NSWAI

News Letter

NATIONAL SOLID WASTE ASSOCIATION OF INDIA

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FROM THE PRESIDENT'S DESK

On behalf of NSWAI and my personal behalf best wishes for the year 2003. I am thankful to the General Body of our members for re-electing me to the Managing Committee and members of the Managing Committee for electing me as President of the Association. Our Founder President Mr. R. K. Garg has in the last six years brought glory and prestige to NSWAI. Through his stature and contribution, our Association has been recognized by MoEF (Ministry of Environment & Forest), Govt. of India and ISWA (International Solid Waste Association), as the principal professional body and consulting partner NGO in respect of solid waste. Therefore, it is no surprise that the prestigious project of data base web site for municipal solid waste in India, a ENVIS Project has been assigned to NSWAI. We owe our gratitude to Mr. Garg and place it on record. You would be happy to learn that his continued guidance is available to us as Emeritus President. He will also be a spokesperson of NSWAI at Second Round Table on Hazardous Waste Rules to be held on Feb. 01, 2003 at M.C. Ghia Hall, jointly organised by NSWAI and Indian Environmental Association.

M. C. Badarinarayana

DISPOSAL OPTIONS OF USED/SCRAP TYRES AND TUBES

1. Introduction

Rubber is produced from natural or synthetic sources. Synthetic rubbers are produced from unsaturated hydrocarbons. The process of vulcanisation improves the property of rubber. It gives increased strength, elasticity, and resistance to heat, electricity, chemical action and abrasion. Vulcanised rubber also exhibits frictional properties highly desired for pneumatic tyre application. Major uses for vulcanised rubber are vehicle tyres and conveyor belts, shock absorbers and anti-vibration mountings, pipes and hoses etc. These materials are required to be replaced after end of life (EOL)*. These waste materials can be reclaimed and recycled/reused.

In developing countries, the reclamation and reuse of scrap tyres is an important aspect because waste rubber needs to be taken care of from economical as well as environmental consideration. According to a presentation made at the Tire Technology Conference, Cannes, France in Jan., 2001, there is almost complete reclamation of the material from used*/end of life tyres, in India. Reclamation of tyre materials-rubber, plastic, nylon strips, nylon flakes and bead wire employs some 250,000 people, mostly in villages and generates GDP of the order of US $ 375 million. About 90% of the material reclaimed is used in a wide variety of products, such as retreads, shoe soles, fabric ropes, animal harness and wire cages. Most of the remainder is used as fuel in village industries or brick kilns. India generates less than half the scrap per million kilometres of tyre used as compared to America. Unlike in the developed countries, in India, reclaimed rubber makes a significant contribution to overall rubber consumption. In the year 2001-02, an estimated consumption of major raw materials accounting to more than 75% cost of total raw materials was natural rubber 304,400 tonnes, nylon tyre cord fabric 65,200 tonnes, carbon black 167,400 tonnes, rubber chemicals 16,000 tonnes, and butyl rubber 24,500 tonnes. Tyre production in India in the year 1999-00, 2000-01 and 2001-02 was 414.13, 424.71 and 435.14 lakhs respectively.

Used tyres are a major problem in North America and Europe where EOL tyres, until recently, were either buried with other industrial waste in land fill sites or stock piled in huge dumps that could easily contain millions of tyres. Tyre dumps, besides being unsightly, are responsible for a number of serious fires in the USA where dumps burned out of control for several weeks causing ground and water pollution.

* Used tyres/ EOL tyres are those tyres which have completed their functional life and can not be used for fitment in any automobile.

2. Reclamation and Reuse of Scrap Tyres

There is a thin line of distinction between the terms recycling and reclaiming. The term 'recycling' is a broader one encompassing any form of reuse of waste rubber, prominent among them being grinding of vulcanised rubber waste either by cryogenic or ambient grinding process. 'Reclaiming' is a process of de-polymerisation, wherein vulcanised waste rubber is ground, then treated with application of heat, chemicals and is then intensely worked mechanically. Reclaimed rubber though may not have properties comparable to virgin rubber, it still has tremendous opportunities in tyre and non-tyre rubber products. Reclaimed rubber is a unique material offering advantages such as a price stable alternative rubber hydrocarbon and a process aid ensuring shorter mixing times and enabling higher productivity. It also acts as an agent for savings in energy and cost. Reclaimed rubber has already established its worth and versatility as seen by its use in products like automobile tyres,

butyl tubes, cycle tyres and tubes, battery containers, tread rubber, belts and hoses, moulded and extruded products etc.

The proportion of natural and synthetic rubber used for tyre manufacture depends on the application of the particular tyre.

	Truck tyre tread (in %)	Passenger vehicle tyre tread (in %)
Mineral oil	13	20-24
Carbon black	30	33-37
Rubber	57	40-45
of which,		
Natural rubber	65	25
BR & SBR	35	75

2.1 Why reclaim or recycle rubber?

Rubber recovery can be a difficult process. There are many reasons, however, why rubber should be reclaimed or recovered;

1. Recovered rubber can cost half that of natural or synthetic rubber.
2. Recovered rubber has some properties that are better than those of virgin rubber.
3. Producing rubber from reclaim requires less energy in the total production process than does virgin material.
4. It is an excellent way to dispose of unwanted rubber products, which is often difficult.
5. It conserves non-renewable petroleum products, which are used to produce synthetic rubbers.
6. Recycling activities can generate work in developing countries.
7. Many useful products are derived from reused tyres and other rubber products.
8. If tyres are incinerated to reclaim embodied energy then they can yield substantial quantities of useful power. In Australia, some cement factories use waste tyres as a fuel source.

2.2 Tyre reuse and recovery in developing countries

In many developing countries, there is a large wastage of rubber tyres although there is an enormous potential for reclamation and reuse of rubber tyres. The aim of this brief is to give some ideas for what can be done with this valuable resource. Whether rubber tyres are reused, reprocessed or hand crafted into new products, the end result is that there is less waste and less environmental degradation as a result. In developing countries, there is a culture of reuse and recycling. Waste collectors roam residential areas in large towns and cities in search of reusable articles. Some of the products that result from the reprocessing of waste are particularly impressive and the levels of skill and ingenuity are high. The process of tyre collection and reuse is a task carried out primarily by the informal sector. Tyres are seen as being too valuable to enter the waste stream and are collected and put to use.

2.3 Recovery Alternatives

There are many ways in which tyres and inner tubes can be reused or reclaimed. The waste management hierarchy dictates that re-use, recycling and energy recovery, in that order, are superior to disposal and waste management options. Kind of Recovery and Recovery processes are:

Product reuse and repair: retreading; and regrooving.
Physical reuse: use as weight; use of form; use of properties; and use of volume.
Material reuse: physical tearing apart; cutting; and processing to crumb.
Chemical and thermal recovery: reclamation; pyrolysis; and combustion.
Energy reuse: incineration.

2.3.1 Product reuse

Damaged tyres are, more often than not, repaired. Tubes can be patched and tyres can be repaired by one of a number of methods. The use of retread tyres saves valuable energy and resources. A new tyre requires 23L of crude oil equivalent for raw materials and 9L for process energy compared with 7L and 2L respectively for re-treading. Tyres of passenger vehicles can generally be re-treaded only once while truck and bus tyres can be re-treaded up to six times. Re-treading is a well established and acceptable (in safety terms) practice. The process involves the removal of the remaining tread and the application and vulcanisation of a new tread. Secondary reuse of whole tyres is the next step in the waste management hierarchy. Tyres are often put to use because of their shape, weight, form or volume. Some examples of secondary use in industrialised countries include use for erosion control, as tree guards, in artificial reefs, fences or as garden decoration. In developing countries wells can be lined with old tyres, docks are often lined with old tyres which act as shock absorbers, and similarly crash barriers can be constructed from old tyres. Old inner tubes also have many uses; swimming aids and water containers being two simple examples.

2.3.2 Use of Waste Tyres as Waste Containers

Old truck tyres can be converted into garbage bins and other utility articles using simple technology. Multi-ply truck tyres are stripped of their tread by a hand or electrically powered machine that can be manufactured at the village level from materials that are readily available. The heavy sheet of rubber remaining (the casing) is cut and shaped appropriately to make utility articles. Conversion of old truck tyres into not only garbage bins but also various other utility articles such as benches, and shelves has been demonstrated by a team of technicians from Thailand who also made a presentation on the subject at a Seminar titled "Appropriate Technology for Sustainable Development" held on November 28, 2001 at All India Institute of Local Self Government, Mumbai.

This can be one of the ways to utilise the waste tyres and also replace plastic or wood in other products that can be made out of waste tyres and thus will have a positive effect on the environment. This would be a means of starting a new cottage industry by which poor and unemployed can earn modest amount of money without having to own many tools or production space around their houses. Women in the household can also do this making it easier for people to keep their surrounding free of trash.

2.3.3 Material re-use

It involves the material being broken down and reused for the production of a new product. In developing countries this hand reprocessing of rubber products to produce consumer goods is well established and the variety of products being made from reclaimed tyres and tubes is astonishing. The rubber used in tyres is a relatively easy material to reform by hand. It behaves in a similar manner as leather and has in fact replaced leather for a number of applications. The tools required for making products directly from tyre rubber are not expensive and are few in number. Shears, knives, tongs, hammers, etc., are all common tools found in the recyclers' workshop, along with a wide range of improvised tools for specialised applications. Shoes, sandals, buckets, motor vehicle parts, doormats, water containers, pots, plant pots dustbins and bicycles pedals are among the products manufactured. Another way in which physical reuse can be achieved is by reducing the tyre to a granular form and then reprocessing. This can be a costly process and there has to be a manufacturer willing to purchase the granules. Crumb rubber from the retreading process can be used in this way, as it is a good quality granulated rubber. Granulated rubber tends to be used for low-grade products such as automobile floor mats, shoe soles, rubber wheels for carts and barrows, etc., and can be added to asphalt for road construction, where it improves the properties of this material.

2.3.4 Chemical and thermal recovery

This type of recovery is not only lower in the waste management hierarchy, but is also a higher technology requiring sophisticated equipment. Chemical recovery is the process of heating waste rubber reclaim, treating it with chemicals and then processing the rubber mechanically. Reclamation processes are:

1. Acid reclamation - uses hot sulphuric acid to destroy the fabric incorporated in the tyre and heat treatment to render the scrap rubber sufficiently plastic to allow its use as a filler with batches of crude rubber.
2. Alkali recovery - Reclaimed rubber, treated by heating with alkali for 12 to 30 hours, can be used as an adulterant of crude rubber to lower the price of the finished article. The amounts of reclaimed rubber that are used depend on the quality of the article to be manufactured.
3. Pyrolysis - one form of thermal recovery is pyrolysis. This involves heating the tyre waste in the absence of oxygen which causes decomposition into gases and constituent parts. It is a technology which is still immature in the tyre-reprocessing field.

2.3.5 Energy recovery

Tyres consist of around 60% hydrocarbons, which is a store of energy that can be recovered by incineration. The heat produced can be used directly in processes such as cement making, or to raise steam for a variety of uses, including electricity generation. Again, this technology requires sophisticated plant and its application is limited when looking at small scale enterprise.

3.0 Landfill

Landfill is the final step in the waste management hierarchy. The landfill disposal of tyres, if properly managed, does not constitute an environmental problem. However, concerns about conserving resources and energy have seen an increasing opposition to land filling. Also, public sanitation and municipal waste management is often ineffective in developing countries and scrap tyres are often found littering the streets.

4.0 Used Tyres – Current policy provisions in India

1. Import of used tyres are permitted freely in the EXIM policy with effect from April 1997at a Government fixed floor price.
2. Used tyres can be imported freely if cif value is US $ 175 and above for truck and bus tyres and US $ 25 and above for passenger tyres(import duty of 30% is levied on such value).
3. Import of used rubber tyres and tubes as waste, parings and scrap of rubber, primarily for use as reclaimed rubber without cut in bead wire (for tyres) and not cut in two pieces (for tubes) is restricted.
4. Fixation of floor price and stipulation regarding cut in tyres/tubes, to a large extent, has discouraged large scale import of used tyres.

References:

1. Recycling of Rubber, Intermediate Technology Development Group
2. Personal Communication, Automotive Tyres Manufacturers Association

Annual General Body Meeting

The Annual General Body Meeting of the Association was held on 30 November, 2002. The new Executive Committee was elected. Members of the new Executive Committee are listed below.

Shri R. K. Garg - Emeritus President
Dr. M. C. Badarinarayana - President
Dr. Amiya Kumar Sahu - Vice President
Shri Ramdas Bhattacharya - General Secretary
Dr. Rakesh Kumar - Joint Secretary & Treasurer
Prof. H. Veeramani - Member
Dr. Indrani Chandrashekharan - Member
Shri D. R. Rasal - Member
Shri R. C. Rastogi - Member
Dr. M.V. M. Desai - Member
Shri P. S. Jayawant - Co-opted Member

ENVIS (Environmental Information System) Node

A Proposal to Ministry of Environment and Forests, New Delhi to set up ENVIS node for collection of data regarding the different components of solid waste management from major cities/towns/villages from various states of India was approved. The project generally envisages, collection of data on urban solid wastes through out the country, data feeding into the website and establish information service nationally and internationally.

Calendar of Events

1. Second Workshop 2003 on International Municipal Solid Waste Management and Treatment Technology, 26th June, 2003, China Association of Urban Environmental Sanitation, Room 410, A3 Sanlihe North Street, Xicheng District, Beijing -100045, China.
caues@public.bta.net.cn

2. ISWA 2003 World Congress in Melbourne, Australia, Ian Coles, Chief Executive Officer, Eco Recycle Victoria, Level 2, 478 Albert Street, East Melbourne 3002,AUSTRALIA.
icoles@ecorecycle.vic.gov.au; www.ecorecycle.vic.gov.au

Appeal for Membership

NSWAI was registered on 25 January 1996 under the Societies Registration Act 1860. The objectives and activities of the association are of scientific nature and include promotion of safety, health and environment, to create awareness and disseminate information on all aspects of solid waste management through seminars, workshops and publishing literature. We appeal to you to become member of the NSWAI to support the effort for creating a better environment for all.

Subscription Fee :

Admission fee	:	Rs. 100	US$ 10
Annual membership fee	:	Rs. 200	US$ 20
Life membership fee	:	Rs. 1000	US$ 100
Institutional membership fee	:	Rs. 5000	US$ 500

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Mr. R. C. Rastogi; Dr. (Mrs.) K. Lala; Dr. S. R. Male; and Mr. R. Bhattacharya.
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