

Using Construction Waste (250723)

General Information

School	ETSECCPB
Departments	Departament d'Enginyeria Civil i Ambiental (DECA) Departament de Tecnologia de l'Arquitectura (TA) Escola Tècnica Superior d'Enginyeria de Camins, Canals i Ports de Barcelona (ETSECCPB)
Credits	5.0 ECTS
Programs	MÀSTER UNIVERSITARI EN ENGINYERIA ESTRUCTURAL I DE LA CONSTRUCCIÓ (pla 2015)
Course	2024/25

Main teaching language at each group

- Group 10ES1 Spanish (Q1)

Faculty

Responsible Faculty: Marilda Barra Bizinotto
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Objectives of Education

Course to introduce the student to the recycling of construction and demolition waste and other industrial waste.

Capacity to assess the environmental impact of construction waste recycling techniques.

Identify primary and secondary materials.

Understand the basic notions of sustainability, recycling and chain management.

Analyze construction and demolition processes. Identify and assess construction and demolition waste.

Know the processing and production of recycled aggregates. Characterize recycled aggregates. Learn about the applications of recycled aggregates in civil construction for the production of recycled concrete and how granular material in layers of firm.

Environmental impact by Leaching. Protection of soils and aquifers.

Learn about the properties of combustion waste. Urban solid waste. Incineration and recycling of incineration slags. incineration plants. Emission strategies.

Learn properties of steel aggregates. Applications on roads. Fly ash. Applications. Environmental problems. K factor.

Inertization and immobilization. Treatments with binders. Mining waste and industrial waste.

Alkaline activation as a technique for waste recovery.

Total hours of student work

		Hours	Percentage
Supervised Learning	Large group	25.5 h	56.67 %
	Medium group	9.75 h	21.67 %
	Laboratory classes	9.75 h	21.67 %
	Guided Activities	0.0 h	0.00 %
Self Study		80.0 h	

Contents

Sustainability - Waste - Recycling

Conceptual discussion: Sustainability - Waste - Recycling. Recycling in construction - Life Cycle Materials - Sustainability and Energy Efficiency - Carbon footprint

Specific Objectives

Enter the cycle of sustainable construction. Distinguish between primary and secondary materials

Construction and demolition waste

Processing. Situation in Spain and the world linked and unlinked applications of recycled aggregates in road. Tests and experiences.

Properties of recycled aggregate. Dosage recycled concrete. Recycled concrete properties in fresh and hardened state. Durability

RCD fines. Technical considerations and environmental quality

Exercise dosing

Specific Objectives

Learn landfills processing construction and demolition waste, fixed and mobile plants, recycled aggregates. become acquainted roads with recycled aggregates from Spain

Soil and water protection. Leaching

Protection of soil and water. Toxicity of organic and inorganic content. Leaching: General concepts. Essays and legislation. Tendencies leaching practice

Fly ash from thermal power plants

Production. Classification. Properties. Additions. Alkali activation

Inerting for implementation

Inerting for implementation

Steel slag

Using waste from other industries: Blast furnace slag and steel slag

Used tires

Used tires. Use in concrete and asphalt mix

Municipal solid waste

Municipal solid waste

Other usable waste

Glass, shell of rice, vegetable fibers

Practice other recoverable waste

Recycling of asphalt

Classroom assessment

Activities

Visit to a waste recycling plant.

Make a technical visit to a recycling plant

Dedication

3h

Study 1: Directed Study 1: International experience in road application Experience

Dedication

2h

Teaching Methodology

The course consists of 2,3 hours per week of classroom activity (large size group) and 0,3 hours weekly with half the students (medium size group).

The 2,3 hours in the large size groups are devoted to theoretical lectures, in which the teacher presents the basic concepts and topics of the subject, shows examples and solves exercises.

The 0,3 hours in the medium size groups is devoted to solving practical problems with greater interaction with the students. The objective of these practical exercises is to consolidate the general and specific learning objectives.

The rest of weekly hours devoted to laboratory practice.

Support material in the form of a detailed teaching plan is provided using the virtual campus ATENEA: content, program of learning and assessment activities conducted and references.

Although most of the sessions will be given in the language indicated, sessions supported by other occasional guest experts may be held in other languages.

Grading Rules

() The evaluation calendar and grading rules will be approved before the start of the course.*

Continuous assessment: written questions on the subject of the class that must be delivered on paper at the beginning of the next class will be formulated.

All deliveries will be qualified and skilled absence with a zero.

The subject will be adopted with the average from continuing evaluations, representing 25% of the mark, a test representing 40% of the mark and a final paper that represent 35% of the mark. The work will be delivered on paper and will be presented orally in class (20 minutes).

Test Rules

Failure to perform a laboratory or continuous assessment activity in the scheduled period will result in a mark of zero in that activity.

Office Hours

Thursday from 4:00 p.m. to 6:00 p.m.

Bibliography

Basic

- Vázquez, E. (ed.). [Progress of recycling in the built environment: fina report of the RILEM Technical Committee 217-PRE](#). Dordrecht: Springer, 2013. ISBN 9789400749078.

