

Sustainable Solutions to Construction Waste within UAE Construction Sites

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Introduction

The United Arab Emirates (UAE) is currently grappling with the challenge of realizing sustainability in construction and the conservation of the natural environment. The main problem has proved to be management of waste from construction activities. The UAE is one of the biggest waste producer in the world. The region is only challenged by the US when it comes to waste share per capita (Al-Qaydi, 2006). Construction waste connotes the total quantity of materials purchased minus the materials that are used in the project. Construction waste comprises all materials produced as a result of the construction process and later abandoned by the constructor. This waste includes resources accrued from design, preparation for construction, from the actual construction and during renovation. There are two categories of construction waste; inert construction waste and non-inert construction waste. Inert waste consists of earth, plastics, metal, glass, debris, concrete and asphalt. Non-inert waste comprises organic matter, lumber and packaging materials. The major causes of waste are poor construction policies and off-cuts resulting from planning and design (Oliver. & Caban, 2006). This report highlights the adverse effects associated with constructions waste and postulates key sustainable solutions to the management of construction waste within UAE construction sites.

Impact of Construction Waste

Constant accumulation of construction waste has caused a number of challenges. These include:

- 1) Resource depletion. The construction industry in the UAE is a frequent consumer of resources resulting from various sources and suppliers. Most materials for instance sand,

gravel and steel are common to most construction projects (Dixon, 2013). Without reuse of the resultant waste, the resources will be depleted over time due to the heavy use and the little recycling. This drives construction prices up and reduces economic output of UAE.

- 2) Pollution and the introduction of hazardous substances to the environment. Pollution in this scenario can be classified into many types: that caused by manufacture of construction supplies and products; pollution resulting from the development of the construction site and other operation activities such as preparation of location and design (Tam, 2008). All these processes expose the employees on site and the local populace to various risk. Water resources, the air and land are contaminated by the waste. This pollution also affects the balance between the land, air and water thus impacting the natural ecosystem. The impact is threatening even though not immediate.
- 3) Financial losses. Most of the materials that are put away as waste after construction are very expensive. Their procurement and transport to the construction sites also takes up a huge chunk of the money. Amassing huge quantities of waste implies massive financial losses to the contractor (Naum, 2007).
- 4) The creation of derelict land. Derelict land is land that has become unusable and unproductive due to construction and development processes (Excellence, 2014). Disposal of construction waste especially concrete, gravel and sand in a particular place will gradually reduce the quality of that land. This dilapidated land will take a lot of financial and time resources to reclaim.
- 5) Global warming. The constant disposal of waste in the sea is slowly causing a rise in sea levels. Rising sea levels are a massive threat to people who reside close to oceans and seas. Low lying areas will experience recurrent floods and some areas could get

submerged completely with time (Dixon, 2013). The release of harmful gases to the air causes ozone depletion and eco-toxicity. Draining waste into land and water resources causes acidification and harms soil organisms.

Solutions to increasing levels of construction waste

Solutions to these conundrums revolve around processes and procedures to prevent, reduce and manage construction waste. Among the three, waste prevention is of the highest importance. Curbing the amount of waste produced from the beginning preserves the environment and reduces financial expenditure.

Methods of waste prevention

Prevention aims to reduce the amount of waste generated, lessen the harmful effects of the waste to humans, living things and the environment and the content of harmful substances in the waste. It provides resource efficiency through proper utilization of materials. The methods are:

1. Creating designs that cause less waste and offer maximum utilization of the available construction resources. The design team can tune the building proportions to correspond to standard metal and lumber specifications (Council, 2013). Also creating framing layouts for the construction will go a long way in reducing the cost of materials and tools ordered. The team will also ensure flexibility in design to meet the changing needs of the client. Recycled materials can also be included in the design. All these measures will ensure efficiency in the construction process therefore reducing the amount of waste that will come out of the construction process (Kaian, 1999) (Koskela, 1992). On the worksite, quantities of waste allowable should also be implemented. A site waste management plan (SWMP) is developed at this stage. A SWMP creates an estimate for waste and the different ways its will be managed.

2. Logistics management. Logistics management revolves around the acquisition of the raw materials and their transfer to the construction site. Involves choosing the best means of transportation of the equipment and construction material, choosing the most proficient routes of supply, choosing the most skilled company to deliver the provisions while incurring little to no wastage from source to destination. Proper logistics management will reduce the damage of material and equipment, reduce costs and greatly prevent wastage. Arranging deliveries to fit the construction plan reduces the challenge of storing materials onsite longer than is required (Waste, 2009). The constructor must also turn down damaged deliveries as that is already waste that would start piling up at the site.
3. Incentives and Training. Lack of knowledge and little comprehension of the effects of the accumulation of construction waste is one reason why there is a culture of disposing waste (Excellence, 2014). Training designers, site workers and clients on the different methods of waste prevention, re-use and recycling is one way of tackling this complication. Construction companies and government agencies could partner to train them on the benefits of waste prevention and minimization and later offer incentives to construction firms that efficiently apply the acquired procedures in their design and implementation.
4. Improving construction methods. The application of modern and efficient construction methods directly results in the reduction of the net waste levels. Implementation of processes like offsite fabrication, prefabrication, the re-use of construction and demolished waste, using building materials that are easily recyclable or which can be reused in other areas of the same construction have become common practices aimed at waste prevention and reduce accumulation of waste on the site.

Methods of Waste Minimization

Waste minimization encompasses the management of the volumes of waste produced during the construction process.

1. Reviewing and implementing the SWMP in full detail. Here the predictions of waste volumes are refined and the laid down procedures are implemented. The quantities of the various wastes are quantified and the waste management action for each specific type of waste is completed. Damage avoidance must be emphasized during the application of the SWMP.
2. Recycling. Various wastes from the different stages of construction can be readily recycled in other stages or in different construction sites. Creative reuse of equipment and tools can be thought out and implemented on the worksite (Ferguson, 1995). Water already used from one stage of construction can easily be channeled to use in another stage instead of draining it off. During demolition, the workers can salvage material that can later get used in other processes. Materials like lumber, metal and gravel are readily reusable. Materials that are not entirely usable by a particular project can be sold off to other contractors or transported for storage at another location. Some suppliers are also willing to take back packaging material and other things.
3. Monitoring and Evaluating Construction Activities. This can be achieved by creating methodologies that check performance and efficiency of the construction process (Tam, 2008). Regular reviews of the waste management processes are done and improvements executed. This will ensure that the waste program is on course and working as it should be. It also reduces damages identifies material for reuse. It is also an effective way to

calculate the cost of waste management against profits and overall construction cost(Waste, 2009).

4. Safe and secure storage facilities. After every period of construction, materials that were not used are returned to storage(O'Brien, 2011). Most of the wastage occurs in this routine as most equipment and construction materials are not well kept and damages occur. Efficient storage services should be provided in order to reduce damage from moving and handling.
5. Government Policies and Legislation. The steady increase of construction waste and the neglect by the constructors to reduce the waste lead to the government decreeing waste management laws and regulations(Al-Qaydi, 2006). The regulations provide guidelines for disposing waste, volumes of waste allowed and the various disciplinary measures in case the procedures are not followed. Taxing of landfill waste is another regulation that has been implemented. These policies have enhanced the waste management practices during construction. Every firm has a legal obligation to warrant that the waste they produce is handled safely.
6. Acquiring the services of waste disposal contractors. Disposal contractors collect the waste at the site, transport it and dispose of it efficiently. Most of the waste is taken away and put to use in other activities(O. & Caban, 2006). This decreases the volume of waste at the construction site; allows professionals to handle, sort and treat the waste and reduces the effects that the waste has on the environment.

Benefits of Construction Waste Minimization

Waste minimization has many benefits to the client, contractor, the environment and our ecosystem. Some of the benefits are explained below.

Financial Benefits

Recycling and reusing of waste material goes a long way in reducing the overall financial expenditure of the project. It is also a fact that preventing and minimizing waste that comes out of the construction process is way more economical than hiring a waste contractor to dispose of it. Some of the waste such as packaging material can be sold back to the supplier or to other contractors for income. And with waste disposal costs escalating within the UAE, waste management is the most effective way to go (Council, 2013).

Ensure Regulatory Compliance

Firms that do not follow guidelines as set down by the government and environmental agencies face punitive measures and high taxes on the waste (Agency, 2012). Every construction firm that produces waste has to meet several guidelines established by the Environmental Standard Systems Management. Complying with legislation ensures smooth running of the firm and avoids financial penalties (Naum, 2007).

Conserving the Environment

Recycling and reusing waste materials ensures that fewer raw materials are extracted and this preserves our natural resources and ensures an extended provision of supplies. Fewer landfills will avoid the issue of derelict land (Kembangan, 2014). Decrease in pollution of the air, land and water slows down the extent of global warming and ensures balance in our ecosystem.

Competitive Advantage

Contractors with a sterling record in waste management are more likely to get hired than firms with poor and ineffective waste management systems. Implementing waste minimization will keep the client, investors and authorities happy (Teo & Loosemore, 2001).

Conclusion

The practice of waste minimization is essential to a sustainable construction process. It reduces costs, espouses protections and preserves our environment, complies with associated rules and regulations, and above all places the firm head and shoulders above fellow competitors. Many firms in the UAE are implementing apt modus operandi for preventing and managing construction waste. Waste minimization should be integrated and effectually implemented from the planning phase, design, through preparation, during and after the implementation of the project.

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