http://www.communities.gov.uk/corporate/
EA – Environment Agency	http://www.environment-agency.gov.uk/
Others	
BRE – Building Research Establishment	http://www.bre.co.uk/
NGOs	
Environmental	

REPORT 003



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