





“MASUKO GROUP - MASUKO RECYCLING - GREEN CONCRETE PROJECT”

The new Hungarian patent is simple and requires only minor technological development for an innovation that provides utilization of waste in the cement industry. We are looking for partners in the utilization of patent rights regarding the technology.

Masuko Group is the sole patent right owner.

Masuko Ltd sells the patent usage right country by country - the inventor has majority ownership in the company.

About the patent:

The additive is mixed with cement to make possible using pre-sorted municipal waste in the production of a waterproof and fireproof concrete.

Almost any possible municipal waste which can be ground to the size of 10 mm can be used to produce concrete as of the patent, which is a new way for reusing waste.

The municipal waste replaces gravel in the concrete mix, which then has virtually the same physical characteristics as the previously known concrete products.

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During the research and development of lightweight concrete, I have begun to think about the reuse of other waste materials as well. This has led to successfully mixing (manual concrete mixer or industrial mixers alike) such materials with cement, which could not absorb water as of their material structure and thus cannot be mixed with cement in larger quantities via standard processes. As a result of the research, a large scale of concrete types has been created - they make part of a green construction product group with the patenting process at the Hungarian patent office starting at 8th May 2015 (P1500224).

As of today, I have sample materials containing the following wastes together or one by one:

- grained polifoam
- grained car tires
- grained wood, sawing waste, pine tree
- neutralized communal waste
(which is usually burned or put underground as of today's practices)

From the above, it can be seen, that the processes I have developed, contain the creation of concrete from all types of waste, which can be fine-grained to small particles. The final product can be imagined as sand and small rocks in conventional concrete with "waste" instead of sand and rocks. However, the concrete can contain much more "waste" proportionally. To simplify the definition, 1 m³ of concrete can contain on average 0.5-0.8 m³ of waste with maintaining its solid structure.

In *MASUKO Recycling* all types of grain sizes can be used from 0.1 - 100 mm diameter in which the grain size can be completely variable. Grain size can be different or the same as well in the same concrete material.

- grained car tires, where one may not remove the strengthening metal and fabrics from the tire

- all types of grained plastic waste, where potentially non plastic materials may not be removed

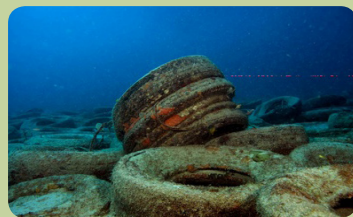
- all types of grained metal waste

- grained natural waste, pine leaves, reed, waste wood materials (non-reusable woods, such as railway basement woods)

- grained mixed waste, such as materials left from car waste

- grained textiles
- grained glass waste
- grained and neutralized communal waste.

During my experiments, I haven't found such materials that could not make exceptional concrete if the material can be fine-grained to small particles. Rubber grain, communal and other wastes can replace the currently used river-rocks in concrete at constructions of public roads, basements and other engineering constructions.



MASUKO Recycling's exceptionally widespread construction areas are the followings:

- basement of buildings
- concrete basement
- pedestrian ways
- basement of streets and highways
- protection walls
- sandwich panels
- agricultural and industrial stores, etc.

The usability of green concrete primarily depends on its durability. Durability is influenced by the physical qualities and quantities of the selected waste material, as the ready-made concrete contains large percentage of waste material (40-80%).

Due to the fact that the chosen waste material can be variable, durability may be controlled by the changing quantity of waste material.

The waste, that is ideal for green concrete production is available in large quantities, also it can be used for that purpose only resulting in a high margin.

EACH AND EVERY CONCRETE MADE WITH THIS TECHNOLOGY IS REUSABLE AS BASE MATERIAL, THUS RECYCLABLE!

* Official examination has been made so far only of polystyrene concrete. It gained „A2” -non burnable fire protection classification, which is the highest of the scale. Only materials that do not contain burnable parts can gain classification „A”. According to this measurement, other concrete types of other base material will gain „A2” classification in the worst case.



Fire-tightness test -*illustration*

Hoover gate, Colorado, USA -*illustration*



Water resistancy is essential for two reasons. On the one hand, the concrete does not take up water, on the other hand, due to the special added mixture nothing leaks out. Also, neither ground water, nor rain water can wash out anything.



Waste concrete
Each type of concrete is water- and firetight!*

Industrial waste concrete

Car Tires Concrete

Basement of streets and highways, pavement, noise insulated walls, supporting elements of sandwichpanels for polystirol buildings. In all areas where flexibility of concrete is a must. In all areas where concrete flexibility is essential.

Natural waste concrete

Passive XXIst century adobe house, agricultural buildings, warehouse, noise insulated walls. As a sandwichpanel coplete wall systeme can be produced, without additional supporting element.

Dross concrete

It can be used in place of conventional concrete materials

Railway basement woods

It can be used in place of natural waste concrete.

Concrete made of the remains of waste heap

Basement of streets and highways, pavement, square concrete, civil engineering, etc.

Contaminated soil concrete, concrete that is unsuitable for other use

During road-building clay-bearing, sanded, rocky, or any other type of soil can be used at the spot for road basement.

"Grained car" concrete

It can be used equally as rubber concrete.

Mixed plastic waste concrete

It can be used equally as rubber concrete..

Communal waste concrete

Neutralized communal waste concrete

Similar to natural based concrete.

Glass waste concrete

It can be used in place of conventional concrete materials.

The continuous advancement in the waste recycling industry has become a necessity in order to serve the demand for the need to reuse a wide range of waste materials in order to expand the material's life span. In every area, there are waste materials typical for the region that can pose a problem to recycle or store. To solve this problem a complex system has been created whereby the regional waste materials can be processed locally according to procedures appropriate to that waste material. This means that green concrete can be produced immediately with a patented procedure using special additives. This, as mentioned previously, may be used as substructure of streets and highways, pavement, noise insulated walls, bicycle path, concrete slabs, or any kind of concrete. The above technology may also be used by mixing a variety of different waste materials.

EQUIPMENTS

INDUSTRIAL SHREDDERS

Larger particles of waste material ground to smaller particles in a machine. This grinding process provides a more even and therefore more manageable material. This procedure is mainly designed for the break-down of waste materials, such as small furniture, wooden or cardboard boxes.

TUBE TYPE WASHES - IF NEEDED

Washing and cleaning is the procedure whereby surface contamination is being removed. It makes recycling easier. Polluting particles are liquidified: dissolve, disperse, emulsify.

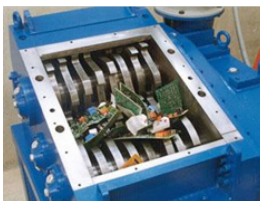
The liquid is mostly water, water solution, but can be organic solvent. The chemical solutions or organic solvents' quality is chosen according to the type of the waste material or the characteristics of pollution, and the cleansing grade of the solvent. The efficacy of the procedure can be improved with chemicals (eg. water-softener, moisteners, emulsifiers and dispersives), also cleansing medium temperature is raised. The procedure of washing contains several phases, which are different from each other depending on the chemical components of the washing liquid, the percentage of solid and liquid material, and the temperature.

MOBILE NEUTRALIZATION EQUIPMENT - IF NEEDED, TO REMOVE BIOLOGICAL POLLUTION

Naturally degradable waste materials, sludge and the processing of other organic waste with the aid of aerob termophilic fermentation. The EWA fermentor consists of an insulated working area, a diffusor used for intensive ventilation of the content and a system used for rotating the base content. This consists of a segmented flooring and trough conveyer placed in the inner circumference of the fermentor furthermore to an integrated internal and external storage. All the technological stages are part of the 40 feet long container. (All in one.)

Temperature of the content exceeds 70°C, gradual denaturation of the proteins take place. High temperature in the content causes inactivation of the germs and pathogens (virus, bacterium, fermentive bacterium, hyphomycetes, vermicules) at a definite time length. This procedure is called the aerob termophilic stabilization and sanitization of the content. Due to the high temperature, the number of microorganisms, and the blastogenesis of the seeds of glumaceae decrease. Under 50°C, continuous fermentation, and the intensive ventilation of the content the so called biological post dehydration is facilitated. Capacity: 35 m³ / 72hours. Price is approximately 270 000 €

The machine with four times bigger capacity only costs twice as much.



Shear type shredder



Aerob fermentor EWA



Automated concrete mixer



Concrete mixer

SMALL, AUTOMATED CONCRETE MIXER

Varied capacity (1 - 5 m³) concrete mixer. Concrete is made easily and fast from waste on the spot.

CONCRETE PUMP, IT CAN BE ATTACHED TO THE CONCRETE MIXER - IF NEEDED

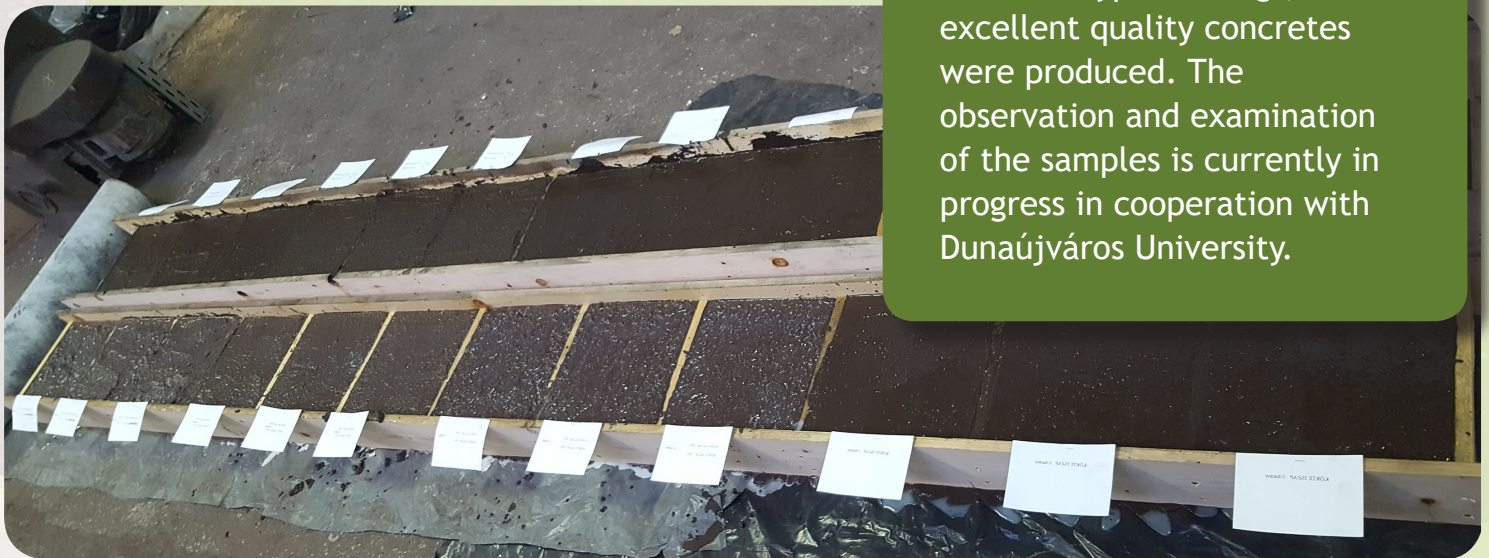
This technology does not demand neither washing nor neutralization because the ready-made concrete - due to the special additives - encloses the content (waste particles). Therefore pollution cannot leak out, and the rain water or the ground water cannot wash out anything.

The neutralization and reusing of slag from waste burning plants, iron and cement plans is a new an innovative field of technology, thus it is worth further discussing it:

As in the case of every concrete made with **MASUKO Recycling** technology, no polluting material can escape from the slag-concrete - it absorbs soot, ash, polluted slag and fixes it to the waterproof concrete. This way, it will be suitable to be used as for example pedestrian or bicycle road, sewer or any similar construction. Because of its materials, it is highly solid and thus is suitable for bearing large weights.

THE PRODUCTION OF SLAG CONCRETE WITH **MASUKO Recycling** TECHNOLOGY:

Slag, used as material, has to be ground to particles smaller than 10 mm, than can be used as gravel is traditional concrete, thus can be mixed in any regular concrete-mixer. The sole difference is the **MASUKO Recycling** additive added at the mixing process.



At model castings with different types of slags, excellent quality concretes were produced. The observation and examination of the samples is currently in progress in cooperation with Dunaújváros University.

THE CURRENT SITUATION OF DEBRIS FLOATING IN THE OCEANS:

According to the latest studies, the amount of floating debris in the oceans is above all expectations; it is over 70 million tons only in the Pacific Ocean. These „garbage islands” are mostly made of contaminated plastic waste and they are not only there because of environmental pollution, but also as a result of environmental disasters, such as hurricanes and floods.

The collection of the huge amount of garbage has grown to be a global issue and more and more attention is directed towards finding the best solutions. In the last couple of years, different solutions have emerged. The most recent solution, which is under testing currently, is the inflatable floating dam system of the Ocean Cleanup program.

The 5 garbage patches collected by the streams



The collection seems to be a manageable task. However, what needs to be done with the collected marine waste, remains an open question (for all waste, reusing requires complicated technologies).

Generally, collected waste is transferred to a large depot, where it is carefully sorted and pretreated as only sorted sorted waste is suitable for reuse. Such materials are transferred to a processing plant at the place of usage where it is turned into a product or energy through laborious and expensive processes. Contaminated, not processable waste materials are still mostly burned. Unfortunately, mixed garbage containing plastics go under this last process every time - further polluting the environment.

The most efficient solution to this issue is to think about waste transferred to the shores as a usable material that can be processed immediately and not as waste that needs to be hidden, vanished. The greatest advantage of **MASUKO Recycling** waste-reusing system is that wastes can be processed without any extra sorting or pretreatment.



Illustration

The essence of the system is that the collected debris is ground onboard the collecting ships and is directly transferred to the processing plants at the shores. The processing plants can create concrete or concrete slabs from the ground waste which can be used locally or elsewhere as well to build for example dams, armour units on breakwaters, noise protection walls or even bicycle roads.

REQUIRED UNITS FOR **MASUKO Recycling** WASTE-REUSING SYSTEM



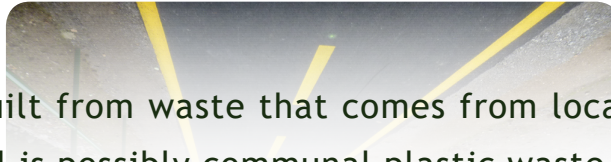
3E two-axis shredder

Special units that can be operated on ocean barges:

Waste grinding in two steps:

1. A two-axis pre-shredder can create 10-15 cm large pieces from the waste. From that, materials can get to a
2. Grinder, that can create 0.2-0.6 cm large particles that are usable for the creation of concrete.

The ground waste can be transferred to the processing plant based on the shore or near the shore, Thanks to the **MASUKO Recycling** additives, 1 m³ concrete takes up to 0.5-0.8 m³ waste being absolutely waterproof - so that no waste can leak from the concrete mixture. Based on the local needs, either concrete or any concrete structure can be built from the material.



Cycling paths can be built from waste that comes from local waste yard after waste selection. Base material is possibly communal plastic waste, polluted plant waste, or several other type of waste materials or the mixture of them. First of all, waste must be ground with industrial shredder. (Plant and plastic waste is ground with different type of shredders). If needed, washing or neutralization is the next step. Waste particles are taken to the mixer, with cement, water and the appropriate additives. Concrete is made on the spot, which can be used in the place of conventional concrete.

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