

REVIEW ARTICLE

Residues Management Environmental Proper Behaviors Training at Schools

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ABSTRACT

The residue materials management process is a multidimensional issue at the country that in addition to its effective rule in economic cycle, it is also declared as one of the important development scales at macro-level. Today in residue management and to protect natural resources, there should be special attention to the recycling status and reusing in management system specifically. Recycling and reuse of natural mines and resources will reduce exceeded and pollutant emission in environment, also it will have the environmental protection and sanitary level enhancement and economical saving in following. Because schools are one of the pollutant source in living environment and producer of residues it is possible to train recycling principals and residue management main techniques as one of the important environmental proper behaviors theoretically and practically to students and schools agents. Correct performance of different residues management at school level will involve them practically with different residues reduction process quality, gathering, transferring, distinction, burying and recycling and by making environmental culture will fund protecting main skills and avoid continuous environmental destruction in new generation.

Key terms: natural sources, residue management, living environment, school, training

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INTRODUCTION

Recent century upheavals accompanied with population and technological progress and human tendency to increase consumable material and as the result increase of solid wastes material are as issues that has made great crisis in human societies.

The solid waste materials pollution and trashes in cities and industrial accumulation centers are as the scientific and operational attention of experts in world which has been focused to correct recycling and general recycle of this material [18].

Recycling is the process during which materials are gathered and separated as crude materials for production of new products, [14]. According to scientific sources available about recycling, after the trash producing reduction rate are put as the highest step of trash materials management because the recycling not only save the environment from pollution danger rather it has too many economical benefits.

Up to now many different techniques in different countries are presented for increase of waste materials recycling system. The quality and quantity composition of trash has important role in solid trash management strategies edition. Wastes distinction as one of the economical principal in every program has been issued. As this process is closer to the trash producing time point, the recycling operation will have more economical benefit and quality and quantity progress [22]. Students and schools authorities' cooperation in distinction from the school and separation of wet and dry wastes will avoid solid wasted contamination and providing reuse of their sanitary recycling. On the other hand training and increase of students 'general awareness about the consumption model variation and making living environment culture about trash producing reduction will play significant and vital rule in residue management.

Evaluation method: studies and information gathering has been done through library, using computer and reviewing articles.

RESIDUE (WASTE MATERIAL)

According to article B, clause 2 of residue management law verified in 1383 at Islamic parliament, it is referred to solid and liquid and gas materials except wastewater which directly or indirectly has been made by human activity and it is regarded as waste from the producer view. Residues are divided to five groups:

1-general residues: it is called to all residues which are made usually by the human daily activities in cities, villages and out of them like home trashed and building futile, 1.

2- Medical residues (hospitals): it is referred to all infected residues and harmful materials from hospitals and treating centers and medical realization laboratories and other similar centers. Other dangerous residues from hospitals are not included in this definition.

3- Special residues: it is called to residues that due to high capacity of at least one of dangerous features like poisoning, illness infecting, exploding or igniting, acid specification and similar features requires special protection.

1-according to article 4 and clause 2 of residue management role verified in 1383, sludge made by wastewater treatment in cities and house wastewater wells extracting if they are dry or with low humidity, will categorize as the typical residues

And those residues in medical section and also a part of typical residues in industrial, agricultural section which requires special management are considered as special residues.

4- Agricultural residues: it is referred to residues made by agricultural activities as excreta and corpse of animal, fish and poultry and rotting or inconsumable products.

5- Industrial residues: it is called to all residues due to mining and industrial activities and refineries residues like gas industries, petrochemical and power plants and similar cases like sludge, futile and exceeded materials in industries.

Schools residues includes food wastes, paper and carton, metal can and glass, plastic and disposable containers, electrical and laboratorial wastes, these residues are pit in special and typical residues.

RECYCLING

According to article 3 of residues management law operational regulation verified in 1384, it is the process of changing residues to material or consumable energy. In other word recycling is the process during which material are gathered and separated and then they are applied as the gathering and distinction of crude materials for more products production. The most important concept in residue management is recycling and it avoids beneficial resources waist and prevent national treasure lost. Crude material consumption reduces energy consumption.

The first step in recycling of residues is separation of them. In order to separate, two types of methods are used which are known as distinction from the source and from distinction. Separation from the source in street and city and shops and schools is performed through distinction by material type and kind of residues. In this method in addition to avoid losing national treasures, the society sanitary is also obeyed. In distinction at distinction, special location has been regarded for material recycling. In recycling center residues are divided in to recyclable material and unrecyclable materials. Many of stores and factories waste materials like cans, glasses and newspapers are bought in order to recycle from customer.

The paper recycling importance at schools

Paper as one of the strategic products has great portion in official centers trashed and also schools and training centers, also home trashes are regarded the same and it is known as the wastes king [2].

In the twentieth century in many of world countries due to different reasons as cellulose source limitation and daily increasing consumption of paper products, environmental problems and high cost of paper production and cartoons from crude cellulose materials and high cost of energy and etc. the use of waste paper recycling has been taken in to consideration seriously as European union has emphasized on the paper reuse and recycling rather than burying them. Because in Iran about 10.9 % of city trashes are made of papers and cartoons 12 and according to consideration of paper as solid corroded material and compostable, recyclable trash in the country, we can understand the high potentiality of these materials recycling in the country. On the other hand the paper recycling has special importance as strategic valuable product in our country.

1- Reduction in need for wood paste and cutting trees and protecting natural sources, the pastes obtained from recycling paper is considered as assistance for production of 1.5 million tons of paper and cartoon in country. Also recycling yarns plays important role as substitution for paper paste in paper

producing industry to the point in modern era many of countries around the world the paper industry could not exist without the recycled yarns, 19. According to performed researches in Iran only by 25% of paper and cartoon available in solid waste materials in the country we can provide 100 thousands of recycled paper. This activity means the life continuity of 1700000 trees [14].

2- Energy consumption reduction: factories that use recycled papers consume 40% less energy compared to factories that use new wood trunks for paper production, for producing 1 tons of paper from new trunks about 20 Giga joule energy required.

3- Waste water production reducing due to water consumption decrease: to produce one ton of paper from new trunk about 300000 liters of water required that reduces to 60 % if recycled paper is used.

4- Environmental pollution reduction: waste paper has been used for some plastic wooden structures and about this case we can use recycled plastic and for both cases it reduces the environmental pollution [1]. Burying paper will produce bio gas at burying location that contains methane (greenhouse gas) and it is linked to global warming.

5- chemical materials consumption reduction: to produce one ton of paper from new trunk about 130 kilo grams of calcium carbonates , 85 kilo grams of sulfurous and 40 kilo grams of chlorine is needed which is really rear for production of recycling paper.

6- Making trashes

7- Protecting treasure (avoid importing and making outcome obtained from recycling materials).

8- Waste volume reduction and relatively its effects on other residue management steps as reduction of collecting costs, transportation and burying wastes [15, 12].

In order to achieve the process of paper recycling properly at our country economically and in environmental sanitation and great part of waste paper is not combined with other trashes and don't lose its recyclability feature, 10. The most practical and economical and the healthiest method is the paper distinction from the source. Because recyclable paper in schools and training centers are mainly contains books and notebooks and published papers and official corresponding documents and cartoons in packing and handkerchiefs, 16, so by collecting and distinction in the source and paper recycling by students in schools in addition to make responsibility sense and energy saving strengthening, it leads to changing society consumption model variation.

WOODEN WASTES IN SCHOOLS AND ITS ENVIRONMENTAL IMPORTANCE

Wood is the natural product which has been used by human from ancient time and wooden products in schools include table and chairs, dresser and doors. These products based on the consuming material, will lose their practicality due to weaknesses made by lack of product quality consideration, the location and the consumption quality after time passage from service condition and they are expelled as the wooden wastes materials. Because wooden wastes in our country has high amount and some statistics declares that about 5 million cub meter of wood is consumed in country that about 1 million cube meter is provided by importing and from other hand Iran is the country that is covered about 7.5% by jungles (that is why it is regarded as country with wooden low coverage), if we could reduce the wastes and increase the wood factories production quality and also reduce wooden wastes recycling, the outcome will increase to 25 % and there will be no need for wood importing [7].

Therefore if the wooden recycled materials are returned to production cycle, the benefits and advantage are obtained as below:

1- Avoiding national treasure lost as jungle, energy and etc.

2- Saving in primary material consumption and protecting natural source for future generation

3- Avoiding environmental pollution for making products from primary Materials.

4- Reducing pollution materials entrance to environment as trash

5- Reducton of need to waste burying location

6- Consuming model correction

7- Making new jobs in collecting workshop establishment, selling and buying, distribution and application of recycled wooden products (wooden trashes to produce MDF, mulch production and plants fertilizers, fuel, plastic wood composition and etc.) [4, 21].

4- It is used as the soil cover and for sands flowing prevention

5- WPC is made through composition of different types of heat flexible polymers and wood dust or other yarns. These materials are similar to wood and they are used in most of applications instead of wood and production made of woods, low humidity absorption, enough resistance for oxidization and proper resistance toward insects and termites penetration and low weight and longevity, low extension and expansion, proper physical features and resistance to sunlight and proper thermal insulator in home structure are the important benefits in plastic-wooden structures also it seems that these type of

material could solve plastic wastes in all points of country, these products have high consumption to make windows and cars and home tools and different water structures.

6- Polyethylene is the branch of waste plastic material which are irrevocable in nature and known as PET and these are the polystyrene family.

7-according to polymers recyclability feature we can reuse the plastic materials after consumption during the recycling process.

8-thermoplastics are deformed by temperature and they are melted in expression these types of materials have capability to be recycled and change to secondary products.

8- Protecting treasure and sources through avoiding importing and making outcome made from recycled materials [1].

A main obstacle in wood waste recycling is separation of wood from other trashes and wastes, performing the distinction plan from the source at school will avoid wooden wastes pollution by separation of wet and dry trashes and it provides the field for recycling and wooden wastes recycling.

Schools wastes recycling and economical saving

At present time plastic materials due to their exclusive features as lightness, flexibility and strength and high resistance to chemical factors and many different specifications, they have found wide application. By fast distribution of petrochemical industry in Iran, vast scale of different materials is produced in these industries which are increased by plastic material production enhancement with few rates.

In producing different plastic dishes different polymer materials are used, for example water bottle are made by polyethylene terephthalate [6], dairy containers made by polyethylene PE, polypropylene, PP and polystyrene PS, and disposable dishes are made by PP and PS and plastic bags from PE which are wrongly known as nylon.

Because burying is not proper method for plastic wastes and it remains with no destruction for a while and leads to pollution in environment, at present time to solve plastic trashes two recycling methods are used. Plastic waste recycling in addition to protect environment is economical and by efficient use of mentioned materials and making job is significant.

The important issue in plastic waste recycling is collecting and separation of them. Plastic wastes collecting depends on geographical, economical, social and dominant regulation condition of country, generally in our country plastic materials in addition to other solid materials as glass, iron, paper and cartoon are collected. Then solid wastes are taken to recycling location, different plastics are separated, one from their identity and other from the sensitivity toward temperature, one type is from the thermoplastic type like polyethylene bottles, polypropylene parts and glass containers, transparent glass dishes and colorful type are separated from each other. The thermo set type is the plastic types that are not change to paste as melamine dishes, electrical switches and etc. recycling these types of plastics is on a way that after separation operation, crashing, washing and drying is grinded and used as strengthening in plastic production. Other type of plastic separation is distinction based on color, as plastics with yellow, blue, red, white and colorless plastics are separated. If colorful polymers which don't have similar color are separated, the outcome will be dark so factories to obtain fix color add carbon and finally the black trash plastic is made. As more sanitary the plastic waste collecting is the final products purity degree obtained from recycling has better quality.

According to mentioned materials because schools are one of the main source of producing wastes, the distinction plan from source and separation of plastic material from other wet and dry wastes in addition to economical saving will provide the sanitary recycling field for these materials.

Schools glass waste recycling importance in environmental pollution reduction

Glass is a solid tough material which is obtained from mineral materials and cooling in special condition, by presence of organic materials in glass its quality is affected. Mineral materials include calcium, sodium carbonate and calcium carbonate, crashed glass in addition to other subsidiary materials as oxidizing materials and coloring, clarifying, reviving, matting, bleaching, flux which are used in glass manufacturing [5].

Primary sources in glass industry usually are provided from nonrenewable sources with long renewing time as calcium, calcium oxide so we can make the expanding process of glass recycling industry balanced[6]. Also glass recycling leads to energy saving, saving in costs and space required for burying, reduction of environmental pollution as air pollution, water contamination, mineral pollution and greenhouse gas exhausting and also making trashes, increasing cooperation and environmental awareness, in addition to these cases, glass recycling is usually simple and cheap and could be used frequently without smallest change in its quality.

The products made from recycled glasses are used in below items:

1- Preparation of a kind of asphalt that contains glass grids and used in road making

- 2- Production of tiles and clay bricks, façade stone and also in cement and plastic composition, glass polymers and isolators.
- 3- Reflecting signs in roads
- 4- Fiberglass isolator
- 5- Telephone girder and post protection.
- 6- Artificial sand preparation to reconstruction and correction of beach soil
- 7- Fiberglass
- 8- Abrasive like polishers

In the distinction from source plan, glass is separated from dry trashes then dry trashes are recycled and transferred then glass wastes are separated and sold to glass recycling factories that in addition to reduction of cost, the recycling cost is considered from the sanitary point of view[17].

Schools chemical laboratory residues

Materials and laboratory tools are categorized to corroding material, oxidizing materials and materials activated by water and igniting materials and exploding and poisoning Materials. The residues from these chemicals are a group of materials which are not ignored simply.

Because avoidance from trash production is much easier than its management after its production, correct training about chemical materials are trained to students at laboratory to use all materials and equipment efficiently. Supervisor during their experimentation also should be familiar about dangers and methods of removing these residues and they are charged to remove residues. These supervisors collect and extract these residues frequently from the laboratory area and in proper containers and expel them out. For example plastics from chemical resistance to soluble and glass dishes are used for mineral acids. Separate baskets with door should be used and put in laboratory for broken glasses and igniting materials like paper and clothes which are used for cleaning igniting liquids. Solid none-harmful trashes are dropped in to baskets while poisoning solids are packed in plastic bags and put in separate basket and both baskets should be labeled accurately. Waste soluble liquids should be poured in to proper dishes and labeled exactly. Halogen soluble should keep separately from other soluble. Purifying phosphoric and sulfuric materials by cleaning detergents and washing liquids should be done by water or ethanol before organ lithium residues treatment. Under no condition trashes which are not treated and insolvable soluble should not poured to dish washing sink. Destroying igniting materials and their empty containers should be done by high accuracy and cooling the residues, materials with low activation should be diluted in an ineffective soluble like hexane and put its container in the ice bath and add cool water drop by drop. Material with high activation: diluted soluble is added slowly to the dry ice and by adding a material with save activation with igniting material and also it is not frozen in dry ice or heavy metal ions which are not poured in wastewater channel could be poured in a large vaporizing container and put under the hood to be vaporized.

Electrical and Electronic Wastes in School and Their Environmental Danger

Technological progress in electronic industries which began development from 1980 has increased the electronics equipments sale. The beneficial life of these equipments is partly low and this time is reduced according to the technological fast variation and continuous variation in collection and parts specification is reducing continuously. The result of this phenomenon is increase of electronic wastes, therefore electronic wastes are assumed as unusable collection, broken or irreparable as television, CPU and monitors with flat screens and cathode ray, laptop, scanner, phone, video and etc. and their wire collection which are considered in two main blow cases:

- 1- Poisoning material entrance to civil waste flow which could bring harmful results for human health and environment. Poisoning material as lead, mercury and 6 capacity chrome in cathode ray tubes, electrical boards, capacitors, batteries, liquid crystal screens, copy machines also contains such poison materials, these wastes also contain poison material as lead, cadmium in boards and lead oxidation and cadmium in monitors cathode rays, mercury in switches and flat screens, cadmium in batteries, polycarbonates in older capacitor and transformers. Brominates in electrical boars and plastic covers, polyvinyl chloride in cables.
- 2- Financial sources lost: in addition to poison material these poisoning materials contain other valuable materials as gold, platinum, palladium, copper and silver that is recycled is done, proper economical opportunities is provided that depends to electrical waste and the material percentage changes.

That is why by burning or burying electrical wastes main problems is made in environment, burying wastes causes release of poison material to underground waters, also burning these materials will emit oxides and poisonous gas toair. Material proper recycling (use of modern technical science and best technologies) of electrical waste in addition to direct effect on material source saving, has

influences portion in greenhouse gas reduction. Producing precious materials specially valuable metals used for excavation in mines, mentioned processes with high energy consumption due to low density of these metals in mine stone which itself is assumed as CO₂ gas emission. If materials and metals wastes from electrical wastes like computer are not performed correctly, it only needs some percentage of energy consumption for metal excavation from mine stone. On the other hand electrical waste correct recycling assist environmental condition improvement and avoiding ozone layer destruction and earth warming due to HCFCs and CFC gases emission.

If there is no control or incorrect management in electronic wastes or improper process of recycling due to high cost of recycling and lack of developed technologies, three main dangers caused by poisoning materials emission, will threaten the environment and safety.

First threat: poisoning materials available in wastes as lead, mercury, arsenic polychlorinated biphenyls and etc.

Second threat: dangerous reaction products exist in electrical product during incorrect operation as producing dioxin or eruption during melting plastics accompanied with fire prohibiting halogens

Third threat: dangerous material emission that are used during recycling, for example Siyanda or other washing referral, mercury for amalgamation of gold, releasing them for transportation and improper operation, 24. That is why recycling industry also could have serious dangers from environmental aspects and professional matters. Because in our country still there is no program in recycling field for electrical materials specially for poisoning materials exist in hardware. Electrical waste recycling cost also is more than throwing them away. By reuse of these equipments and deliver them to training centers we can have more proper optimized application from these equipments.

Residue management in school:

Because a part of city waste contains school trashes, it is significant to pay attention to materials recycling from these trashes in addition to economical and environmental aspect, and influential in making responsibility sense and saving feeling in students and making positive view in trashes application and providing motivation to clean the environment.

Recycling and separation from the source has important role in residue management; therefore it is necessary that first the residue management conceptual planning is performed at schools and then recycling programs is prepared at school. For residue management conceptual planning below items should be obeyed:

- 1- According to high costs of residue management system, specially burying in sanitary condition, it is necessary to regard residue management system in order to avoid facing with service presentation problems.
- 2- In regional residue management system it is possible to apply none governmental department to establish recycling industry, also government support them by avoiding taking tax to improve recycling.
- 3- Application of municipalities and village authorities[8].

Reside management environmental proper behaviors training suggestive programs:

- 1- Increasing students' general information level: the aim of environmental training purpose is informing environmental information of each individual as to realize the environmental values and take afford in protecting them and support them by deep contemplation in environmental processes. Training system in their plans should pay attention to this issue to protect environment. Therefore inserting concepts related to environment in different educational column leads that students from the beginning and at the time of personality formation consider environmental protection not only as a lesson rather as a duty and human responsibility [9].
- 2- Changing consumption habit in students: increasing consumption means increase of waste and environmental pollution, if students are trained that what effect production of each kilograms of waste has on environment and society sanitation and what expenses are spent and by proper training to them, the correct consumption model is popularized and gradually many of problems due to pollutant entrance to environment is solved. Because students are considered as a member of society and future generation culture making and they could have important role in consumption model variation and as the result reduction of pollution [11].
- 3- Shaping encouraging motivation: preparation of catalogue and advertising brochure and holding painting game and newspaper writing by subject of environmental protection and country national treasure saving at school. Also according to this matter, the main part of school recyclable residues are papers and cartoons, in order to encourage students in separation from source plan by holding

periodic recycling festivals in schools and presenting gifts for cooperation of students , they also receive the stationary discount draft.

- 4- Provoking schools to cooperate with municipalities systems and recycling system and correspondences with recycling system and ordering students visits from this organization to observe paper recycling process.
- 5- Training talents in schools and proper training of students about recyclable materials and separation from source plan informing n media, TV, radio and magazine and social science trainers who are trained in schools and proceed to teach students which leads to transfer those concepts to family and others.
- 6- Strengthening facilities and separation from source plan necessities at School: for example specifying the trash type on the dry residue separation baskets which hare verified at school and reducing the time distance to collect recyclable material from school [20, 23, 24].

CONCLUSION

Training and teaching in safety condition is one of the individual and social definite rights. In school teaching and training students is fulfilled and their mental and social personality is formed, the environmental sanitary general principals like preparing drinking water, removing wastewater and trashes, providing heat, light and proper ventilation and fighting with insects and rodents at school are the sanitary training environments requirements.

According to environmental proper behaviors training for residue management at schools in addition to economical saving, it has significance in making responsibility sense and saving feeling in students and forming positive view in trash application and making motivation to clean the environment. To improve sanitation condition in training environments frequently there should be attempts to program priorities and residue management authorities in country should edit a complete program and provide instruction in collecting and recycling waste materials in schools and organizations. Municipalities recycling organization is the only system that invested in this section and by using other countries experiences in culture making and informing about the national treasure losing to students who are the country future makers, could perform sensitive role.

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