Institute in Action  
- IWM Response to the draft National Waste Strategy, 'A Way with Waste'

Waste Management at Work

EC Law & the Waste Industry
Regular EC law column by Paul Rice of Denton Hall

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Clear challenge for UK glass recycling
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Shering's weighbridge technology is delivering valuable data at a Hampshire Waste transfer site

International & UK News

Buyers Guide & Classified
Nominations for IWM Junior Vice-President

Nominations for the next Junior Vice-President of the Institute of Wastes Management will soon be required to be submitted to the Chief Executive Officer. It is normal for the Junior Vice-President to become the Senior Vice-President in the following year, and then to be elected as President for the year after that. Thus, the Junior Vice-President for 2000-2001 will become President of the Institute for 2002-2003. If not already a General Councillor, on election as Junior Vice-President, the person concerned automatically becomes a member of the General Council, ex-officio, and remains so throughout their period of office and for a further year after their term of office as President.

Candidates for the Junior Vice- Presidency must be Fellows of the Institute, and nominations should be received by the Chief Executive at Institute Headquarters by the 31st December 1999. Nominations must be in writing, and must be proposed and seconded by any two General Councillors or Centre Councillors. A standard nomination form can be obtained from Mark Gibson at IWM headquarters on tel: 01604 620426.

Professionalism is not just a question of image but one of responsibility

In recent weeks we have seen two devastating tragedies - both caused by earthquakes. The first of these was in Istanbul and this was closely followed by similar scenes in Taiwan. If these two tragic events have taught us anything, it is that the highest professional standards must always be adhered to in the protection of public health.

Industries such as civil engineering, construction or, for that matter, the waste management industry, are never under such close scrutiny as when a disaster such as these earthquakes occur, particularly when it leads to widespread loss of human life. Natural disasters they may be, but this will not stop the public and the media looking to lay the blame closer to home.

In both cities hit recently by earthquakes, it was all too easy to quickly establish that standards, especially in the construction and design of buildings, played a significant part in the terrible loss of life.

A key role of a professional Institute such as ours is to ensure the highest standards of operation, to promote best practice, and to protect life, health and the environment. Similarly, it is incumbent on members of such a professional body to understand and undertake their own individual professional responsibilities. If standards and regulations are flouted, then blame is rightly apportioned.

There is a third role which is just as vital, and that is the role of regulator. If standards are in place, then they need to be monitored, inspected and the results reported to ensure that they are being adhered to.

The appalling death count, particularly in Taiwan, was due in no small part to the likely flouting of building regulations - we all need to ensure that our commitment to high standards ensures that our actions do not cause or add to further disasters in the future.

IWM COMMENT
by Tony Hirons

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Municipal solid waste in Kazakhstan: urban waste management problems in a transition economy

by Tatyana B Vermenchicheva, Lyazzat M Saribekova, & Sonia Heaven

50% is added by public organisations (schools, canteens, shops, hotels etc). It is anticipated that the volume of MSW will increase one-and-a-half times in the next 10-12 years.

Most of the waste stream (an estimated 97%) is deposited at illegal dump sites which have an adverse impact on the environment. Dump sites occupy 1350 ha of city and regional centers. Every year sizeable areas are added to dump sites, often including valuable agriculture land, and the state of these sites is unsatisfactory. For example, 92% of sites have no surface or ground water protection systems, and dumping and buffer zones are absent at 45% of sites. Analysis of site operations demonstrates that the methods used for storage of MSW are outdated and are reaching their limits. Firstly, storage and neutralisation of wastes is labour intensive. Secondly, further vast areas are required and high costs are incurred for transportation of waste to landfills that are often located far from city boundaries.

Regulatory aspects
Finding solutions to the problems surrounding MSW is currently hindered by the absence of a well-developed system of legally enforceable regulation of waste handling operations. Kazakhstan’s environmental legislation, both newly implemented and dating back to the Soviet period, contains a number of acts and norms regulating different aspects of storage, transportation, recycling and disposal of waste. Regulations are implemented and enforced by different departments of local and national government, and no single organisation has a co-ordinating function. Such important aspects as the monitoring and inventory of wastes and the licensing of waste handling activities are not regulated by legislation.

The main legislation governing environmental protection is the Environmental Protection Act of the Republic of Kazakhstan 1997. Article 60 is entitled ‘Environmental requirements for handling of production and consumption waste’. In practice, this article simply makes provision for detailed regulations to be made by other bodies.

A draft law on the use and recycling of production and consumption waste was scheduled by a resolution of the Kazakhstan Government on 15 December 1995. A working group tasked with the preparation of the draft law was created by the Ministry of Environmental Protection and Natural Resources (formerly the Ministry of Ecology and Bioreources). The working group made use of world practice and general principles of legislation from the USA, Czechoslovakia and Russia, materials from UNO meetings, and, in particular, decisions of the Basle Convention.

The draft law is based on legal norms in the Constitution and on the general principles of environmental safety in the Republic of Kazakhstan as outlined in the Environmental Protection Act 1997. The main purposes of the draft law are to unify unco-ordinated legal norms regulating the activities of state, legal and natural entities in the sphere of production and consumption waste, to systematise public management of waste-related activities, and to define economic methods which will stimulate reductions in the volume of wastes. This draft has not yet become law.

Table 1: Composition of MSW by weight according to different sources

<table>
<thead>
<tr>
<th>Components of MSW</th>
<th>Reference 7 (%)</th>
<th>Reference 3 (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Paper</td>
<td>22.9</td>
<td>24-40</td>
</tr>
<tr>
<td>Food waste</td>
<td>33.6</td>
<td>3-5</td>
</tr>
<tr>
<td>Yard waste</td>
<td>21.2</td>
<td>-</td>
</tr>
<tr>
<td>Textiles</td>
<td>7.3</td>
<td>4-5</td>
</tr>
<tr>
<td>Glass</td>
<td>2.7</td>
<td>4</td>
</tr>
<tr>
<td>Metals</td>
<td>1.5</td>
<td>2-5</td>
</tr>
<tr>
<td>Plastic</td>
<td>1.6</td>
<td>1-2</td>
</tr>
<tr>
<td>Leather, rubber</td>
<td>1.4</td>
<td>-</td>
</tr>
<tr>
<td>Wood waste</td>
<td>3.3</td>
<td>3</td>
</tr>
<tr>
<td>Other waste</td>
<td>4.6</td>
<td>-</td>
</tr>
</tbody>
</table>

Vetore MANAGEMENT October 1999
MSW generation in Almaty

Almaty is the former capital city of Kazakhstan with a population of 1.12 million. It is situated in the south-eastern part of the country at the foot of the Zailiyski Alatau mountain system. The city has two main types of housing - five or nine storey blocks of flats, and single-storey individual houses.

Like all big cities, Almaty has become a large generator of MSW. The term MSW includes the following types of waste in Almaty: waste generated in private houses including flats; maintenance waste and ash from district local heating systems; green waste and fallen leaves collected from parks; large household goods; and refuse collected on the streets. It is estimated that approximately 2 million m³ or 500,000 tonnes of solid waste are generated annually in Almaty. Data collection is inadequate due to limited resources, and the rapidly changing economic conditions mean that figures go out of date quickly, but according to one survey the volume generated in 1996 was 1,888 million m³ or 1.56 m³ per person. Average amounts of solid waste generated range from 250-500kg per person depending on lifestyle, with a further 35-40% from public organisations. The greatest quantity of waste (68%) is generated in regions with multi-storey buildings where the majority of the population lives.

Various sources give figures for the composition of waste, but it is not always stated how these were obtained (eg, by analysis, use of previously existing state norms, or simply using data from elsewhere). Information from two sources is given in Table 1. The first column shows data from a survey carried out in Almaty in 1995, based on generalisation of data from waste collection enterprises. According to this, the moisture content of the waste was 47.5% and the density 253 kg/m³. The data in the second column is quoted as averaged for Kazakhstan but no information is given on its source or the methods used to obtain it. Once again, these figures are likely to be strongly affected by the changing economic conditions.

Waste collection and temporary waste storage

The system used for temporary storage and collection of wastes depends on the compactness of buildings, number of stores, type and quality of collecting vehicles, and methods of waste transportation.

MSW in Almaty is collected in containers, which are usually situated at communal waste collection points in public areas near blocks of flats, or in the yards of private houses. In large blocks of flats, special chutes are constructed in order to facilitate refuse collection. However, in recent years these have not been used due to disruption and breakdowns in the system of transporting refuse away from the collection points. Waste from one-storey buildings is collected by the inhabitants in their own containers and is put out along the side of road on specific days of week where it is collected by a truck.

The containers used in Almaty are mainly of 0,55, 0,6, 0,75 and 1,25m³ capacity. All types of MSW are discarded in the containers: at present there is no system for separate collection of waste, although in the Soviet period there were collections of paper and scrap metal for recycling. The 0,55 and 0,75m³ containers are permanently stationed at the communal waste collection points and are emptied into a collection truck. The 0,6m³ containers are used in buildings with chutes, and 1,25m³ ones are removed and replaced with an empty container. In practice, however, the number of containers provided is insufficient, with no more than 3-4 to serve several hundred households and the frequency of emptying is inadequate due to breakdowns and lack of vehicles. As a result, the communal waste collection points are often piled with refuse, and the excess is usually disposed of by burning in situ.

The photograph opposite shows a typical collection point immediately after emptying and cleaning: it can be seen that the bins provided are already full with waste swept up after the departure of the collection vehicle, and any further materials will have to be piled up in the open. Smoke marks from burning can also be seen on the surrounding walls.

Full containers are emptied mechanically into the loading hopper of a vehicle. The refuse is compressed by means of a compacting plate or screw device into the loading space of the vehicle. The waste then goes by a one or two stage transportation system to sites for recycling or disposal. The one-stage route goes directly from the communal waste collection points to the municipal landfill site. The two-stage route involves transportation of waste through a transfer station where wastes are loaded onto smaller capacity vehicles into larger ones to the landfill site. Trucks with a capacity of 15m³ are used for collection and transportation of waste to the transfer station; vehicles of 40m³ capacity transport waste from the transfer station to the municipal landfill site. After collection at the transfer station, wastes are transported to facilities for recycling or disposal. It should be noted, however, that in practice a significant quantity of the waste goes to illegal dump sites.

Until 1992, MSW in Almaty was handled by a special enterprise that collected and processed waste and was part of the State Joint-Stock Company (JSC) Bgobastvo. The task was subsequently taken over by JSC Zhitishkomhimehnozastro, which was reorganised in 1997. Private firms have also been set up for MSW collection; at present, 15 different organisations carry out collection and transportation of waste to the transfer station and landfill site by agreement with individual enterprises, including, in some cases, with the newly-formed housing co-operatives which have been created by inhabitants of the previously state-owned apartments. Organisations that do not have an agreement with an appropriate service organisation transport their waste themselves.
day, there are no special structures of the type required for a typical sanitary landfill.

The capacity of the transfer station is 500,000 m³ of MSW rehandling per year, and it can receive 2,000 m³ of waste per day. Periodically, however, the regulations for operation of the transfer station are broken and the volume of incoming waste exceeds the outgoing volume. For example, in April 1998, 2,340 m³ of MSW was received every day, but only 1,716 m³ was taken out to the landfill site. In practice, it is never possible to make up these shortfalls and backlogs in removal, and the transfer station was, therefore, acting as an unlicensed dump site. The station is sited only 500 m from a residential area, and nearby houses suffer from smell and flies. There are no facilities for leachate collection, gas collection or emission control, and the wastes are not covered daily. The width of the buffer zone is from one-third to one-seventh of that required. The transfer station had lifting equipment for loading waste into vehicles, compacting waste and also for processing received wastes, such as shredding and working. This equipment worked until about 1990 but is now seriously in need of renovation.

Since 1983, waste has gone to the municipal landfill site located 34 km from the city. About 4, 685 300 tonnes of solid waste were stored at the landfill in the period from 1987 to 1995. The site lacks facilities and good operation, and while the original design included lining materials and compaction of the waste, these plans were not realised. With no liner and no leachate collection system, the site operates in violation of regulations.

The landfill is not divided into cells, and wastes are not compacted or covered with clean soil. The quantity of vehicles and plant operating at the site is insufficient and an auxiliary working area planned for was not constructed. Weighing facilities were not even included in the original design, and there is no monitoring or measurement of incoming waste. Each enterprise disposes of its own waste and in addition to municipal waste, the site also receives industrial and toxic waste. There is no control on the dumping of wastes, and epidemiological regulations are not observed. In reality, the landfill is simply a dump site and a potential source of environmental contamination.

The municipal landfill site is the only official waste disposal site but most of the city's waste goes to illegal dump sites. More than 10 illegal dump sites were recorded in Almaty at the beginning of 1999, although the periodic purges by the city authorities have reduced the number from previous years. In the first half of 1998 it is estimated that the volume of MSW disposed of at the municipal landfill site and transfer station decreased in comparison with 1997 by 46.5% and 4.7% respectively and in total by 27.2%. Around 47% and 62% of waste in 1997 and 1998 respectively was disposed of at illegal dump sites in the city. As a result, the amount of waste disposed of at Vtorma for recycling. Most of the waste that goes to Vtorma is secondary raw material. However, recycling of secondary material at the company has decreased from year to year; by 1996 the volume had reduced by a factor of seven in comparison with 1999. At present, only lamps containing mercury are recycled and neutralised by Synap and Amalgam.
Efforts to resolve MSW problems

The problems of the transfer station, the processing plant and MSW have been considered in a number of documents. The Resolution of the Akim (Mayor) of Almaty No. 375 of 1 September 1992 was concerned with environmental questions in the Dordzhik and Aimbabulak residential areas close to the dump sites. In particular, it dealt with compost quality, opportunities for compost use, its impact on the environment, and restoration of the compost area and transfer station.

The Resolution of the Ministry of Ecology and Biological Resources No. 11 of 25 March 1993, ‘On the environmental situation of Almaty and measures for its improvement, was concerned with changing the location of the transfer station from a residential area, elimination of the dump site, control of transportation of all MSW to the municipal landfill, and the introduction of a three-phase method of MSW digestion with biogas production.

On 11 August 1993, the Cabinet of Ministers of the Republic of Kazakhstan No. 11184 of 25 November 1993 on improvement of Almaty's environmental situation and the Resolution of the Akim of Almaty No. 68 of 14 February 1994, ‘On measures for improvement of the environmental situation in Almaty', referred particularly to municipal waste and the necessity of moving the transfer station. However, none of these resolutions were implemented.

In July 1998, after a vigorous campaign by members of the public, deputies and environmental organisations such as Green Salvation, documents concerning the closure of the transfer station and restoration of the territory were prepared. A Resolution of the Akim of Almaty of 17 June 1998 and a Protocol of Resolution of 18 June 1998 provided for the elimination of the dump site and improvement of operation of the transfer station. At present, a small area of the site is used for reception, reloading and transport of MSW, and all the waste received is removed on the same day. Figure 4 shows a picture of the area of the site that is still working. The rest of the dump on the transfer station area site has been cleared up.

Future plans

There are currently many opinions and initiatives to provide solutions to the problem of MSW, but little consensus on which of them is best for Almaty. For example, the construction of an incineration plant has been suggested, but there is considerable opposition to this idea, both from residents and the public because of Almaty’s existing air pollution problems. The city is subject to temperature inversions that trap air emissions; an estimated 170,000 tonnes of harmful substances are emitted per year and air pollution exceeds standards by a factor of 2.5. From a practical viewpoint, in a country with vast reserves of space but relatively limited ones of foreign currency, it may not be the favoured option, unless it could provide power and heat to the city’s district heating systems.

Environmental groups have also been active in proposing solutions. The Green Salvation group suggests separate collection and recycling of municipal waste by means of mini-reprocessing technologies. At present, the option of constructing one large-capacity processing plant for the whole of Almaty does not appear feasible. Further, it is difficult to find financing for large-scale plants. Secondly, it is hard to provide such plants with sufficient amounts of raw material, and thirdly, material prices are extremely unstable. These conditions can be more easily met by small-scale plants, however, which could be constructed at industrial enterprises, schools, etc. Green Salvation is currently investing technology for small-scale MSW recycling.

The Tabigat environmental group also suggests separate collection of MSW. The prominent geologist and environmentalist A. Ratsko recommends waste management for Almaty and the Almaty region based on solid digestion of municipal waste, with the provision of appropriate protection to prevent the spread of toxic substances beyond the boundaries of the landfill site. Wastes are compacted and covered with layers of clay and are degraded by the activity of microorganisms over a cycle of 20 years. The biogas produced during the degradation process could be used as fuel in a turbine. The energy produced in this way could be used in large urban areas.

The study will thus require a one-year study. The Japan International Co-operation Agency, the official agency responsible for carrying out technical co-operation programmes, is undertaking the study in conjunction with the local and national government bodies including the Ministry of Natural Resources and Environmental Protection, Almaty City Environment Department, Almaty Akmait (municipal administration), and the City Fund for Environmental Protection.

The purposes of the study are design of a general plan for improvement of solid waste management in Almaty up to 2010; a feasibility study for priority projects chosen from the general plan; and transfer of technology to the Kazakhstan. The study is looking at planning and investigation of MSW management. The main issues that will be decided in the general plan are the share of responsibility of state and private sectors in the sphere of waste management; prevention of environmental contamination by waste disposal and recycling facilities; and strengthening of the financial basis for waste management.

The study will look at the administrative territory of Almaty and its suburbs where MSW facilities used by the city are situated. The Akim of Almaty has also produced a plan for environmental improvement of the city, which includes sections on waste management and initiatives for clean technology and encouragement of small businesses in recycling and waste minimisation (see Table 2).

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