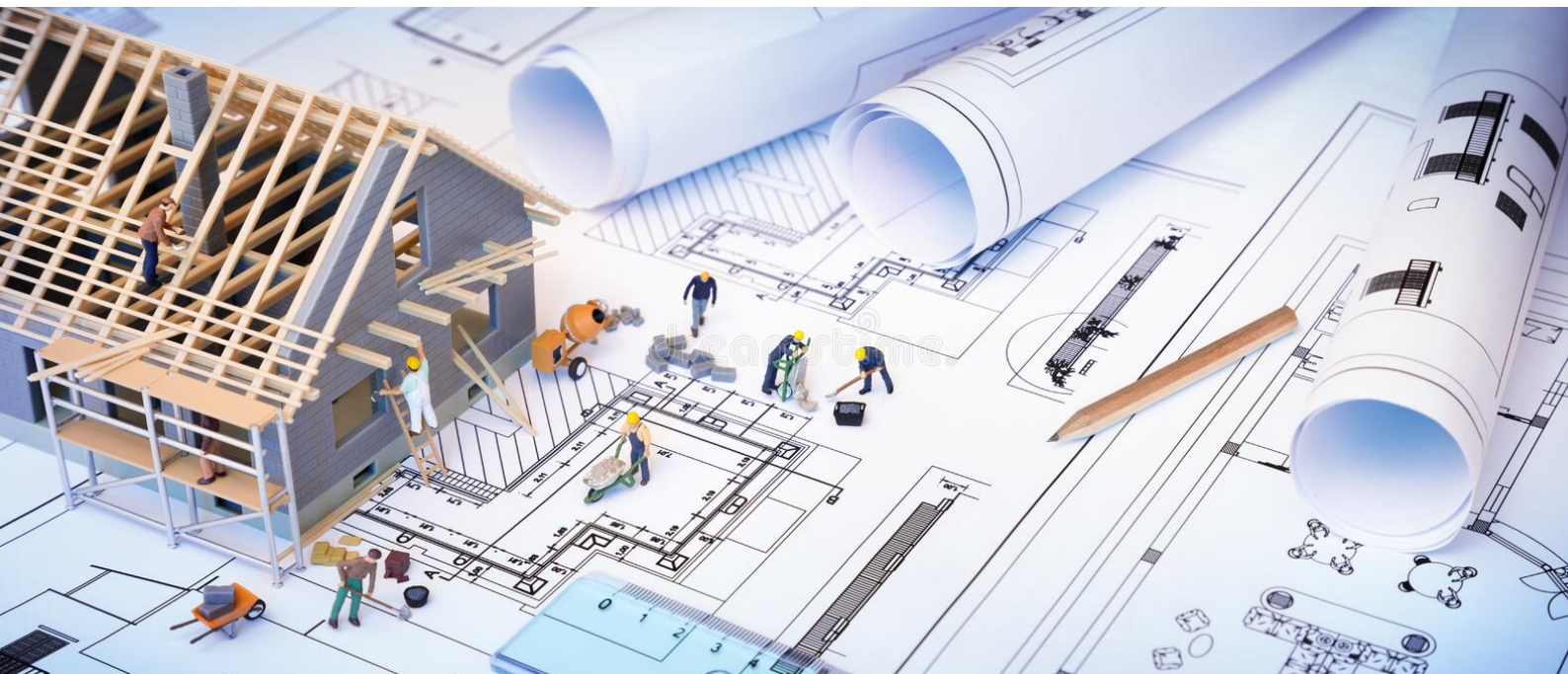


Catalogue of ecological materials in the Construction, Reconstruction, and Rehabilitation of Buildings



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ABSTRACT

The construction industry is an important player in the worldwide economics. Based on studies in developed countries, the construction industry has exploited 30-40% of the natural resources; 50% of the energy was used for heating and cooling in buildings, approximately 40% of the materials' worldwide consumption had been converted to the building environment and 30% of the energy was used in operational requirements.¹

This catalogue was produced in connection with the objectives of the Action Plan of the Bulgarian Recycling Association, as part of the activities of CircPro project². The document is synchronized with the National Waste Management Plan 2021-2028, in particular **Goal 2: Increasing the amount of recycled and recovered waste with Program to achieve the targets for recycling and recovery of construction and demolition waste**. The program includes a non-investment measure that envisages including a requirement for the use of recycled building materials in the tender documentation for the construction, reconstruction, and rehabilitation of buildings. The target to be achieved is the use of 2% recycled materials for the period 2021-2023 and 2.5% for the period 2024-2028. All public authorities are responsible for the implementation of this measure.

Current document is not characterized by a mandatory nature, it aims to educate and motivate public contracting authorities and to build on the useful practices acquired during the implementation of the CircPro project. That will possible reduce the greenhouse gas emissions to the environment due to the purchasing of sustainable and recycled materials, such as recycled steel and glass, as well as renewable materials like rubber and bamboo.

¹ Dubrin. Growth opportunities for the global construction industry 2018-2023 – A Potential \$10.5 Trillion Market, Research and Markets (2018).

² For more information, please visit <https://projects2014-2020.interregeurope.eu/circpro/>

INTRODUCTION

The goal of a circular economy model is to make the most of the materials and resources available to society by applying three basic principles: reduce, reuse, and recycle. Therefore, the life cycle of products is extended, waste is given a new life and does not end up in landfills, and a more efficient and sustainable production model is established over time. In recent years, a growing focus on material and product circularity has impacted new production models that close the loop on material sourcing and help drive cross-industry collaboration. Likewise, the increased efficiency of reused, recycled, and repurposed materials will continue being supported by the incorporation of advanced innovative technologies³.

Although CE challenges in the construction industry are multi-dimensional, the areas of major challenges are generally summarised as: design & construction strategies, supply chain management, policy strategies for CE adoption, End-of-Life (EoL) principles, CDW management strategies, information exchanges & analytics for CE. These challenges are closely related to the unique characteristics of the construction industry. First, the material consumption pattern in this industry provides neither convenience nor a fair starting point to tackle CE challenges. The construction materials interact dynamically with each other in a building project spanning large spatial and temporal differences. They are difficult to manage from a CE perspective given the fact that the life-cycle properties of different materials vary significantly and the extensive lifespan of construction products can bring various operational uncertainties at the EoL phase. Second, the fragmented structure of this industry has been blamed for its low efficiency for decades. Constructions are highly heterogeneous environments, with critical information and coordination needs, and spanning a relatively large business network in which different parties only speak their own languages. Therefore, a massive amount of waste is generated in the built environment due to the poor coordination among multiple stakeholders across a supply chain that spans considerable geographic and time frames. Furthermore, the scalable implementation of CE is inherently difficult to achieve no matter which industry is considered. It is well-recognised that CE transition is a multi-dimensional challenge involving environmental, economic, technological, societal, governmental, and behavioural factors. Therefore, innovative solutions are in demand to address wicked CE challenges in the construction industry⁴.

³ Circular Economy in the Construction Industry, Jul 13, 2022, <https://www.cemexventures.com/circular-economy-in-the-construction-industry/>

⁴ Circular economy in the construction industry: A review of decision support tools based on Information & Communication Technologies, Journal of Cleaner Production, 2022

This catalogue aims to present to public contracting authorities the options they have for the proper management and use of recycled construction materials, in connection with the implementation of the National Waste Management Plan 2021-2027, the European Green Deal and the EU Circular economy Action Plan.

The catalogue content covers the following sections:

- Requirements of European and national legislation in construction waste management;
- Construction products in the context of recycling and reuse;
- Modern opportunities for using recycled materials in building construction;
- Future opportunities for public procurement contractors for the construction of buildings to realize the basic principles of the circular economy.

WHAT ARE RECYCLED CONSTRUCTION MATERIALS?

Construction and demolition waste (CDW) represents one of the heaviest and most voluminous waste streams generated in the European Union (EU). The group is responsible for approximately 25-30 percent of the total amount of generated waste in the EU.

A recycled building material is any product or material that has previously been used in another construction. All sorts of materials can be re-used and repurposed, including brick, steel, timber, and even whole elements like windows and tiles.

This term can also refer to building materials manufactured from 'waste'. For example, recycled plastic bricks, or concrete made from waste steel dust. Recycled aggregates are made by reprocessing used materials through crushing, mixing, screening, and grading until they meet the required specifications. These materials might have come from a demolished building or be excess or waste from another project.

Another example is topsoil. During the groundworks phase of a building project, a layer of soil and earth will be excavated in order to lay the foundations. This can be processed to create a nutrient rich soil perfect for landscaping. Making the most of the by-products of construction is another great way to minimise its environmental impact. And when that by-product can be used to nourish plants and other wildlife, all the better.

Material reclamation is changing the game in the construction industry, providing a cost effective, eco-friendly alternative to harvesting virgin resources and manufacturing new products⁵.

EUROPEAN LEGISLATION IN THE FIELD OF CONSTRUCTION AND DEMOLITION WASTE

Waste Framework Directive 2008/98/EC: This directive establishes the legislative framework for the handling of waste in the European Union. It includes the definition of key concepts such as waste, recovery and disposal and puts in place the essential requirements for the management of waste. The directive places an emphasis on reuse and recycling: „by 2020, the preparing for re-use, recycling and other material recovery of non-hazardous construction and demolition waste (excluding naturally occurring material defined in category 17 05 04 in the list of waste) shall be increased to a minimum of 70 % by weight“. Also, according to the WFD, “Member States shall take measures to promote selective demolition in order to enable removal and safe handling of hazardous substances and facilitate reuse and high-quality recycling by selective removal of materials, and to ensure the establishment of sorting systems for CDW at least for wood, mineral fractions (concrete, bricks, tiles and ceramics, stones), metal, glass, plastic and plaster”.

In the revised WFD, Member States are encouraged to take appropriate measures to implement, among other things, the “production and marketing of products that are suitable for multiple use, that are technically durable and that are, after having become waste, suitable for proper and safe recovery and environmentally compatible disposal”, which stresses the importance of the design and production phases for waste management. Several examples of economic and other measures to provide incentives for the application of the waste hierarchy are listed in Annex IV.

Furthermore, it is suggested that, by 31 December 2024, the Commission should consider setting preparing-for-reuse and recycling targets for CDW and its material-specific fractions.

Key moments in Waste Framework Directive 2008/98/EC:

R5 Inorganic substance recycling/reclamation

⁵ WHAT ARE THE BENEFITS OF USING RECYCLED BUILDING MATERIALS?, ETM, November 30th, 2021

Recycling/reclamation of other inorganic materials

Operations whose purpose is the recovery of inorganic non-metal wastes and which are not covered by other more specific operations (e.g. R6, R8, R10). Inorganic non-metal wastes represent a large proportion of the total waste generated and consist of a broad spectrum of waste types. The main groups are waste from thermal processes (slag, ashes, sands, dust etc.), construction & demolition waste, and waste from mining and quarrying. The treatment processes include the following: preparing for reuse, reprocessing of construction and demolition waste; reprocessing and recycling of glass waste; use as secondary raw material in cement kilns; asphalt mixing plants. This includes soil cleaning resulting in recovery of the soil and recycling of inorganic construction materials.

R5 has the following three options:

- Inorganic materials recycling or reclamation (to end-of-waste) (e.g. soil cleaning resulting in recovery of the soil and recycling of inorganic construction materials).
- Preparing for reuse of inorganic materials.
- Recovery of inorganic materials in the form of backfilling



1 Figure: The waste hierarchy according to Waste Framework Directive

The recent and ambitious **Circular Economy Package**⁶, which includes revised legislative proposals on waste as well as an ambitious Circular Economy Action

⁶ Adopted 2nd December 2015, https://environment.ec.europa.eu/strategy/circular-economy-action-plan_en

Plan (CEAP)⁷ to stimulate Europe's transition towards a circular economy. The CEAP targets “closing the loop”, moving from a linear to a circular economy, and highlights the importance secondary raw materials and maintaining the value of waste at the end of life through reuse and recycling as a central part of a successful circular economy.

The European Green Deal published by the EU Commission in December 2019 aims to make Europe the first carbon-neutral continent. Significant amounts of energy and mineral resources (i.e., sand, gravel, binders, steel, etc.) are needed for constructing new buildings and/or retrofitting existing ones. Buildings account for 40% of energy consumption, and the requested annual renovation rate of the existing building stock increased from 0.4% to 1.2% in the EU member states. In this context, innovations in the construction sector and related research efforts on making buildings more energy efficient, eco-friendly, sustainable, and adopting low-carbon materials have become the major challenge for scientists.

The Construction Products Regulation (Regulation (EU) No 305/2011, CPR) has applied in full since 1 July 2013. Its objective is to achieve the proper functioning of the internal market for construction products, by means of harmonised technical specifications to express their performance (e.g. thermal conductivity or sound insulation). It defines construction products as products placed on the market for incorporation in buildings and civil engineering works in a permanent manner. This includes for instance cement, windows, roof tiles or fire detection systems.

The Commission published a report on the implementation of the CPR in July 2016. An evaluation of the CPR was released in October 2019. The revision of the CPR is mentioned in the Communication on a European Green Deal and represents one of the deliverables of the new Circular Economy Action Plan (NCEAP), in order to address the sustainability performance of construction products. The NCEAP particularly mentions the possible introduction of recycled content requirements for certain construction products, taking into account their safety and functionality.

The Commission published an inception impact assessment on 17 June 2020. A public consultation ended on 25 December 2020.

Furthermore, Parliament’s Committee on the Internal Market and Consumer Protection (IMCO) adopted an own-initiative report on the implementation of the

⁷<https://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:52015DC0614&from=EN>

CPR on 28 January 2021. The report particularly stresses the underperformance of the standardisation system and the need to address the overlaps in the information required by the CE marking and the declaration of performance.

Furthermore, it points to the current lack of digitalisation in the construction sector, despite the considerable potential of digital technologies. The report also highlights a number of weaknesses in market surveillance. Moreover, it calls for an ambitious revision of the CPR, asking the Commission to envisage inter alia incorporating certain requirements regarding environmental performance and sustainability criteria across the lifecycle of products into the harmonised standards for specific product categories.

On 30 March 2022, the Commission adopted a proposal for a regulation laying down harmonised conditions for the marketing of construction products, repealing the current CPR. The proposed regulation was part of a package of proposals aimed at making sustainable products the norm in the EU, boost circular business models and empower consumers for the green transition.

The Commission proposal includes the following main changes compared to the current CPR:

- the scope is renewed, and reused and 3D-printed construction products and pre-fabricated one-family-houses are included;
- the Commission would be allowed to adopt technical specifications in cases where the standardisation system is not delivering as expected, and to set product requirements.
- it sets out new environmental, functional and safety product requirements for construction products;
- it establishes a 'harmonised zone' (as opposed to the areas under the responsibility of Member States) and a mechanism to deal with Member States 'imperative regulatory needs' on health, safety or protection of the environment, including climate;
- it creates a new obligation for manufacturers to provide a declaration of conformity (concerning compliance with product requirements), on top of a declaration of performance, and introduces the possibility to give information via electronic means;
- it defines a list of general sustainability requirements (to be further defined in Commission acts/harmonised standards);
- it introduces simplification and exemption provisions for micro-enterprises;
- it strengthens enforcement powers of market surveillance authorities;
- it reinforces the product contact points for construction, to better support economic operators;
- it sets up a new Commission system allowing any natural or legal person to share complaints or reports related to possible breaches of the Regulation;

- it is aligned with the proposed regulation on eco-design requirements for sustainable products on climate and environmental sustainability and on the digital product passport⁸;

The following guidance or framework documents have been developed as a response to these actions (EC, 2019):

- **Waste Management Protocol:** (non-binding guidelines) to help practitioners, public authorities, certification bodies and clients of recycled materials to handle properly this waste stream. It promotes the management of CDW in line with the waste hierarchy (with a priority for prevention and reuse as higher ranking options than recycling and recovery), therefore it contributes to resource efficiency. The Protocol is intended to raise awareness about legal requirements, as well as state-of-the-art techniques.

- **Waste Audit Guideline:** pre-demolition guidelines to boost high-value recycling as well as voluntary recycling protocols aimed at improving quality and building confidence. The Guideline describes the waste audit process and elements to be included in it. The waste audit, to be organised by the owner of a building or infrastructure, should result in an inventory of materials and components arising from (future) demolition, deconstruction or refurbishment projects, and provide options for their management and recovery.

- **EU Level(s)** – European reporting framework for sustainable buildings: Level(s) is a voluntary framework that building specialists in Europe can adopt to measure, report, and share the environmental performance of their buildings. The most important feature of Level(s) is the fact that it embraces a life-cycle approach, looking at the performance of any building through its whole lifetime. This is important because decisions based on the whole life-cycle of a building ensure sustainability from the cradle to the grave, rather than short-term, cosmetic fixes, that might actually end up contributing to higher carbon emissions. Level(s) goes beyond energy performance and sub-optimization, and promotes the implementation of circular economy principles.

- The document, **Sustainable Products in a Circular Economy – Towards an EU Product Policy Framework** contributing to the Circular Economy (EC 2019c), describes EU policies on products that influence the transition to a circular economy in selected priority areas, including construction. The document highlights that circularity and sustainability need to be assessed over the whole lifecycle of a building to optimise reductions of carbon emissions and material flows. Potential circularity in the construction sector is also discussed.

⁸ REVISION OF THE CONSTRUCTION PRODUCTS REGULATION 2022, <https://www.europarl.europa.eu/legislative-train/carriage/revision-of-the-construction-products-regulation/report?sid=6001>

NATIONAL LEGISLATION IN THE FIELD OF CONSTRUCTION AND DEMOLITION WASTE

The legislation regarding the management of waste was introduced in Bulgaria in 2012, transposing the Waste Framework Directive (2008/98/EC) into The **Waste Management Act (WMA)**.

- **"Construction waste"** is construction and demolition waste corresponding to the waste codes specified in Chapter 17 of the Index to Commission Decision 2000/532/EC of 3 May 2000 replacing Decision 94/3/EC establishing a list of waste in accordance with Article 1, letter "a)" of Council Directive 75/442/EEC on waste and Council Decision 94/904/EC establishing a list of hazardous waste in accordance with Article 1, paragraph 4 of the Directive 91/689/EEC of the Council on hazardous waste and its subsequent amendments;
- **"Recovery of construction waste materials"** means all construction waste recovery activities excluding incineration with energy recovery and processing into materials that are used as fuel. Recovery also includes the activities of preparation for reuse, recycling or other material recovery.

According to WMA e-use, recycling and recovery of construction and demolition waste should reach 70% of the total weight of the generated waste.

“The systems for treatment of construction and demolition waste should ensure that no later than January 1, 2020 its re-use, recycling and other recovery of materials from non-hazardous construction and demolition waste, including backfilling operations by replacing other materials reaches in quantity not less than 70percent of the total weight of waste, excluding unpolluted soil, excavated land and rock in their natural state.”

In the Waste Management Act there are two additional intermediate targets for 2016 and 2018.

The targets for re-use, recycling and other recovery of materials, including backfilling operations using waste to substitute other materials, of non-hazardous construction and demolition waste, with the exception excavated soil, land and rock in their natural state which do not contain hazardous substances, shall apply, as follows:

1. no later than 1 January 2016 - as a minimum 35 per cent of the total weight of waste;

2. no later than 1 January 2018 - as a minimum 55 per cent of the total weight of waste;

3. no later than 1 January 2020 - as a minimum 70 per cent of the total weight of waste.

The calculation method used is:

Recycling ratio waste construction and demolition in % = Amount of recycled CDW / Amount CDW generated as defined in Regulation (EC) No 2002/2150

Key moments in Waste Management Act:

Art. 8. (1) Sending and accepting industrial, construction and hazardous waste shall be carried out only on the basis of a written contract with person, possessing permit, complex permit or registration document pursuant to Art. 35 about the relevant activity and a ground for waste with the relevant code pursuant to the ordinance pursuant to Art. 3 for classification of waste.

(2) The possessors of waste shall be obliged:

1. to comply with the provisions for collection, shipments and treatment of waste;

2. to maintain in permanent order and normal action the facilities for treating waste;

3. to undertake all measures for not mixing:

a) hazardous waste with other hazardous waste or other waste, substances or materials; mixing includes also dilution of hazardous substances;

b) usable waste with non-usable waste;

4. to organize safe storage of waste, which cannot be treated in compliance with the requirements of this act on the territory of the Republic of Bulgaria;

5. if hazardous waste are available, a responsible person shall be appointed and their safe management shall be organized;

6. to keep accountability for the waste in a procedure determined by this act and the acts of secondary legislation for its implementation;

7. at the moment of a request to provide access of the control bodies to the facilities, in which waste

are formed, to the facilities of storage and treatment of waste and to the documents on waste;

8. to provide instruction and periodical training of the staff, who work with hazardous waste;

9. to provide and realize the needed measures for non-dissemination of pollution after closure of the sites and activities, as well as of the installation or facilities for treating waste;

10. to provide the needed financial funds for:

a) implementation of the monitoring plan;

b) closure of the installation or the facilities for treating waste;

c) post-operative monitoring and control;

11. to notify the competent bodies about forthcoming change of the raw materials and the technological processes, which would lead to change of the quantity or type of the formed waste and their hazardous substances.

(3) Possessors of hazardous waste pursuant to Para. 2 may do mixing or waste, pursuant to the condition that:

1. the mixing activity is done by persons, who hold permit or complex permit pursuant to Art. 35;

2. the requirements pursuant to Art. 1, Para. 3 have been met and the hazardous impact of the waste management is not increased on human health and the environment, and

3. the mixing activity meets the best available techniques.

(4) (Amended - SG No. 19 of 2021, in force from 05.03.2021) When hazardous waste is mixed in a manner that contradicts the requirements of this law, separation shall be carried out, provided that this is technically possible and necessary to comply with the requirements of Art. 1, para. 3. When separation is not necessary, mixed waste is treated by persons holding a permit or complex permit under Art. 35 for activities with them.

(5) For mixed waste, formed from households, the act requirement shall not apply on:

1. control of hazardous waste;

2. ban for mixing hazardous waste pursuant to Para. 2, p. 3, letter "a";
3. labelling of hazardous waste;
4. keeping documentation about hazardous waste pursuant to Chapter Four, Section I.

(6) This act provisions on labelling and documentation on hazardous waste shall not apply to separate fractions of hazardous waste, formed from households till their acceptance or collection, disposal or recovery by a person holding the relevant permit.

Art. 10. (1) (1) The construction, destruction of legal buildings and facilities and voluntary removal of illegal buildings or unfit for use or constructions, endangering safety shall be proceeded in a way, providing follow up recovery, including recycling of the formed construction waste in compliance with the requirements of the ordinance pursuant to Art. 43, Para. 4.

(2) During construction, destruction of legal buildings and voluntary removal of illegal buildings or unfit for use of endangering safety buildings, the contracting authority shall take responsibility for the fulfilment of the purposes, related to the preparation for second use, recycling and other recovery of material of construction waste, pursuant to Art. 32, Para. 1.

(3) (In force from 14.07.2014) compulsory removal of illegal buildings or of unfit for use or endangering safety buildings shall be done by the owner or processor of the destruction selectively of different materials.

(4) The relevant municipality Mayor shall be responsible for the provision of the separate construction waste during compulsory removal of building, for recovery of the materials and for imposition of recycled construction materials, including for covering the costs for carrying out the activities of shipment and treatment.

(5) The costs for carrying out the activities of transportation and treatment of construction waste, formed as a result of compulsory removal of a building, shall be on the account of the person, who has made the illegal building or of the owner of the building or facilities. On the basis of an enforced order for removal of the building and a protocol for the made costs for the activities on shipment and recovery of the waste, the Mayor of the relevant municipality shall submit an application for issuance of an order for an immediate fulfilment for collecting of the taking from the obliged persons pursuant to Art. 417, p. 2 of the Civil Procedure Code.

(6) (Effective from 14.07.2014) The assignor of public contracts for the design and implementation of constructions, with the exception of the removal of constructions, includes in the conditions for selecting a contractor and in the contracts for awarding obligations to the contractors for placing recycled building materials according to the requirements of the regulation under Art. 43, para. 4.

(7) The produced products from recycled construction waste, which are placed on the market of the Republic of Bulgaria and are intended for permanent placement in the buildings or in parts of them shall provide the implementation of the basic requirements to the buildings on the basis of their exploitation indicators, determined in the technical specifications, as well as of the normative requirements for their recovery depending on the area of their application

Art. 11. (1) (In force from 14.07.2014, amend. – SG, 105/16, amend. and suppl. - SG 13/17) The contracting authority of construction works in the meaning of § 5, p. 40 of the Additional Provisions of the Spatial Planning Act, with the exception of current repair works, and the contracting authority of removal of constructions, shall be responsible of drawing out a plan for management of construction wastes in the cases, determined by the Ordinance of art. 43, Para. 4. The plan shall be drawn up by a designer with the necessary designer's competence within the meaning of Art. 162, para. 1 of the Spatial Planning Act.

(2) (revoked – SG, 105/16)

(3) (revoked - SG 13/17)

(4) (amend. - SG 13/17) The plans for management of construction waste shall be approved by the mayor of the municipality or authority, authorized by him/her, at the request of the developer of the building after entering into force of the building permit and before the opening of the construction site and/or prior to the commencement of the activities on building or demolition of construction of the site under Para. 1.

(5) (amend. - SG 13/17) The competent authority under Para. 4 may require provision of additional information or removal of the incorrectness in case of incompliance with the requirements of the ordinance pursuant to Art. 43, Para. 4, by submitting a grounded opinion to the applicant not later than 14 days after receiving the plan.

(6) (amend. - SG 13/17) The municipality Mayor shall approve the plan for management of construction waste or shall refuse with motivation its approval within the term of 14 days after receiving the plan, or from removal of the incorrectness and/or provision of additional information.

(7) (new - SG 13/17) for constructions located in the territory of more than one municipality, the plans under Para. 1 shall be approved by the mayors of respective municipalities or authorities, authorized by them for the part of construction that takes place on their territory.

(8) (prev. para. 7 - SG 13/17, suppl. - SG 77/18, in force from 01.01.2019) the refusal for approval of the plan may be appealed before the relevant administrative court pursuant to the Administrative

Procedure Code.

(9) (prev. para. 8 - SG 13/17) the approval of the plan for management of construction waste shall include a check-up of compliance with the purposes for recycling and recovery of construction waste.

(10) (prev. para. 9 - SG 13/17) the implementation of the plan for management of construction waste and the site conditions shall be established:

1. for the construction, for which construction supervision is exercised – by the final report pursuant to Art 168, Para. 6 of the Spatial Development Act, exercising construction supervision, in which the implementation of the purposes for recovery and recycling of construction waste and the purposes for placing recycled construction materials during implementation of the project shall be described, by applying also copies of the initial accountancy documents, proving submission of waste to persons, holding permit or a registration document for carrying out activities with waste;

2. for the constructions, for which there is not construction supervision – by a report to the Mayor of the municipality, according to a form, pursuant to the ordinance of Art. 3, Para, 4 in which the implementation of the purposes for recovery and recycling the construction waste and the purposes for placing recycled construction materials during the project realization shall be described, here also copies of initial accountancy documents shall be attached, proving provision of the waste to persons, holding permit or registration document for carrying out activities with waste.

(11) (prev. para. 10 - SG 13/17) The documents pursuant to Para. 9 shall be produced to the body, who has approved the investment project or plan for management of construction waste, as well as to the director of the regional inspection of environment and water (RIEW). On whose territory the construction mounting works or destruction is carried out.

(12) (new – SG, 105/16, prev. para. 11 - SG 13/17) The control on the plan implementation for management of construction wastes shall be carried out in a procedure, provided by the ordinance under Art.3, Para. 4.

(13) (New - SG No. 13 of 2017, previous para. 12, amended - SG No. 25 of 2019) It is prohibited to put into operation constructions for which the requirements under para 12.

(14) (New - SG No. 105 of 2016, previous para. 11 - SG No. 13 of 2017, and previous para. 13 - SG No. 25 of 2019) the control of the implementation of the construction waste management plan is carried out in accordance with the procedure determined by the regulation under Art. 43, para. 4.

(15) (New - SG No. 19 of 2021, in force from 05.03.2021) the persons under para. 1 undertake selective demolition measures to enable the separation and safe treatment of hazardous substances and facilitate reuse and high-quality recycling through the selective removal of materials, as well as ensuring the establishment of sorting systems for construction and demolition waste and least for wood, mineral ingredients (concrete, bricks, tiles and ceramics, stones), metals, glass, plastic and gypsum.

Art. 19. (1) 1) The Municipality Mayor shall organize the management of the household and construction waste, formed on its territory, according to the requirements of this act and the ordinance pursuant to Art. 22.

(2) The Municipality Mayor shall provide conditions, in which each holder of household waste shall be serviced by persons pursuant to Art. 35, who have been given the right to carry out activities on their collection, shipment, recovery and/or disposal.

(3) The Municipality Mayor shall be responsible for:

1. provision of vessels for collection of household waste – containers, buckets, etc.;
2. collection of household waste and their treatment before the landfill sites or other installations and facilities for recovery and/or their disposal;
3. cleaning the streets, squares, alleys, parks and other territories of the populated places, intended for public use;
4. selection of ground, building up, exploitation, closing, monitoring of landfill sites for household waste or of other installations or facilities for recovery and/or for disposal household waste;
5. organization of the collection, recovery and disposal construction waste of repair work, formed by households on the territory of the relevant municipality;

6. separate collection of household waste on the territory of the municipality at least for the following materials: paper and cardboard, metals, plastics and glass;

7. organization of the activities on separate collection of mass disseminated waste and/or giving assistance to the organizations for recovery of mass disseminated waste, including determining the places

for disposition of the needed elements of the systems for separate collection and the places for delivering mass disseminated waste;

8. fulfilment of the decision pursuant to Art. 26, Para. 1 of the general meeting of the regional associations pursuant to Art. 24, Para. 1 and shall assist for establishing centres for second use, repair and preparation of second use;

9. organization of separate collection of hazardous household waste outside the scope of the ordinances pursuant to Art. 13, Para. 1 and their delivery for recovery and/or their disposal;

10. the separate collection and storage of household organically broken down waste, including setting the places for disposition of the needed elements of the system for separate collection of waste and their delivery for composting or anaerobic destruction;

11. provision of grounds for free delivery of separated collected waste from the households, including large-size waste, hazardous waste, etc., in all populated places with population larger than 10 000 inhabitants on the territory of the municipality and if needed in other populated places;

12. cleaning waste on the municipality roads in compliance with Art. 12;

13. (suppl. - SG No. 19 of 2021, in force from 05.03.2021) the provision of information to the public under items 1 - 12, 14 and 15, as well as information on measures to prevent the formation of waste and the prevention of unregulated disposal of waste through the website of the relevant municipality, as well as in another appropriate way;

14. maintaining register of the grounds for delivery of waste off plastics, glass, paper and cardboard on the territory of the relevant municipality;

15. prevention of throwing waste on unpermitted places and/or formation of illegal dung-hills and organization of their cleaning.

(4) (repealed – SG, 105/16)

(5) (In force from 14.07.2014) in case of failure to fulfil the requirements of Para. 3, p. 11, the deductions pursuant to Art. 64 shall be increased by 15% for the period till removal of the non-fulfilment.

(6) (New – SG, 105/16) the grounds under Para. 3, p. 11 shall be provided and exploited independently by the Municipality or through signing written contract with a person, possessing permit under Art. 35, Para. 1 for the relevant authority and for wastes with the relevant code under the Ordinance pursuant to Art. 3, Para. 1.

(7) (new – SG, 105/16) to the grounds under Para. 3, p. 11, which are provided and exploited independently by the Municipality shall not apply the requirements of Art. 38, para. 1, sentence one and Art.

69, para. 2, and on them may be placed containers, ownership of persons, who implement their obligations individually or of organization of utilization

Art. 22. (1) (1) (amend. – SG, 105/16) The Municipal council shall adopt an ordinance, which shall determine the terms and conditions for throwing, collecting, including the separate one, shipment, overloading, recovery and disposal of household and construction waste, including bio-waste, hazardous household waste, mass dissemination of waste on the territory of the Municipality, developed pursuant to the requirements of this act and the acts of secondary legislation for its application, as well as payment for providing the relevant services pursuant to the Local Taxes and Fees Act.

(2) The ordinance pursuant to Para. 1 shall provide for the requirements to the grounds for delivery of waste and paper and cardboard, plastics and glass, including the conditions for registration of the grounds, as well as the conditions for delivery of waste on the grounds pursuant to Art. 19. Para. 3, p. 11.

(3) The Municipal council shall publish on its internet site and shall set to public discussion the draft ordinance pursuant to Para. 1. All interested persons, bodies and NGOs may participate in the discussion.

Art. 32. (1) (amend. – SG, 105/16) The systems for treating construction waste shall provide by 1 January 2020 latest, the preparation for their second use, recycling and other recovery of materials from not hazardous construction waste, including in digging activities by replacing other materials with waste in a quantity, not smaller than 70% of their total weight, from which are excluded the materials in natural state, provided by code 17 0504 from the list of wastes under Decision 2000/532/EC.

(2) The purposes pursuant to Para. 1 shall be achieved in stages according to the terms in § 16 of the Transitional and Final Provisions.

(3) (Repealed - SG No. 19 of 2021, in force from 05.03.2021)

Art. 33. (1) (1) the systems for separate collection of waste pursuant to Art. 19, Para. 3, p. 6 and for separate collection of waste from packaging shall cover not less than 6 000 000 citizens on the territory of the country and shall obligatorily include all the populated places with population larger than 5000 citizens and the resort populated places.

(2) The wastes from paper and cardboard, glass, plastics and metals, formed from trade sites, production, farm and administrative buildings shall be collected separately.

(3) Exception for the requirement pursuant to Para. 2 shall be admitted in populated places, where there is not built up system for separate collection of these waste from households.

(4) (In force from 01.01.2013) Users of trade sites, production, farm and administrative buildings in the populated places pursuant to Para. 1 shall be obliged to collect separately the waste pursuant to Para. 2 and to deliver them to persons, holding permit, complex permit or registration document pursuant to art. 35 and/or with organization on recovery.

(5) The procedure and conditions for establishment and functioning of the systems for separate collection of waste pursuant to Para. 2 and 4 shall be determined by the ordinances pursuant to Art. 13, Para. 1 and Art. 22.

Art. 64. (1) (1) For disposal of waste of a regional or municipal landfill site for non-hazardous waste and of landfill sites for construction waste shall be made sums in the amount and procedure, determined by the ordinance pursuant to Art. 43, Para. 2.

(2) The sums pursuant to Para. 1 shall have the purpose to diminish the quantity of the deposited waste and to encourage their recycling and recovery.

(3) (Supplement - SG No. 19 of 2021, in force from 05.03.2021) Deductions are determined in BGN for one ton of deposited waste and are transferred by the owner of the landfill monthly to a bank account for foreign funds of RIEW, on whose territory the landfill is located. Every user of the landfill is also responsible for ensuring the deductions, by monthly transferring to the owner of the landfill the funds due based on the amount of waste he has deposited.

(4) The collected sums pursuant to Para. 1 shall be spent for activities of building up new facilities for treatment of household and construction waste, providing fulfillment by the municipalities of the act requirements and the acts of secondary legislation for its implementation.

(5) The amount of the sums for household waste shall be diminished where the purposes in the relevant region pursuant to Art. 49, Para. 9 have been fulfilled by the municipalities in compliance with the decision pursuant to Art. 26, Para. 1, p. 6, as follows:

1. with 50 percent for the purposes of reuse and recycling under Art. 31, para. 1, item 1;

2. (amended - SG No. 19 of 2021, in force from 05.03.2021) by 50 percent for the purposes of limiting the quantities of landfilled household biodegradable waste, determined by the ordinance under Art. 43, para. 2;

3. (new - SG No. 19 of 2021, in force from 05.03.2021) with 50 percent for the purposes of reuse and recycling under Art. 31, para. 1, items 3 - 6 according to the terms in § 15, para. 2 of the transitional and final provisions;

4. (new - SG No. 19 of 2021, in force from 05.03.2021) by 50 percent for the purposes of reducing landfilled household waste according to the terms in § 15, para. 5 of the transitional and final provisions.

(6) The diminishing of the amount of sums pursuant to Para. 5 shall apply independently one from another.

(7) In case that it is found that untrue information is provided for diminishing the amount of the sums pursuant to Para. 5, the obliged persons shall pay the sums in double amount for the relevant period, during which the information was used.

(8) (Supplement - SG No. 19 of 2021, in force from 05.03.2021) The amounts due for unpaid deductions under para. 3 are determined by an act for establishing a public state claim, issued in accordance with Art. 166 of the Tax and Insurance Procedural Code by the director of the RISW, on whose territory the landfill is located. The act is drawn up on the basis of documents determined by the regulation under Art. 43, para. 2. The deed is drawn up for the user of the landfill, who has not transferred to the owner of the landfill the due deductions for each ton of deposited waste. When the deductions have not been paid by the owner of the landfill, but the user of the landfill has transferred the due deductions for each ton of deposited waste, the act is drawn up to the owner of the landfill.

(9) The non-deposited sums pursuant to Para. 3 after the enforcement of the instrument for absorption of a public-state receivable pursuant to Para. 8, they shall be collected compulsorily with the interests and costs by the NRA pursuant to the Tax-security Procedure Code.

(10) The collected sums by NRA shall come into the account, indicated in the request for their collecting.

Administrative Breaches and Punishments:

- A natural person shall be punished by a fine of BGN 300 to 1000, who does not comply with the provisions for re-use, recycling and utilization of CDW;
- With a property sanction in the amount of BGN 3,000 to BGN 10,000. a sole trader or legal person shall be penalized if:

1. commissioned or carried out construction or assembly works or removal of constructions without a Plan for management of construction and demolition waste /PMCDW/;

2. fails to achieve the goals for the utilization and recycling of construction waste, according to the requirements and deadlines set by the Ordinance;

3. does not achieve the goals for the use of recycled construction materials according to the requirements and deadlines defined in the Ordinance;

A mayor of a municipality and/or an official who does not organize the collection, utilization or disposal of construction waste from repair work generated by households on the territory of the respective municipality shall be fined from BGN 1,400 to BGN 4,000, if not subject to a more severe penalty. Municipality;

A fine of BGN 7,000 to BGN 20,000 applies to:

- an official who approved a Waste Management Plan, without measures foreseen or the measures envisaged do not ensure the fulfillment of the goals for utilization and recycling of construction waste;

- an official who does not take the necessary actions to implement and/or does not fulfil the goals for the utilization and recycling of construction waste, defined in the Ordinance;

The same year a specific ***Ordinance on construction and demolition waste management and use of recycled building materials*** concern-

ing construction and demolition waste management and the use of recycled building materials was issued, which was the first ever legislation about this category of waste.

Key moments in Ordinance on construction and demolition waste management and use of recycled construction material

Art. 1. The ordinance regulates:

1. the creation of a management and control system for the collection, transportation and treatment of construction and demolition waste (CDW);
2. the requirements for the use of recycled building materials in construction;
3. the requirements for CDW management in the process of construction and demolition of constructions.

Art. 2. The purpose of the regulation is:

1. to prevent and limit air, water and soil pollution, as well as to limit the risk to human health and the environment as a result of the collection, treatment and transportation of CDW;
2. to promote the recycling and utilization of CDW to achieve the goals under Art. 32 of the Waste Management Act (WMA).

Art. 6a. (New - SG No. 71 of 2020) (1) Construction and demolition waste (CDW), which has undergone a recovery process, the products prepared by CDW for reuse, with a view to their use in construction according to their intended initial use and re-cycled construction materials, representing construction products that contain or are entirely produced from construction waste, are used in the constructions in construction elements or parts of the construction provided by the designer in the investment project, in which the recovered products will provide the basic requirements for the construction.

(2) Construction waste, products prepared by CDW for reuse, as well as recycled construction materials, which are construction products, are used in constructions based on a declaration issued by the person who has the right to carry out activities with CDW, according to Art.35 of the Waste Management Act (WMA) and the documents defined in chapter four of the Ordinance on the management of construction waste and on the use of recycled construction materials (SG, No. 98 of 2017).

1. bodies that participate in the evaluation and verification of the constancy of the operational indicators of the essential characteristics according to Annex V of Regulation (EU) No. 305/2011;
2. bodies for technical assessment according to Chapter V of Regulation (EU) No. 305/2011;
3. persons for assessing compliance with national requirements;
4. persons for issuing Bulgarian technical approval.

(2) The persons under para. 1, item 3 are certification bodies that certify the assessment carried out with a certificate of compliance with the national requirements for the intended use of the product.

(3) The persons under para. 1, item 4 must have competence to analyze the risk of using innovative construction products, to determine the characteristics of the product that have an impact on the achievement of the main requirements for construction, to determine the appropriate methods for their evaluation and requirements for the production control in the product areas in which they issue Bulgarian technical approvals (BTA).

(4) (New - SG No. 71 of 2020) The person who has the right to carry out activities according to Art. 35 WMA, determines and declares the characteristics of the products prepared for reuse by the CDW, as defined in the methodology approved for the product under Art. 17, para. 1, item 4, letter b), depending on the intended reuse.

Art. 17. (1) The Minister of Regional Development and Public Works is a notifying authority under Art. 29 and 40 of Regulation (EU) No. 305/2011, which:

1. evaluates, empowers and monitors the activity and compliance with the provisions of Art. 30 and 43 - 46 incl. of Regulation (EU) No. 305/2011 and of Art. 10 of the Law on the technical requirements for products of persons for evaluation of construction products;
2. issues, refuses to issue, revokes, continues and suspends, updates, reissues, extends, refuses to extend and limits the scope of the issued permits to the persons for evaluating construction products;
3. notifies the European Commission (EC) and the member states of the issuance, revocation, continuation and suspension of the action, updating, extension and limitation of the scope of the issued permits of persons designated as

bodies for technical assessment under Art. 29, paragraph 1, and to persons authorized to perform tasks as third parties in the process of evaluating and verifying the constancy of operational indicators under Art. 39 of Regulation (EU) No. 305/2011;

4. approves:

a) procedures for certification of compliance of construction products with national requirements according to Art. 14, para. 1, developed by the Association of Conformity Assessment Bodies of construction products (ACABCP);

b) methods for preparation for reuse of products prepared by the CDW, and criteria for providing them for use in construction

(2) (New - SG No. 71 of 2020) The procedures and methods under para. 1, item 4 are published on the electronic page of the contact unit.

Art. 22 Recycled construction materials, which are construction products under para. 1, item 3, are placed on the market by the person under Art. 35 WMA in accordance with the requirements of Regulation (EU) 305/2011 of the European Parliament and of the Council establishing harmonized conditions for the marketing of construction products, accompanied by the documents under Art. 4 of Ordinance No. RD-02-20-1 of 2015 on the conditions and procedure for placing construction products in the constructions of the Republic of Bulgaria (promulgated, SG No. 14 of 2015; amended and supplemented, no. 18 of 2016 and No. 95 of 2017) and from information on the CDW used in the product, issued by the person under Art. 35 WMA.

Art. 23 (1) Construction waste under Art. 22, para. 1, item 1 and the products prepared by CDW for reuse under Art. 22, para. 1, item 2, are invested in constructions when the construction designer has foreseen in the investment project the construction elements or parts of the construction in which the utilized materials will provide the basic requirements of the construction.

(2) Recycled construction materials, which are construction products under Art. 22, para. 1, item 3, are included in the constructions on the basis of documents drawn up by the person entitled to carry out activities according to Art. 35 WMA, which produces them as a result of CDW recycling activities as follows:

1. declaration indicating the intended use/uses, and safety in Bulgarian according to the requirements of Art. 4 of Ordinance No. RD-02-20-1 of 2015 on the terms and conditions for placing construction products in constructions of the Republic of Bulgaria.

2. primary accounting documents and information on CDW used in the product, which certify the origin, type and quantities of CDW

(3) The declarations under Art. 4 of Ordinance No. RD-02-20-1 of 2015 on the terms and conditions for placing construction products in the constructions in Bulgaria are drawn up after evaluating the construction product in accordance with the requirements of Regulation (EU) 305/2011, when there is a published harmonized specification for the product, or according to the requirements of Art. 13 of Ordinance No. RD-02-20-1 of 2015 on the terms and conditions for the application of construction products in the constructions in Bulgaria, when there is no published harmonized specification for the product.

Some additional Ordinances in the field of waste management, are the following:

- Ordinance №1 from June 4th 2014 on the procedures and forms for providing information about the waste treatment activities and the procedures for keeping public registers;
- Ordinance №2 from July 27th 2014 on waste classification;
- Ordinance №4 on conditions and requirements for the construction and operation of incineration and co-incineration plants;
- Ordinance №6 from 27 August 2013 on the conditions and requirements for construction and operation of landfills and other facilities and installations for recovery and disposal of waste

OTHER STRATEGIC DOCUMENTS

National Waste management plan 2021-2028

Strategic objective:

Increasing the amount of recycled and recovered waste

The plan sets an ultimate target for recycling and other material recovery from non-hazardous construction and demolition waste of at least 70% of the total waste weight.

A prerequisite for achieving the goals are the approved normative provisions of the WMA and Ordinance on construction and demolition waste management and use of recycled construction material, where the responsibilities of municipal, regional and central institutions are clearly distinguished.

NATIONAL PROGRAM TO ACHIEVE RECYCLING GOALS FOR CDW

/PART OF NATIONAL WASTE MANAGEMENT PROGRAMME 2021-2027/

INVESTMENT MEASURES: FINANCING OF PROJECTS FOR THE CONSTRUCTION OF SYSTEMS, FACILITIES AND INSTALLATIONS FOR THE SELECTIVE DESTRUCTION, PREPARATION, RECYCLING AND UTILIZATION OF CONSTRUCTION WASTE AND FOR THE PRODUCTION OF RECYCLED CONSTRUCTION MATERIALS

NON-INVESTMENT MEASURES: AIMED AT THE SUCCESSFUL PRACTICAL IMPLEMENTATION OF THE REGULATORY FRAMEWORK, AS WELL AS AT INCREASING AWARENESS AND CAPACITY IN THE AREA UNDER CONSIDERATION.

Measures and indicators the monitoring and control of the environmental impact in the implementation of the National Plan for the period 2021-2028:

- Number of implemented projects for recycling and utilization of construction waste;
- Quantity of recycled waste tons/year;
- Amount of received new products ton/year.

Responsible authority:

- Municipalities;
- Regional inspections Environment;
- Executive Agency Environmental Environment.

National Strategy and plan for Circular Economy of Bulgaria 2022-2027

Strategic objectives:

1: Green and competitive economy

Specific objectives:

- Higher resource performance
- **New business models:** analysis of the possibilities to increase the requirements for mandatory content of recycled materials in certain product groups and ways to strengthen control in construction
- Connectivity in the economy
- Bulgaria contributes to the supply of critical raw materials

2: Less waste, more resources

Specific objectives 2.1: Less waste, more resources - Institutional trainings for the inclusion of "green criteria" in public procurement related to construction

Specific objectives 2.2:

- Strengthening the role of the construction sector in the management of construction waste, through the implementation of a voluntary agreement;
- Implementation of a pilot project for a regional installation for the treatment and recycling of CDW;
- Implementation of the infrastructure for the treatment and recycling of CDW;

Specific objectives 2.3: More recycled waste, better quality raw materials

Specific objectives 2.4: No landfill waste

3: Economics in favor of consumers

Specific objectives 3.1: Better informed consumers

Specific objectives 3.2: Sustainable consumption patterns

Specific objectives 3.3: Social green economy

HARMONISED STANDARDS

The approach of Regulation (EU) No 305/2011 for a better functioning of the single market for construction products is different from the general principles originally set in the new legislative framework. The main differences are the following.

- **Division of powers between the EU and the Member States.** The EU deals only with the single market access rules and not with requirements for products' performance as such. As mentioned above, the Member States are responsible for fire safety, environmental, energy and other requirements applicable to buildings and other construction works;
- **Harmonised marketing conditions.** Instead of harmonising construction products or the requirements for them, the Construction Products Regulation limits itself to creating harmonised conditions for marketing such products;
- **Harmonised standards.** The use of harmonised standards is obligatory for manufacturers when placing the construction products on the

market and for Member States when setting requirements for their performance⁹.

A **Harmonized Standard** is a European Standard (EN) developed under the mandate of the European Commission and the European Free Trade Association (EFTA) that supports the essential requirements of the New Approach Directives. The application of the harmonized standards is voluntary, but it is the easiest way to prove the conformity of the products with the essential requirements of the directives. An explanation of the relationship between the harmonized standard and to which of the essential requirements of the directives it applies is given in Annex "Z" of each mandated standard.

In order to become harmonized standards, it is necessary for the member countries to translate the titles of the standards into their national language, send them through the CEN/CENELEC administrative centres of the European Commission and the EFTA Secretariat for publication in the Official Journal of the European Union. With this act, European standards developed under a mandate become harmonized standards. From the date of publication, these standards can be applied to prove the conformity of products with the directives¹⁰.

The following European standards regulating construction products have been introduced into Bulgarian national standards / БДС /:

- БДС EN 12620:2002+A1:2008 Aggregates for concrete¹¹

This European Standard specifies the properties of aggregates and filler aggregates obtained by processing natural, manufactured or recycled materials and mixtures of these aggregates for use in concrete. It covers aggregates having an oven dried particle density greater than 2,00 Mg/m³ (2 000 kg/m³) for all concrete, including concrete in conformity with EN 206-1 and concrete used in roads and other pavements and for use in precast concrete products. It also covers recycled aggregate with densities between 1, 50 Mg/m³ (1 500 kg/m³) and 2, 00 Mg/m³ (2 000 kg/m³) with appropriate caveats and recycled fine aggregate (4 mm) with appropriate caveats."

⁹ REGULATION (EU) No 305/2011 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 9 March 2011 laying down harmonised conditions for the marketing of construction products and repealing Council Directive 89/106/EEC, <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32011R0305>

¹⁰ Bulgarian Institute for Standardization, https://bds-bg.org/bg/harmonized-standards_p23.html

¹¹ БДС EN 12620:2002+A1:2008 Aggregates for concrete, Bulgarian Institute for Standardization, <https://bds-bg.org/en/project/show/bds:proj:75461>



THE BULGARIAN
INSTITUTE FOR
STANDARDIZATION
(BIS) IS THE NA-
TIONAL STAND-
ARDIZATION BODY
IN THE REPUBLIC
OF BULGARIA.

It also specifies that a quality control system is in place for use in factory production control and it provides for the evaluation of conformity of the products to this European Standard.

This standard does not cover filler aggregates to be used as a constituent in cement or as other as inert filler aggregates for concrete.

NOTE 1 Aggregates used in construction should comply with all the requirements of this European Standard. As well as familiar and traditional natural and manufactured aggregates Mandate M/125 "Aggregates" included recycled aggregates and some materials from new or unfamiliar sources. Recycled aggregates are included in the standards and new test methods for them are at an advanced stage of preparation. For unfamiliar materials from secondary sources, however, the work on standardisation has only started recently and more time is needed to define clearly the origins and characteristics of these materials. In the meantime such unfamiliar materials when placed on the market as aggregates must comply fully with this standard and national regulations for dangerous substances (see Annex ZA of the standard) depending upon their intended use. Additional characteristics and requirements may be specified on a case by case basis depending upon experience of use of the product.

- БДС EN 12620:2002+A1:2008/NA:2017 Aggregates for concrete – National Annex (NA)

This national annex applies only to aggregates and filler aggregates obtained by processing natural, manufactured or recycled materials and mixtures of these aggregates for use in concrete, which meet the requirements of БДС EN 12620:2002+A1: 2008.

This document does not contradict БДС EN 12620:2002+A1:2008, but only complements it in some points and in Annex ZA. With it, national additions and clarifications are made and the operational indicators that must be declared are determined, taking into account the climatic and geographical conditions in the country, as well as the established regional and national traditions and construction experience.

These additions, clarifications and performance declaration requirements apply to general purpose concrete admixtures. In special cases, other documents (for example, normative documentation for specific applications of additive materials, standards for ready-made concrete products, legally approved design documentation for a specific construction, etc.) may require the determination of performance indicators that are not specified in Annex NA. ZA, or set requirements for categories and limit values other than those specified in this national

annex. In these cases, the requirements of the specific normative, standardization or project documentation are applied, insofar as it does not contradict БДС EN 12620:2002+A1:2008.

This national application contains only those points from БДС EN 12620:2002+A1:2008, in which national additions and clarifications are made.

- БДС EN 13242:2002+A1:2007 Aggregates for unbound and hydraulically bound materials for use in civil engineering work and road construction¹²

This European Standard specifies the properties of aggregates obtained by processing natural or manufactured or recycled materials for hydraulically bound and unbound materials for civil engineering work and road construction.

It provides for the evaluation of conformity of the products to this European Standard.

NOTE 1 Aggregates used in construction should comply with all the requirements of this European Standard. As well as familiar and traditional natural and manufactured aggregates Mandate M/125 "Aggregates" included recycled aggregates and some materials from new or unfamiliar sources. Recycled aggregates are included in the standards and new test methods for them are at an advanced stage of preparation. For unfamiliar materials from secondary sources, however, the work on standardisation has only started recently and more time is needed to define clearly the origins and characteristics of these materials. In the meantime such unfamiliar materials when placed on the market as aggregates must comply fully with this standard and national regulations for dangerous substances (see Annex ZA of the standard) depending upon their intended use. Additional characteristics and requirements may be specified on a case by case basis depending upon experience of use of the product, and defined in specific contractual documents.

NOTE 2 Properties for lightweight aggregates are specified in EN 13055-2.

- БДС EN 13242:2002+A1:2007/NA:2017 Aggregates for unbound and hydraulically bound materials for use in civil engineering work and road construction - National Annex (NA)¹³

¹² БДС EN 13242:2002+A1:2007 Aggregates for unbound and hydraulically bound materials for use in civil engineering work and road construction, Bulgarian Institute for Standardization, <https://bds-bg.org/en/project/show/bds:proj:73623>

¹³ БДС EN 13242:2002+A1:2007/NA:2017 Aggregates for unbound and hydraulically bound materials for use in civil engineering work and road construction - National Annex (NA), Bulgarian Institute for Standardization, <https://bds-bg.org/bg/project/show/bds:proj:101256>

This national application supplements БДC EN 13242:2002+A1:2007, which introduces EN 13242:2002+A1:2007, and defines the conditions for applying БДC EN 13242:2002+A1:2007 on the territory of Bulgaria. This document was developed with the participation of Bulgarian Institute for Standardization /BIS/ on the basis of national practical experience in the production and application of rock materials obtained from the processing of natural, artificial or recycled materials for non-bonded and hydraulically bonded materials for use in construction facilities and road construction and is adapted to the climatic conditions of the country.

This national application specifies the characteristics of rock materials obtained from the processing of natural, artificial or recycled materials for unbound and hydraulically bound materials for use in civil engineering and road construction.

This national annex applies only to rock materials obtained from the processing of natural, artificial or recycled materials for unbound and hydraulically bound materials for use in construction facilities and road construction that meet the requirements of БДC EN 13242:2002+A1:2007.

This national annex contains only those points of БДC EN 13242:2002+A1:2007 in which national additions and clarifications are made.

- БДC EN 13043:2005+AC:2005 Aggregates for bituminous mixtures and surface treatments for roads, airfields and other trafficked areas¹⁴

This European Standard specifies the properties of aggregates and filler aggregates obtained by processing natural or manufactured or recycled materials for use in bituminous mixtures and surface treatments for roads, airfields and other trafficked areas. This standard does not cover the use of reclaimed bituminous mixtures.

It provides for the evaluation of conformity of the products to this European Standard.

NOTE 1 the requirements in this European Standard are based upon experience with aggregate types with an established pattern of use. Care should be taken when considering the use of aggregates from sources with no such pattern of use, e.g., recycled aggregates and aggregates arising from certain industrial by-products. Such aggregates, which should comply with all the requirements of this European Standard, could have other characteristics not included in Man-

¹⁴ БДC EN 13043:2005+AC:2005 Aggregates for bituminous mixtures and surface treatments for roads, airfields and other trafficked areas, Bulgarian Institute for Standardization, <https://bds-bg.org/en/project/show/bds:proj:49811>

date M 125 that do not apply to the generality of aggregates types with an established pattern of use and when required, provisions valid at the place of use can be used to assess their suitability.

NOTE 2 Properties for lightweight aggregates are specified in EN 13055-2.

- БДС EN 13043:2005+AC: 2005/NA: 2017 aggregates for bituminous mixtures and surface treatments for roads, airfields and other trafficked areas - National Annex (NA)¹⁵

This national annex complements - БДС EN 13043:2005+AC: 2005, which introduces EN 13043:2002 together with its amendment EN 13043:2002/AC: 2004, and defines the conditions for the application of - БДС EN 13043:2005+AC: 2005 in the territory To Bulgaria.

This document was developed with the participation of Bulgarian Institute for Standardization on the basis of national practical experience in the production and application of rock materials and fine aggregates obtained from natural, industrially produced or recycled materials for use in asphalt mixtures and pavements and is adapted to the climatic conditions in the country.

This national application applies only to rock materials and fine aggregates obtained from natural, industrially produced or recycled materials for use in asphalt mixtures and pavements that meet the requirements of БДС EN 13043:2005+AC:2005. This national application does not apply to the use of asphalt mixes for recycling.

This national annex contains only those points from БДС EN 13043:2005+AC: 2005, in which national additions and clarifications are made.

- БДС EN 13055:2016 Lightweight aggregates¹⁶

This European Standard specifies the properties of Lightweight Aggregates (LWA) and fillers derived thereof obtained by processing natural or manufactured materials and mixtures of these aggregates for concrete, mortar and grout, bituminous mixtures and surface treatments and for unbound and hydraulically bound applications in construction works.

¹⁵ - БДС EN 13043:2005+AC: 2005/NA: 2017 aggregates for bituminous mixtures and surface treatments for roads, airfields and other trafficked areas - National Annex (NA), Bulgarian Institute for Standardization, <https://bds-bg.org/bg/project/show/bds:proj:101255>

¹⁶ БДС EN 13055:2016 Lightweight aggregates, Bulgarian Institute for Standardization, <https://bds-bg.org/en/project/show/bds:proj:98476>

This European Standard covers LWA of mineral origin having particle densities not exceeding 2000 kg/m³ (2,000 Mg/m³) or loose bulk densities not exceeding 1200 kg/m³ (1,200 Mg/m³) including:

- natural LWA;
- LWA manufactured from natural materials;
- LWA manufactured from by-products of industrial processes or from recycled source materials;
- LWA as by-products of industrial processes.

A list of source materials and specific materials, which are within the scope of this standard, is given in Annex A (normative).

NOTE Recycled aggregates from construction and demolition waste and Municipal Solid Waste Incinerator Bottom Ash (MIBA) are covered by standards EN 12620, EN 13043, EN 13139 and EN 13242.

Some LWA for specific applications are covered in separate European product standards (Annex B, normative).

The requirements specified in this standard may not be equally relevant to all types of LWA. For particular applications, the requirements and tolerances can be adapted for the end use.

- БДС EN 13108-8:2016 Bituminous mixtures - Material specifications - Part 8: Reclaimed asphalt¹⁷

This European Standard specifies requirements for the classification and description of reclaimed asphalt as a constituent material for asphalt mixtures. **It is not a standard for compliance.**

This European Standard only specifies reclaimed asphalt with bituminous binders, such as: paving grade bitumen, modified bitumen or hard grade bitumen. Reclaimed asphalt contaminated with coal tar or other additives or components above hazardous levels is not covered by this Standard and will need to be considered under Member State Environmental, and Health and Safety Regulations.

CDW DATABASE

In Bulgaria, a national information system for the generated, recycled, recovered and deposited construction waste has not yet been built, which is why the data

¹⁷ БДС EN 13108-8:2016 Bituminous mixtures - Material specifications - Part 8: Reclaimed asphalt, Bulgarian Institute for Standardization, <https://bds-bg.org/en/project/show/bds:proj:89202>

on construction and demolition waste from the available sources is incomplete. However, the National Statistical Institute has data summarizing the amount of generated, secured and utilized waste from the construction sector in Bulgaria for the period 2008-2018.

According to official data, CDW represents about 6.6% of the total waste that is generated in the country. The tables below present annual data of the National Statistical Institute on the generation and treatment of waste in the "Construction" sector:

Table 3 CDW in Bulgaria 2008-2018/ tons¹⁸

CDW	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Generated /total/	1 827 808	1 020 610	76 803	282 716	n/a	1 543 048	983 537	1 661 067	2 088 923	559 309	192 964
Submitted for recovery	218 533	313 143	7 947	72 939	n/a	136 312	285 662	436 345	1 507 418	148 673	142 622

¹⁸ National Statistical Institute database only for "Construction" sector

During the analysed period 2008-2018, there was an increase in the construction waste submitted for recovery compared to the total amount of construction waste generated, and in 2016 and 2018, the waste submitted for recovery exceeded the construction waste submitted for disposal:

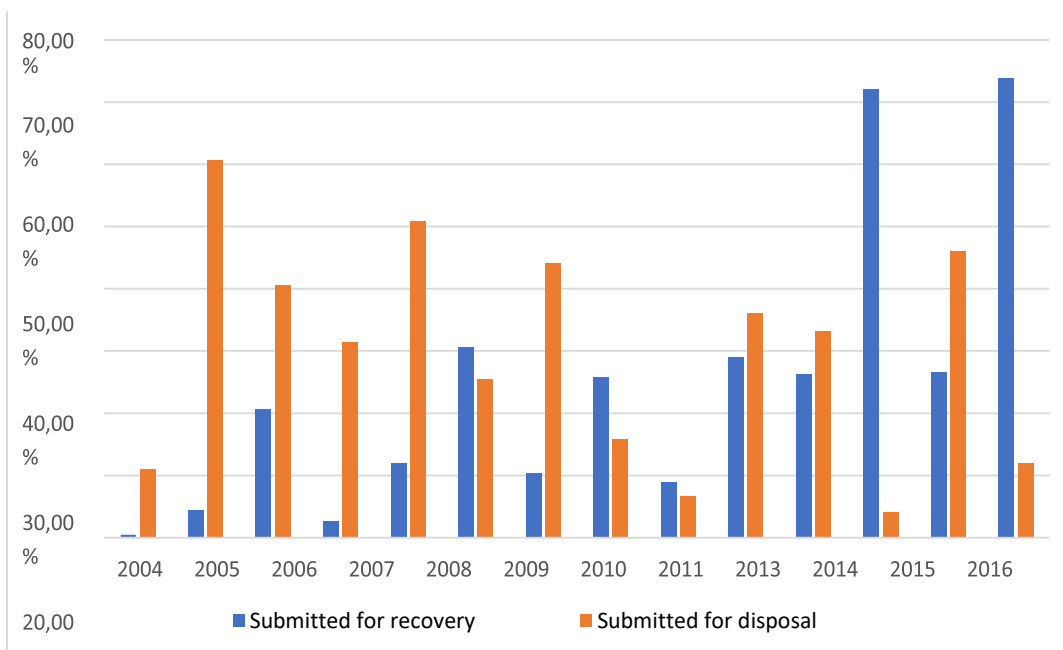


Figure 1 CDW 2008-2028 National Statistical Institute database

Ecological materials for sustainable construction, reconstruction and rehabilitations of buildings

In the course of construction activities, demolition or reconstruction of buildings and structures, inert, hazardous or non-hazardous waste is released. Most of them are deposited or used for backfill. These are wastes including insulating materials, gypsum, concrete, broken bricks and tiles, wood waste, plastic residues from plumbing nets, plaster and more. Some of the waste generated in the demolition of buildings such as metals, bricks, etc. Is very suitable for reuse and recycling. A huge amount of recyclable construction waste comes from the construction and repair of infrastructure such as roads.

Good practices regarding the recycling of construction waste and its reuse have been established in the construction and repair of the railway in Bulgaria. There, re-use and recycling of about 80% of the generated waste is observed. There is also a departmental regulatory framework that regulates the use of recycled materials in repairs.

End-of-life wooden sleepers are usually handed over for incineration, but since they are classified as hazardous waste, incineration takes place in installations that have the relevant permit for hazardous waste activities. Plastic waste is reused or recycled. Rubber pads are usually stored.

Reinforced concrete sleepers are reused, but some of them are also transmitted for disposal. The reason is that due to their high strength, their crushing is difficult¹⁹.

In this chapter, we will consider the main waste streams that are generated during the demolition of buildings in Bulgaria, the possibilities for their recycling, as well as their subsequent application for construction, reconstruction and rehabilitations of buildings

Recycled concrete

Concrete waste from building demolition has a very high potential for recycling.

1. Recycling process

After removal of contaminants through selective demolition, screening, and /or air separation and size reduction in a crusher to aggregate sizes, crushed concrete can be used as: new concrete for pavements, shoulders, median barriers, sidewalks, curbs and gutters, and bridge foundations structural grade concrete soil-cement pavement bases lean-concrete or econo-crete bases and bituminous concrete.

1.1 Separation

75% of the concrete is made of aggregates. Firstly, the contaminants like reinforced steel, foundation material, plastic, wood, bitumen and soils are removed from concrete. . Methods of separation are as follows:

- Magnetic screening
- Demolition
- Using electromagnets
- Air separation

1.2 Crushing

¹⁹ RESEARCH ARTICLE, DECEMBER 03 2020, Preliminary analysis of construction and demolition waste, management in Bulgaria, M. Filipova; I. Zheleva; D. Hvarchilkova

Secondly, the concrete is crushed mechanically or manually in the desired grain size which is usually from 20mm to 50mm. Different types of crusher are used that use impact force to crush larger stones. Namely,

1.3. Jaw Crusher

Concrete is compressed between a stationary and a moveable plate by jaws. Thus concrete is reduced in size while travelling along the length of the wedge between two plates.

1.4. Cone Crusher

Here concrete is compressed between two cone shaped plates. This machine typically produce aggregate of 1.5" minus.

1.5. Impact Crusher

The mechanism involves a spinning rotor with bars that fling the concrete to one or several solid plates or rods.

Some other examples are: gyratory crusher, cone crusher, mineral sizer, horizontal and vertical shaft impactors etc. These crushers can be portable, mobile or stationary.

1.6. Washing

Finally, they need to be washed. Fine and course materials are separated as per size requirement. Here the recovered aggregate contains coarse aggregate and coarse sand. Fine sands are settled down from suspension and wash water is recycled for reuse.

- Shoulders;
- Median barriers²⁰.

²⁰ Based on Recycled Aggregate Concrete (RAC) | Uses & Properties of Recycled Concrete | Steps involved, November 15, 2022 by Unmona Aditi, <https://engineer-ingcivil.org/articles/concrete/recycled-aggregate-concrete-rac-uses-properties-of-recycled-concrete-steps-involved/>

Picture 1 Recycled concrete²¹



Picture 2. 2 Inch - 4 Inch Recycled Concrete²²



2. Mix Design

It is generally accepted that when natural sand is used, up to 30 percent of natural crushed coarse aggregate can be replaced with coarse recycled aggregate without significantly affecting any of the mechanical properties of the concrete. As replacement amounts increase drying shrinkage and creep will increase and tensile strength and modulus of elasticity will decrease, however

²¹ <https://www.mbcruasher.com/en/gb/communication/news/why-and-how-to-recycle-concrete>

²² <https://girardresources.com/products/2-4-recycled-concrete/>

compressive strength and freeze-thaw resistance are not significantly affected. For more information, [click here](#).

It is recommended that RCA be batched in a prewetted and close to a saturated surface dry condition, like lightweight aggregates. To achieve the same workability, slump, and water-cement ratio as in conventional concrete, the paste content or amount of water reducer generally have to be increased.

Concrete with RCA can be transported, placed, and compacted in the same manner as conventional concrete. Special care is necessary when using fine RCA. Only up to 10 to 20 percent fine RCA is beneficial. The aggregate should be tested at several substitution rates to determine the optimal rate.

Often recycled aggregate is combined with virgin aggregate when used in new concrete. An example of a mix design using recycled aggregates in a pavement application is shown following table.

3. Sustainability

Recycling concrete provides sustainability several different ways. The simple act of recycling the concrete reduces the amount of material that must be land-filled. The concrete itself becomes aggregate and any embedded metals can be removed and recycled as well. As space for landfills becomes premium, this not only helps reduce the need for landfills, but also reduces the economic impact of the project. Moreover, using recycled concrete aggregates reduces the need for virgin aggregates. This in turn reduces the environmental impact of the aggregate extraction process. By removing both the waste disposal and new material production needs, transportation requirements for the project are significantly reduced.

In addition to the resource management aspect, recycled concrete aggregates absorb a large amount of carbon dioxide from the surrounding environment. The natural process of carbonation occurs in all concrete from the surface inward. In the process of crushing concrete to create recycled concrete aggregates, areas of the concrete that have not carbonated are exposed to atmospheric carbon dioxide.

4. Applications

Recycled aggregates can be of two types – processed and unprocessed. Different types can be used for different types of construction works.

Unprocessed recycled aggregates are used for:

- Bulk fill;
- Base fill for drainage structure;

Processed recycled aggregates are used for:

- Aggregate in lean concrete;
- Aggregate in bituminous concrete;
- Structural works in bridges;

Recycled Gypsum

1. Recycling process

Gypsum waste primarily consists of waste from gypsum boards, which are wall or ceiling panels made of a gypsum core between paper linings. Such boards are also referred to as sheetrock, plasterboards, drywall, wallboards and gyprock. Gypsum recycling is the process of turning gypsum waste (from construction) into recycled gypsum, thereby generating a raw material that can replace virgin gypsum raw materials in the manufacturing of new products. Two main types of gypsum waste based on their origin can be distinguished:

1.1. Gypsum waste from new construction.

Gypsum waste from new construction activities is typically a clean waste, and primarily consists of off-cuts of plasterboard (drywall, wallboard or gyprock) when the boards have been cut to fit the dimensions of the wall or ceiling. The waste may constitute 15% of the gypsum materials used on the site.

1.2. Gypsum waste from demolition and reconstruction

This waste arises when already installed plasterboards (drywalls, wallboards or gyprock boards), that usually have been installed many years ago, are taken out in connection with that the building is demolished or renovated. For this reason some refer to this waste as “old gypsum waste”, whereas the trade usually refer to this waste as “demolition waste”. Different from the other type of gypsum waste described above, this type of gypsum waste from renovation, refurbishment and demolition works is more likely to present a certain degree of contamination, which can be in the form of nails, screws, wood, insulation, wall coverings etc. For this waste to be recyclable it is required that the equipment processing the waste is capable of separating such contamination from the gypsum to arrive at a pure recycled gypsum. New construction and demolition gypsum waste is both arising after the gypsum products have left the manufacturing sites, and together these two waste types are referred to as post-consumer gypsum waste. The recycled gypsum obtained from this is known as post-consumer recycled gypsum.

Gypsum waste can be turned into recycled gypsum by processing the gypsum waste in such a way that the contaminants are removed and the paper facing

of the plasterboard is separated from the gypsum core through mechanical processes including grinding and sieving in specialised equipment. Gypsum waste such as gypsum blocks and plaster do not require the removal of paper, as they are not made with paper from the beginning. It is typical for the gypsum recyclers to accept up to 3 per cent of contamination from other materials. The professional recyclers are capable of handling gypsum waste with nails and screws, wall coverings etc.

Gypsum is fully and eternally recyclable [6] and, as a consequence, gypsum waste is one of the few construction materials for which closed loop recycling is possible.

Closed loop recycling of gypsum products involves the collection and processing of the gypsum waste, and the delivery of the obtained recycled gypsum to the manufacturer of gypsum products. It is therefore essential that the recycled gypsum achieves a pre-determined quality suitable for the manufacturing of new gypsum products. Presently there is no European standard pre-determining the recycled gypsum's quality and the criteria vary from plant to plant.

By choosing closed loop recycling the need for manufacturers to acquire virgin gypsum is reduced, contributing therefore to promote a sustainable manufacturing process.

The most advanced plants, and most of these are found in the Nordic countries in Europe, have substituted up to 30 per cent of virgin gypsum raw materials with recycled gypsum.

Picture 4. Recycled gypsum²³



²⁴
Picture 5 Recycled gypsom



2. Sustainability

Gypsum materials consist of calcium sulfate dihydrate ($\text{CaSO}_4 \cdot 2\text{H}_2\text{O}$). Sulfate-reducing bacteria convert sulfates to toxic hydrogen sulphide gas; they are killed by exposure to air, but the moist, airless, carbon-containing environment in a

²³

https://www.zkg.de/en/artikel/zkg_2012-09_The_gypsum_industry_presents_its_recycling_concept-1480519.html

²⁴ https://www.researchgate.net/figure/Recycled-gypsum-from-the-recycling-facility-in-Kirkkonummi-C-Delphine-Rumo_fig6_351632302

landfill is a good habitat for them. So gypsum put into landfill will decompose, releasing up to a quarter of its weight in hydrogen sulfide. Moreover, methanogenic bacteria also thrive in such an environment, and convert the paper in the plasterboard to methane gas which is a potent greenhouse gas. Recycling gypsum waste also reduces the need for the quarrying and production of virgin gypsum raw materials.

3. Applications

Recycling of construction ceramics: The technology of recycling construction ceramics from construction and demolition is related to crushing and fractionation, and the recycled materials can be used for various construction purposes - for filling and drainage works, for paving, for park paths and others, as well as for the production of products for general use. It is also possible to recycle ceramics in the form of recycled admixtures for the production of lightweight concrete. Building ceramics is one of the few building materials that can be re-used. Due to the high mechanical strength of ceramics and its durability, the bricks are suitable for use in new masonry.

Metal Recycling: Metals have extremely wide uses in construction. Industrial buildings, various facilities and installations are built with them. Metals are distinguished by plasticity, malleability, they are subject to multiple recycling processes without changing their properties and characteristics. Magnets are used to separate the metals, and after they are separated they are remelted and can be molded into new different products.

Recycled bricks

1. Recycling process

Bricks are amongst the oldest of building materials. The brick's popularity as an ideal building material has not diminished over the years as they are relatively inexpensive to manufacture, very durable, and requires minimal maintenance. Conventionally, bricks are made of kiln-baked mixtures of clay. In ancient times, mud was used to make bricks and simply dried in the sun. The content of brick varies between 31 and 79 % by mass. Higher portions of brick are possible by a careful pre-sorting at the site. A nearly pure material consisting only of tiles can be obtained if re-constructions of roofs are carried out.

Brick is recycled by first crushing the material with a primary jaw crusher then further reducing the crushed material with cone crushers. Then the material must be screened and, where required, blended through the pugmill to obtain several recycled products. Unused bricks, as well as bricks that do not pass the

manufacturers' standards, can also be recycled using the same crushing²⁵ process to form brick chips.

Picture 6 Recycled bricks



2. Sustainability

Brick is one of the most environmentally friendly and efficient building materials currently available. Although construction and demolition (C&D) waste tends to accumulate in many places and accounts for about 24% of materials in landfills, it is no longer a huge problem as old, broken, and used bricks are now sought after materials.

Today, antique bricks command a higher price than a new brick, which is advantageous as it reduces large-scale wastage.

3. Applications

Recycled bricks have as much use as the virgin material. The key uses are as follows:

- Recycled or reused bricks can be used in historical restoration projects;

²⁵ <https://gosmartbricks.com/all-you-need-to-know-about-brick-recycling/>

- Recycled bricks can be sold as aggregate, drainage media, and general fill;
- To preserve water in homes by placing a recycled brick in the cistern to displace water. The brick takes up volume, thereby reducing the amount of water used to flush the toilet each time²⁶.

Recycled wood waste

1. Recycling process

Wood waste is the second-largest component of construction and demolition (C&D) debris after concrete. It contributes 20 percent to 30 percent of the building-related C&D total. Overall, wood accounts for around 10 percent of all material deposited in landfills annually.

For example, the rate of concrete recycling is about 82 percent, according to the Construction Materials Recycling Association (CMRA), while the recycling rate for structural steel is around 98 percent, according to the Steel Recycling Institute.

Wood waste from C&D activities is typically delivered to wood waste recycling operations for processing, although a small market exists for salvaged timbers, boards or other components.

For the purposes of treatment, wood is often graded into four categories:

- Clean recycled wood – Material produced from pallets and secondary manufacture etc and suitable for producing animal bedding and mulches;
- Industrial feedstock grade – Clean wood, plus C&D waste, this is suitable for making materials such as panelboard;
- Fuel grade – Both the grades of material from above, plus that from municipal collections and civic amenity sites, suitable for biomass fuel;
- Hazardous waste – This includes all grades of wood including treated material such as fencing, utility poles (a.k.a. telephone poles) and track work. This waste wood requires disposal at special facilities.

Most C&D related wood is received at mixed C&D processing facilities. The material initially may be sorted by heavy equipment such as front-end loaders or excavators depending upon the material type, before being fed to an in-feed system. For large pieces of wood debris, bulk reduction equipment such as a

²⁶ Based on Editorial Feature - A Guide to Brick Recycling, 2013 <https://www.azo-build.com/article.aspx?ArticleID=8123>

compactor or hydraulic shears may be required to reduce material sizes so that it can be inducted into the wood grinding system.

Conveyor systems also encompass features that allow for further sortation of foreign materials, including ferrous metal, before entering the grinding equipment. After screening to the size required for a particular fiber requirement, the product is available for sale²⁷.

Picture 7 Types of recycled wood waste²⁸



2. Sustainability

Prevent Waste to Landfill- Landfill sites notoriously have many negative effects on the local and global environment as well as people. If waste wood ends up in landfill it will contribute to harmful effects and have no practical use as it would with recycling. To avoid chemical leaching, bad odours, biodiversity loss and many more results of landfill, it is critical businesses and individuals divert as much waste as possible, including wood, away from landfill; zero-waste-to-landfill.

²⁷ The Importance of Wood Recycling in C&D Management - Wood Recycling in the Construction Waste Stream, <https://www.liveabout.com/wood-recycling-construction-2877760>

²⁸ Circular Economy of Construction and Demolition Wood Waste—A Theoretical Framework Approach, Aug 2022, https://www.researchgate.net/figure/Represents-different-forms-of-wood-waste_fig1_362894501

Create New Materials- This benefit may be an obvious one, but wood can be recycled into a variety of useful products and materials. Reusing planks of wood to create furniture or garden additions is a popular way for people to save wood from landfill. Recycled wood from construction or other sectors is used to create building materials, horse/poultry bedding, play areas surfaces, panel board feedstock and more. Across industries, recycled wood is used to create valuable products that would otherwise use virgin materials to create at a higher cost²⁹.

3. Applications

The markets for the recovery and reuse of lumber are rapidly growing, albeit still representing a small niche in terms of overall volume of C&D derived wood waste. For example, recovered wood is now commonly used by architects and homeowners.

There are many applications and materials that wood reclaimed or recycled from the construction and demolition industries can be used for:

- Manufacture of chipboard and fiberboard;
- Manufacture of press wood pallets;
- Bedding materials for animals;
- Production of remanufactured products, including fiber composites;
- Landscaping mulch and architectural components.

Possibilities of using recycled building materials in the Construction, Reconstruction, and Rehabilitation of Buildings in Bulgaria

When is a declaration of performance (DEP) and when a declaration of characteristics of the construction product (DHSP) drawn up?

The construction products are put into the constructions on the basis of prepared declarations indicating their intended use or uses, and accompanied by instructions and safety information in the Bulgarian language. Depending on the technical specifications in accordance with which the construction products are evaluated, the declarations are:

1. declaration of performance indicators (DEP) in accordance with the requirements of Regulation (EU) No. 305/2011 of the European Parliament and of the Council of March 9, 2011 to determine harmonized conditions for the marketing

²⁹ Benefits of Recycling Wood, <https://www.slrecyclingltd.co.uk/benefits-of-recycling-wood/>

of construction products and to repeal Directive 89 /106/EEC (OJ, L 88/5 of 4.4.2011), drawn up according to the model given in Annex III of Commission Delegated Regulation (EU) No. 574/2014 of 21.2.2014, when for the construction product has a harmonized European standard or has been issued a European Technical Assessment (ETA);

2. declaration of the characteristics of the construction product (DHSP), when it is not covered by a harmonized European standard or an ETO has not been issued for it, drawn up according to the model given in Annex No. 1 of Regulation No. RD-02-20-1 on the conditions and the procedure for placing construction products in the constructions of the Republic of Bulgaria. According to Art. 4, para. 2 of Regulation No. RD-02-20-1 of 2015. The DHSP should demonstrate compliance with the Bulgarian national requirements regarding the intended use or uses, when such are defined.

What does the declaration of characteristics of the construction product (DCP) contain, when there are no specific national requirements for a given product, and who draws it up?

According to Art. 13, para. 3 of Ordinance No. RD-02-20-1 of 2015 on the terms and conditions for the application of construction products in the constructions of the Republic of Bulgaria, when no national requirements have been defined for the construction product, the DHSP is drawn up by the manufacturer or by his authorized representative based on test reports or other documents certifying the characteristics of the product. A sample DHSP can be found at: A sample and example version of a completed DHSP, as well as detailed instructions for completing it, can be found on the website of the Product Contact Unit - section "Instructions and manuals".

When and who prepares the declaration of performance (DOP) and who affixes the CE marking?

When a construction product is covered by a harmonized standard or meets a European technical assessment issued for it, the manufacturer draws up a declaration of performance when such product is placed on the market. An amended form of the DEP is given in Commission Delegated Regulation (EU) No. 574/2014 of February 21, 2014 amending Annex III to Regulation (EU) 305/2011.

The "CE" marking should be applied by the manufacturer to all construction products for which the manufacturer has drawn up a declaration of performance in accordance with Regulation (EU) No. 305/2011. When this is not possible or cannot be guaranteed due to the nature of the product, it is placed on the packaging or in the accompanying documents.

If no declaration of performance has been drawn up, the marking

"CE" should not be applied. The basic principles defined in Article 30 of Regulation (EC) No. 765/2008 apply to the CE marking.

Which standards are harmonized within the scope of Regulation (EU) No. 305/2011 of the European Parliament and of the Council of 9 March 2011 laying down harmonized conditions for the marketing of construction products and repealing Council Directive 89/106/EEC

Harmonized standard' means a standard adopted by one of the European standardization bodies listed in Annex I to Directive 98/34/EC on the basis of a request issued by the Commission in accordance with Article 6 of that Directive. A list of harmonized standards within the scope of Regulation (EU) No. 305/2011 can be found on the website of the European Commission.

Which construction products must be CE marked?

The CE marking is applied to those construction products for which the manufacturer has drawn up a declaration of performance in accordance with Articles 4 and 6 of Regulation (EU) No. 305/2011.

For any construction product that is covered by a harmonized standard or for which a European technical assessment has been issued, the CE marking is the only marking that confirms the conformity of the construction product with the declared performance in terms of the essential characteristics covered by the same harmonized standard or from a European Technical Assessment.

What are the national requirements for the use of construction products in the constructions of the Republic of Bulgaria?

1. the normative acts for the design, implementation, control and maintenance of constructions, when they contain requirements for construction products, and/or
2. the national standards that introduce European or international standards;
3. Bulgarian national standards or national standards with equivalent Bulgarian methods and requirements, when there are no standards under item 2;
4. Bulgarian technical approvals (BTO);
5. order of the Minister of Regional Development and Public Works in relation to the intended use or uses of the products - Order No. RD-02-14-1329 of 3.12.2015 of the Minister of Regional Development and Public Works to deter-

mine Bulgarian national requirements for the investment of construction products in construction in relation to their intended use or uses, promulgated in SG. no. 98 of December 15, 2015 (amended in 2017).

Preparation of a Construction Waste Management Plan

According to the Ordinance on construction and demolition waste management and use of recycled construction material, the assignor of the investment intention is responsible for the implementation of the objectives for the recycling of construction waste.

In this regard, he must prepare or commission the preparation of a Construction Waste Management Plan. The main purpose of the document is to trace the entire movement of the quantities of construction waste from the place of generation to the facility for their recovery or final disposal, thereby guaranteeing the maximum degree of recovery of construction waste.

Construction waste management plans are approved: for constructions for which an approved investment project is required - as part of the procedure for coordinating and approving investment projects in accordance with Chapter Eight, Section II of the Law on Construction Waste; for sites for which an approved investment project is not required - by the mayor of the municipality or an official authorized by him, on whose territory the project is implemented.

The preparation of the Construction Waste Management Plan significantly helps to ensure the traceability of the amounts of waste from the moment of its formation until its delivery for recovery or final disposal. The introduction of this mechanism facilitates control by the competent authorities and ensures the fulfillment of national recycling targets.

In accordance with the Ordinance, the Contractors of CMR of projects financed with public funds are responsible for investing in the constructions a certain percentage of products from recycling of construction waste (PRSO) or material recovery in reverse embankments, as follows: construction of buildings financed with public funds - 2%; construction of roads financed with public funds - 10.0%; rehabilitation, major repair and reconstruction of roads financed with public funds - 3.0%; construction, reconstruction and major repair of other constructions of the technical infrastructure, financed with public funds - 8.0%; utilization of pre-treated CO in reverse embankments – 10%.

The introduction of this requirement aims at ensuring a market for the products of construction waste recovery, as well as encouraging business to invest in building the infrastructure for the treatment of construction waste.

The requirements to the Contracting Authority do not apply to: removal of buildings with an expanded built-up area (GFA) of less than 100 sq.m.; reconstruction and overhaul of buildings with a built-up area of less than 500 sq.m.; changing the purpose of buildings with a built-up area of less than 500 sq.m.; construction of buildings with a built-up area of less than 300 sq.m.; removal of unusable or security-threatening constructions, when urgently ordered by a competent authority; all ongoing repairs.

The mayor organizes and supervises the activities of collection, utilization and disposal of construction waste from repair work, generated by households in the territory of the respective municipality.

The mayor of the municipality also controls the delivery of separated construction waste during the forced removal of constructions, monitors the utilization of materials and the use of recycled construction products, including covering the costs of carrying out transportation and treatment activities during the removal of illegal constructions. It is responsible for the closure, reclamation of non-hazardous waste landfills, as well as the subsequent post-operational care and monitoring of these landfills.

Good practices in construction waste management

Good waste management, selective demolition and proper storage ensure better quality waste, therefore better quality raw material that can be re-invested in the construction of new sites.

A waste audit before demolition or renovation of buildings and infrastructures is a specific task within the project planning. It is necessary to understand the type and amount of elements and materials that will be deconstructed and/or demolished, and to issue recommendations on their further handling. An assessment of the viable recovery routes for materials can also be given (including reuse and the potential reuse value, recycling on- and offsite and the associated cost savings and energy recovery).

The waste audit should also consider any relevant legislation such as the requirements for environmental permits if waste is to be used on-site or any waste that may be hazardous and which needs to be managed in accordance with specialized waste legislation. Ideally, waste audits should be performed before the call for tenders, and should be a part of the specifications for tenders. But at a minimum they should be performed before applying for the demolition or renovation permit. The audits' findings support the decisions of the authorities to approve the planned work. The audit report should be revised in the light of final results of the construction, demolition or refurbishment process.

Performing a waste audit presents a series of advantages - both economic and environmental - providing important added value to the whole project:

- Waste audits are the first step towards recycling;
- Waste audits promote fair competition amongst contractors;
- Waste audits increase awareness and ease traceability processes. It is of major importance to know the materials that will be set free; especially the hazardous ones to avoid unexpected costs during the works;

Environmental and technical quality of materials can be steered.

Environmental aspects that will be improved include:

- Specification of contaminants present;
- Contribute to the assurance that these are removed in an environmentally responsible manner;
- The achievement of higher environmental quality for recyclable waste materials;
- Technical quality aspects that will be improved include the identification of "higher quality" batches of recycled materials (for example concrete);

Waste audits contribute to better demolition waste management. Knowing the quantities and nature of materials expected leads to the optimisation of works (how many containers; on-site versus off-site sorting; etc.).

The waste audit can be completed with recommendations on how to perform waste management on site. The issues to be considered may include the following:

- Recommendations on the safe removal of hazardous waste
- Recommendations regarding possible health and safety precautions to take during the deconstruction phase or the waste management phase must also be done.
- Identification of potential waste diversion of certain identified waste streams (reuse, recycling, backfilling, energy recovery and elimination) and estimation of the diversion rates⁵. Different alternatives can be provided for each materials group or waste streams;
- Identification of (economically or environmentally) beneficial on-site sorting activities that may include the Description of the installation requirements for storage, handling, separation and for any other operation to manage the different waste streams.

Key moments

Recycled materials – REACH

Whereas registration based on REACH obligations do not apply to waste, such registration may become obligatory when waste ceases to be waste. The **REACH regulation therefore only becomes of interest when such materials as** recycled aggregates are no longer considered to constitute waste. In the specific case of recycled aggregates it is important to note that, even when they cease to be waste, REACH registration obligations do not apply. The reason for that is that recycled aggregates are regarded as an article, in the sense of REACH. Articles are exempt from the obligation to register. Due to article 7(2) and 33 of the REACH regulation, substances of very high concern (SVHC) in articles must be notified if they are present in a concentration higher than 0.1% w/w. Such substances are typically not identified in recycled aggregates.