

Guidelines to define standards to Locate Disposal Sites for Construction and Demolition Waste in Mexico

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Introduction.

Construction and Demolition (C&D) waste such as concrete, bricks, gypsum, wood, glass, metals, plastic, solvents, asbestos and excavated soil, represent approximately **25% - 30% of all waste generated in the European Union (EU)**, many of them can be recycled [1].



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While some EU countries have currently developed and implemented a recycling C&D waste at a rate of up to 90% [4], others, recycle only about 50%.



[4] European Commission: EU Construction and Demolition Waste Management Protocol. European Commission. http://ec.europa.eu/growth/tools-databases/newsroom/cf/itemdetail.cfm?item_id=8983 (2016). Accessed 21 April 2017



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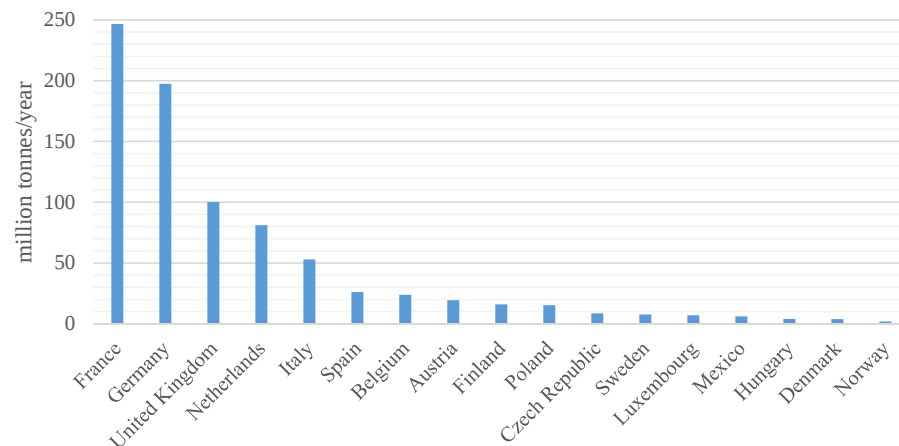


Figure 1 C&D waste generation from European countries largest producers and Mexico
Source: [6]

France, Germany, and United Kingdom are the countries that generate most of the C&D waste in the EU. For instance, in 2012, each produced more than 100 million tonnes (Figure 1).

C&D waste generated in Mexico between 2006 and 2012, reached approximately 6,11 million tonnes per year, only about 16% of recovering, but the recycling rate accounted for 3% [5].

[5] CMIC, Cámara Mexicana de la Industria de la Construcción: Plan de Manejo de Residuos de la Construcción y la Demolición. CMIC. <http://www.fic.org.mx/OTTIC/CMIC/PMrcdCompleto.pdf> (2013). Accessed 26 September 2016

[6] OECD, Organization for Economic Co-operation and Development: Generation of waste by sector. OECD. <https://stats.oecd.org/Index.aspx?DataSetCode=MUNW#> (2016). Accessed 23 April 2017



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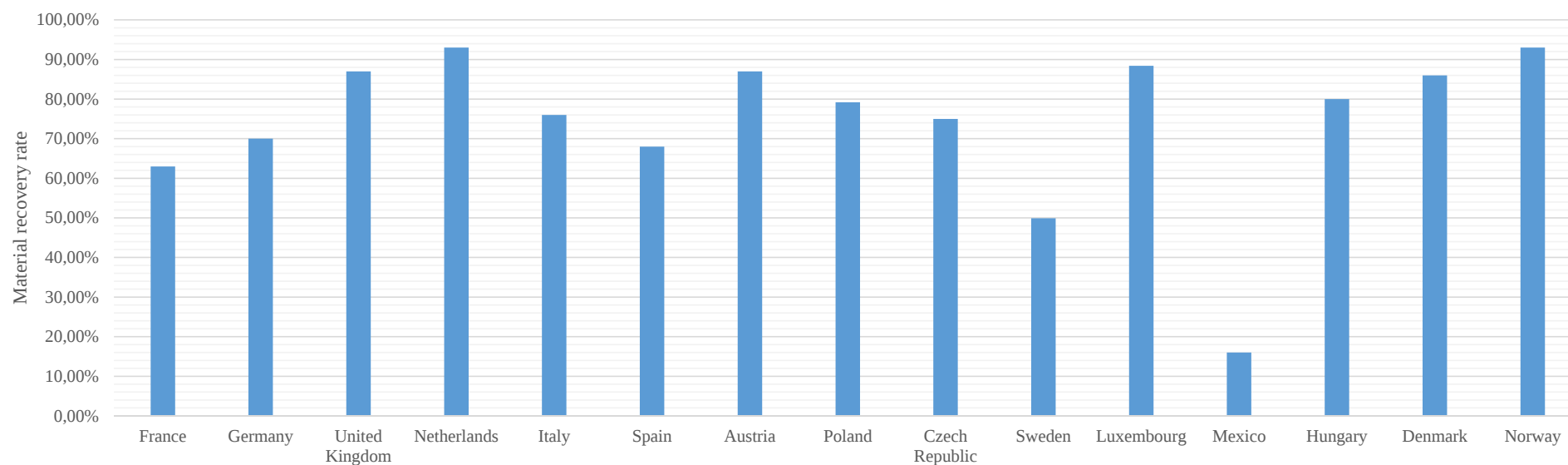


Figure 2 C&D waste recovery rate from European countries largest producers and Mexico

Source: [7]

[7] European Commission: Resource Efficient Use of Mixed Wastes. European Commission.

http://ec.europa.eu/environment/waste/studies/mixed_waste.htm (2016a). Accessed 23 April 2017



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Mexico's low recovery material rate and lack regulations have caused the illegal dumping of C&D waste on certain nature reserves and uncontrolled sites.

Moreover, the recycling technology unavailability serves as a barrier to increase the recovery material rate; in this way, the C&D waste dumping must be regulated to avoid any environmental damages with the help of a C&D waste disposal site location standard.



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Objective

Define guidelines for an Official Mexican Standard to locate final disposal sites for construction and demolition waste in Mexico.



Methods and materials.

1. Compilation of Information: In this stage, it was collected the necessary information to establish the theoretical basis for the research.

- Applicable Mexican normativity
- International Regulation that address the final provision of C&D waste.



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2. Analysis of the regulations' specifications. There were analyzed specifications and articles that compose the regulations collected for the correct final disposal of the C&D Wastes. In addition, it was identified similarities and trends between them.

3. Definition of the guidelines specifications for the standards. From the identification of similarities and trends within the regulations collected, it was defined the specifications that compose the standards, addressing aspects and limitations to properly dispose of C&D, without causing negative impacts on the environment.



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4. Comparison of the guidelines specifications for the final disposal of Municipal Solid Wastes and the reviewed for C&D Wastes. From the specifications defined for the final disposal of C&D Wastes, it was a contrast with the NOM-083-SEMARNAT-2003 for MSW, in order to eliminate the irrelevant aspects to dispose of C&D Wastes, which may intervene in negative impacts to the environment.

5. Guidelines for standard. Based on the NOM-083-SEMARNAT-2003' structure, the diverse sections of the Official Mexican Standard were written: Index, Introduction, Objective, Field of Application, Definitions, General Provisions, Specifications and Characteristics of C&D Wastes final disposal of sites, and References.



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Results.

The main outcome from this study is a Guide for the location of final disposal sites for construction and demolition waste in Mexico, based on technical and environmental issues.



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Specifications for sites location

Main aspects :

- Restrictions due to Civil Engineering Works impact or natural protected areas.
- Respect to right of way of highways, railroads, major and secondary roads.
- Locations out of flooding areas.
- Restrictions to locate within swamps, marsh and alike.
- Close to the sites where the C&D generation.





Photos: <https://www.google.gr/search>

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Do not locate a C&D waste final disposal site to less than **8 kilometers** distance from the trajectory of an airport or aerodrome tracks, as well as, within a radio of **3 kilometers** from an airport or aerodrome tracks center point. All final disposition sites located between 3 and 8 kilometers out from the trajectory of an airport or aerodrome tracks require a study of dust generation.



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Do not locate a C&D waste final disposal site in a less of **300 meters distance** from natural protected areas, agriculture and cattle raising, archaeological or cultural (religious, historical, traditional) zones.



Photos: <https://www.google.gr/search>



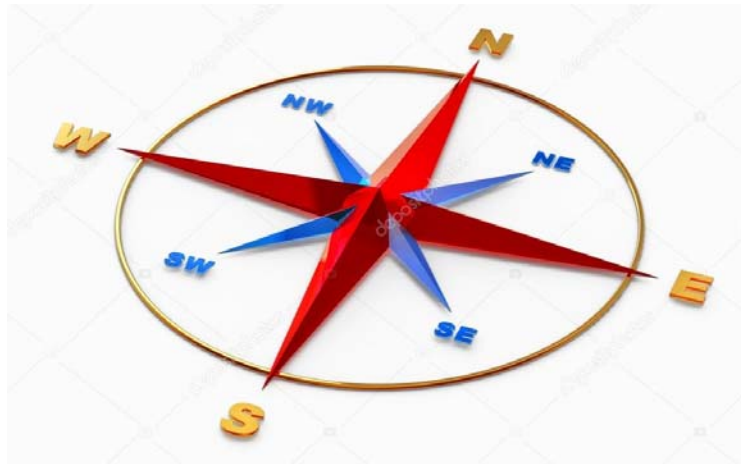
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In locations with more than **2500 habitants**, the site disposal limits must be located within a **minimal distance of 300 meters**, considering the real or planned urban line in the original plan of urban development. This implies to restrict the use of soil within the same distance after the final disposal site has been established.



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The direction of prevailing winds of the final disposal site must be opposite to the populated zone.



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A final disposal site shall not be located less than **800 meters from the right-of-way limits of a state or federal highway and railroad tracks**, unless it is not visible from any point on it.



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The final disposal site should be located outside flood areas indicated in the atlas of risk or with **return periods of 100 years**. It must be guaranteed, that in regions with high rainfall, the precipitation does not cause flood risk that affects the physical stability of works at the final disposal site, does not restrict river flow in the area and does not pose a risk to the environment.



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The final disposal site should not be located **less than 150 meters** from areas of: **marshes, mangroves, wetlands, estuaries, alluvial and fluvial plains**; or should not pose a risk to the environment and public health.



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The final disposal site should not be located less than **50 meters away from areas of caves, fractures or active geological faults** or should guarantee the structural integrity of site works and protection of the environment and public health.



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Must not be located **less than 50 meters from the boundaries of a site previously contaminated with hazardous waste or materials.** Sites that have been used for disposal of waste, except Hazardous Waste, they may not be used for the construction of a new site unless the previously approved Regularization Plan so considers.



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Previous studies to size the disposition site

Generation and composition of construction and demolition waste

Generation of gases

Generation of leachate



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4. Studies to assess the feasibility of locating a site:

Geological

Hydrogeological

Topographic

Geotechnical

Environmental impact



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Constructive facilities

Fences to delimit the area

Access control Offices Maintenance building

Laboratory

Parking area

Equipment for the operation of the landfill

Leachate collection system

Rainwater drainage system



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Conclusions

In Mexico, final disposal of C&D wastes is inadequate causing environmental and human health problems.

This is mainly due to the lack of legislation that enforce waste generators to dispose them in authorized sites that comply with all environmental protection requirements.

The guidelines to define standards to locate disposal sites for construction and demolition waste pretends to fulfill such legal gap that exists in Mexico.



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This standard proposal is just the first step that Mexico must take to create a solid C&D waste management.

After the standard implementation, it will be necessary to propose a pre-treatment waste policy for the material recovery and disposal. This will reduce any negative environmental impact and turn the C&D waste disposal standard more permissible, for instance, in the gas and leakage rules.



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