

A programme developed for Solid Waste management at construction sites

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Abstract

The development of this programme is highly significant to manage solid waste (SW) at different construction sites which also involved how resources are used as well as end-of-life deposition of materials in the waste stream. Ways to collect, recycle, transport, and dispose of SW that affects cost and environmental releases were looked at very carefully when this programme developed. Prior to 1970, sanitary landfills were very rare, SW was “dumped” and organic materials in the dumps were burned to reduce volume and this was common (1). This programme for today solid waste management is involving technologies that are more energy efficient and protective of human health and the environment. These technological changes and improvements have resulted from the needs to reduce direct impact on environment and residents living nearby construction sites. The programme developed so technology can be deployed and used to achieve the more efficient of saving resources, energy and above all environment protection.

Introduction

The traditional model for municipal solid waste (MSW) management consists of receiving in a community's waste stream, preparing it (often minimally), and sending it to a licensed landfill (1). Predictably, after decades of processing household waste in this way, communities across the country are running out of convenient and cost-effective landfills - a problem made more acute both by community resistance to approving new landfills and by the government restrictions regulating the design of the few landfills that are approved(2). In future applications, landfill development will undoubtedly take longer to complete and cost more to build, manage, and close. For all of these reasons, the traditional waste management model will not continue to be a politically acceptable solution due to its critical dependence on landfills and the public's resistance to them (3).

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It is likely that through aggressive 3 R's (waste Reduction, Reuse, and Recycling) action, including, where necessary, legislation concerning packaging, additional significant reductions in the magnitude of the MSW stream can be achieved (3). It is clear that any planning for landfills should include a detailed analysis of the realistically anticipated waste stream with conventional waste reduction efforts, as well as that which could be achieved through highly aggressive waste stream diversion efforts. It is possible that such an analysis would reveal that the amount of waste in need of management by land filling is considerably less than is currently anticipated by the waste management authority of the region (3, 4, 5).

Methods of Research and Activities

Several construction sites in Karbala city including Karbala University I have visited and pictured them (see Figure 1 and 2 below) to study these sites in order to develop a programme to manage solid waste generated at each sites. Some of the photos below clearly show no specific procedure has been adopted to manage the waste and as a result these wastes spreading around each site by the times it reaches area far away from the construction site itself.



Figure 1: construction site at Karbala University (old campus)



Figure 2: construction site near Karbala city centre

The programme developed is to set a procedure that is practicable and applicable which gives a very clear picture on how to manage the solid waste without leaving them dispersing all around the area whether residential or commercial etc. Above all, the scope of environmental impact also studied and given full consideration when this programme has been developed (6).

Potential effects of solid waste generated from construction sites are listed in Table 1 below.

Table 1: Potential effect of solid wastes generated from construction site (7, 8)

| <i>Area at risk</i> | <i>Potential effect</i> |
|---------------------|--|
| Water | Pollution of ground or surface water |
| Air | Odour, dust smell, CO ₂ |
| Land and soil | Contamination by pollutants relevant to the development. |
| Architectural | Changes to amount of land built on and use of the land, heritage effect on existing buildings of architectural interest. |
| Noise | Effect on the ambient noise climate, peak noise levels, sleep disturbance, loss of amenity. |
| Landscape | Change to the landscape, such as the amount of land covered, and hard and soft landscaping. |
| Archaeological | Threat to ancient monuments, site with special classifications |
| Flora and fauna | Effects on habitats, both land and water with special concern for specific sites or sensitive sites. |
| Population | Pollutants or emissions affecting leisure and recreation, infrastructure and land use. |

Discussion

There are several impacts of SW in and around the construction site which are (9):

Truck Traffic

Truck traffic is one of the major causes of adverse impacts of construction site to those who own or use properties near the construction site. It is becoming increasingly clear that the transport of the SW in trucks will be one of the principal sources of adverse impacts to nearby property. In addition to noise and annoyance concerns of truck traffic, increased truck traffic can have adverse impacts on traffic flow and therefore, public safety.

Litter

One of the significant adverse impacts of municipal solid waste of construction site on owners and users of lands near the construction site is off-site litter (paper, plastic, garbage, etc.). This litter can represent a significant degradation of the aesthetic quality of the area and in some instances, a public health hazard. While most of the litter is paper and plastic, some of it contains food wastes and other material that could attract rodents and insects that can serve as vectors of disease.

Dust

Some construction site operations contribute significant dust to the ambient air near the operation. Truck traffic over dirt roads during drier parts of the year and within the area of the construction site can result in appreciable airborne dust.

Noise

The heavy equipment used in the construction site operations and noise from trucks can significantly increase noise levels on adjacent and nearby properties so that they are damaging to public health and welfare.

1. Explanation of How These Impacts may be mitigated (10)

Truck Traffic Problems

The number of SW trucks that reach the construction site during a period of time should be carefully evaluated and become one of the deciding factors in the establishment of the "size" of a waste. The construction site that generates waste each day so that SW trucks arrive at the construction site, to take away that waste, at a rate of one or two every day, must have adequate road capacity and structural integrity as well as a proper maintenance program to mitigate to some extent the adverse impacts of the truck traffic.

Litter

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Litter is controlled by placement of temporary fencing or portable litter fences downwind from the working face, if necessary. The fencing, the operational area, and the construction site in general are policed on a daily basis to pick up any accumulated litter.

Dust Problems

Dust can be controlled through efficient watering of the roadways and other areas of the construction site where dust is generated. At some construction sites, this is difficult to accomplish, however, because of the shortage of water and its cost. Under those conditions, operator may conduct dust control to the least extent possible to just get regulatory requirements enforced.

Noise

Through appropriate control of some construction sites operations and adequate land buffers between the some construction sites active areas of active deposition and adjacent properties, the noise problems of some construction sites can be reduced to insignificant levels. Vehicles are equipped with noise reduction devices (mufflers) in accordance with regulation required and local authority standards for health and safety.

2.Materials Recovery Facility (MRF) (10, 11)

This is a reliable technology to recover materials from the construction site for recycling. Such measure is highly possible to recover: paper, metals, plastics, glass, wood and any other recyclable materials.

Conclusion

All approaches for SW generated from construction sites have potentially significant adverse impacts on public health and the environment. It is highly inappropriate today for those responsible for developing waste management approaches for an area to focus on the development of site without managing the SW of the site without appropriate attention to those impacts and their reliable mitigation at the construction site and evaluation process.

Because of the importance of the 3 R's action in influencing not only the magnitude of the waste-stream, but also its characteristics, it is essential that careful consideration be given to the influence of waste-stream reduction and waste reuse and recycling in developing a long term waste management program for an area such as construction sites. Furthermore, those responsible for development of a waste management program in an area should work with the governmental agencies, the legislative and regulatory bodies, and the public in a highly developed, organized and coordinated program to significantly reduce the magnitude and improve the character of the SW that must be managed at any construction site.

References

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1. Jan den Boer, "Waste Management Planning and Optimisation, Handbook for Municipal Waste Publisher: ibidem-Verlag, Jessica Haunschild u Christian Schon (2005).
2. Atkeyelsh Persson, "Best Practices of Municipal Solid Waste Management: The Role of Households and Municipalities in Solid Waste Management: The Case of Sweden", Publisher: LAP Lambert Academic Publishing (2009).
3. James R. Mihelcic, Julie B. Zimmerman, "Environmental Engineering: Fundamentals, Sustainability", John Wiley & Sons, (2009).
4. Border, D. (2003) 'A review of composting of controlled wastes', Environment Agency Technical Report, in preparation.
5. Boulos, S., Pocock, R. and Gilbert, E. (2006), 'The state of composting and biological waste treatment in the UK', The Composting Association, Wellingborough.
6. British Standards Institution, 'Specification for composted materials', PAS 100:2005, London, (2005).
7. McDougall, F. R. and White, P. R., Integrated Solid Waste Management: A Life Cycle Inventory, Blackwell Science, (2001).
8. A. Porteous, "Dictionary of Environmental Science and Technology", 3rd ed., Chichester and New York, John Wiley and Sons, (2003).
9. NAW, 'Municipal waste management report for Wales 2004-05', National Assembly for Wales, Cardiff, (2006).
10. Environment and Heritage Service, 'Municipal waste management Northern Ireland 2005/06 summary report', Environment and Heritage Service, Belfast, (2006).
11. Burnley, S. J., Ellis, J. C., Flowerdew, R., Poll, A. J. and Prosser, H., 'Assessing the composition of municipal solid waste in Wales', Resources, Conservation and Recycling, 49 (3) 264-283, (2007).

تطوير برنامج لإدارة النفايات الصلبة لمواقع البناء

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ان تطوير هذا البرنامج له من الاهمية لإدارة النفايات في مواقع البناء المختلفة والذي يشمل ايضا الكيفية التي يمكن من خلالها استعمال الموارد اضافة الى الطرح النهائي للمواد غير القابلة للتدوير في اتجاه تيار النفايات. طرق جمع النفايات، تدويرها ثم نقلها لطرحها كل هذه العمليات لها تأثير على التكلفة وما يتحرر عنها الى البيئة قد تم أخذه بنظر الاعتبار وبدقة بالغة عند تطوير هذا البرنامج .

قبل عام 1970، الطمر أو الردم الصحي كان نادر الوجود، النفايات الصلبة كانت تطرح والمواد العضوية المطروحة تحرق لتقليل حجمها وهذا كان شائعا. هذا البرنامج لإدارة النفايات الصلبة ليومنا

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الحاضر والذي يتضمن تقنيات أكثر كفاءة في استهلاك الطاقة وحماية صحة الانسان والبيئة. هذه التغييرات والتحسينات في التقنيات ناتجة من الحاجة لخفض التأثير المباشر على البيئة والسكان الذين يعيشون بالقرب من مواقع البناء. البرنامج تم تطويره بحيث أن التقنية يمكن وضعها واستعمالها لانجاز اكبر كفاءة في ادخار الموارد والطاقة وفوق ذلك كله حماية البيئة.