# REBUILT

# RESULT 3 – A1 – TEMPLATE

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| **Company Name:** | Olympic Repairs |
| **Professional sector and company size** | Engineering Services and Spare Part Trade |
| **Need/problem/challenge addressed** | Waste Management |
| **Sort presentation of the company:** | OLYMPIC REPAIRS is a privately owned Greek technical and trading company that offers complete engineering services in the Marine and Energy industry. Olympic Repairs specializes in repairing, rebuilding and overhauling any engineering installation, including the machining construction of various parts from shipping and industry and spare parts trade. The company's expertise is in diesel engines, industrial applications, engine components, auxiliary equipment and spare parts trade. |
| **Initial Process and CO2 Emission Profile (tools, methodologies, theories, references):** | In previous years, all the industrial lubricants and chemical waste produced by the companies in the sector ended up in the sea. The company produces a hundred (100) kg of lubricants every year equivalent to 3.56 kg of CO2/kg throughout its life cycle [(1)]. For chemicals, equivalent to 5.73 kg of CO2/kg, depending on the type. Also, the footprint of **Recycled** chemicals is drastically reduced to 0.16 to 0.80 kg CO2 per kg. [(2)] [(3)] |

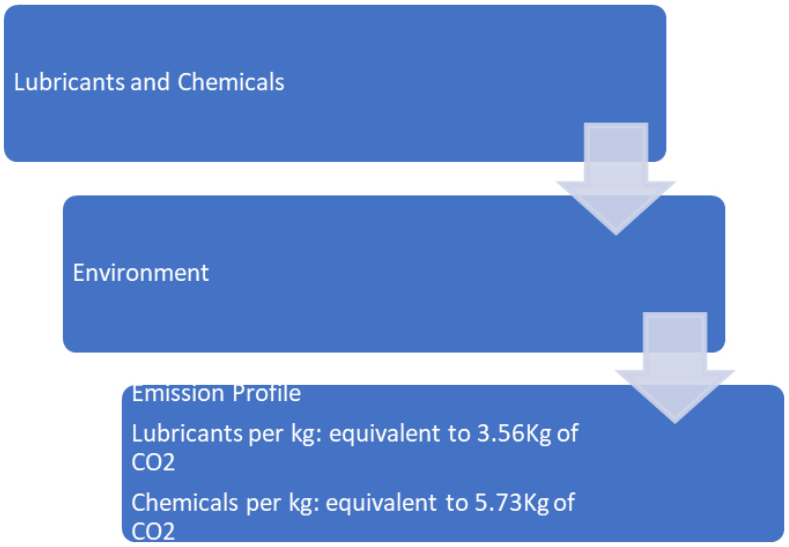


**Figure 1**: Initial process of waste disposal before re-engineering

## Methodologies and References:


1. U.S. Environmental Protection Agency emission factors, 2014 version: https://www.epa.gov/sites/default/files/2015-07/documents/emission-factors_2014.pdf McManus, M.C., Hammond, G.P. and Burrows, C.R. (2003), Life-Cycle Assessment of Mineral and Rapeseed Oil in Mobile Hydraulic Systems. Journal of Industrial Ecology, 7: 163-177
2. Carbon Footprints of Recycled Solvents. Study for the European Solvent Recycler Group (ESRG) (2013). https://esrg.de/media/PDF/Study_print_090514.pdf Emission factors in kg CO2-equivalent per unit. State of Winnipeg, Canada (2012).

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| | 3. https://legacy.winnipeg.ca/finance/findata/matmgt/documents/2012/682-2012/682-2012_appendix_h-wstp_south_end_plant_process_selection_report/appendix%207.pdf<br>Zhang, F., Chen, Y., Chen, Q., Feng, Y., Shang, Y., Yang, X., ... & Xie, Z. (2018). Real-world emission factors of gaseous and particulate pollutants from marine fishing boats and their total emissions in China. Environmental science & technology, 52(8), 4910-4919.<br>Deshpande, P. C., Kalbar, P. P., Tilwankar, A. K., & Asolekar, S. R. (2013). A novel approach to estimating resource consumption rates and emission factors for ship recycling yards in Alang, India. Journal of cleaner production, 59, 251-259.<br>Zuin, S., Belac, E., & Marzi, B. (2009). Life cycle assessment of ship-generated waste management of Luka Koper. Waste management, 29(12), 3036-3046. |
| **Strategic Decision of the company.** | The company has changed its strategy and decided to implement an integrated waste management protocol for the following items:<br>• **Lubricants**: used to run the vessel engines. A small boat needs seven kg of lubricant oils to run its engine, while a large ship needs about two hundred (200) kg.<br>• **Chemicals**: are organic and inorganic chemicals. It is a cleaning and washing material for engines diluted with water. After dilution, a large amount of toxic material results.<br>• **Aluminum** and **iron**.<br>• **Plastic** waste collection containers.<br>• **Fabrics** that are used to clean parts and contact with liquid waste.<br>The company applies to the organization TUV AUSTRIA HELLAS for waste management certification. The organization sends a representative at regular intervals who supervises the procedures and checks the waste management documents and the quantities. The certification cost for the company is 1.200 euros per year. Reorganizing the previous processes, we focus on lubricants and chemical waste because these materials have the most significant risk of environmental contamination. |
| **Process reengineering on selected waste (resources, methodologies, tools):** | The full certification protocol for waste management includes three sub-processes as follows:<br><br>**1. Waste collection and management:**<br>Chemicals and industrial lubricants are collected in plastic containers ending up in a tank specially made, so that no corrosion could lead to a leak. A hundred (100) kg. of industrial lubricants and nine hundred (900) kg. of chemical waste are collected annually. The company has the right to proceed with the recycling process once every three years but chooses to do it earlier for safety and better practice.<br><br>**2. Recycling:**<br>As mentioned in the previous section, the recycling company receives the load to deliver to the final treatment operator in Germany once a year. The quantity of waste to be transported must be declared to the material transport and recycling company. Regarding lubricants, Olympic Repairs receives 0.15 euros per kg, while chemical waste pays 1.15 euros for each kg.<br><br>**3. Emergency:**<br>The protocol includes special procedures for the case of accident, which provide prevention rules or procedures for dealing with an emergency.<br><br>Possible emergencies: (a) fire (b) leakage of waste in the workplace or the environment. The company's laboratories have a special protective coating on the |

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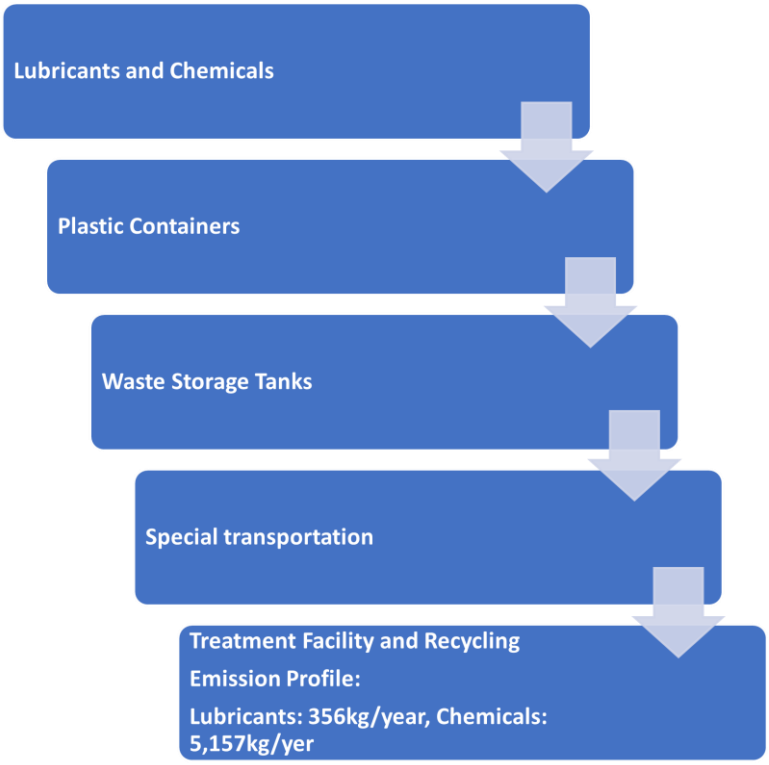
| | floor in the case of a leak. The company also has special formulations such as antidotes, which can prevent contamination.<br><br>In the event of a fire, the necessary measures are taken: staff training, hanging fire extinguishers in specific positions, storing lubricants and chemicals in a specially protected area, special markings to facilitate the staff etc.<br><br>Finally, the certification organization checks the quantities of materials consumed by the company, such as fabrics, plastics, vehicle fuel, water, and electricity, to determine if they are being used rationally according to environmental footprint.<br><br>Possible large increase in the percentage of use of these materials without changing the total income, causes serious recommendations for the company. The historical data of the use of these materials is recorded and compared with each other.<br><br>For the implementation of all the above procedures, the company spends resources internally and externally. Internally in working hours, purchase of materials, implementation of infrastructure etc. externally for the provision of consulting services by security experts.<br><br>  <br>**Figure 2**: New process of waste after re-engineering |
| **Re-engineering outcome and results. Emission profile improvement and** | The company is ISO certified by TUV Austria Hellas. "Olympic Repairs" reduces to 100% the discharge of waste into the sea. According to the methodologies mentioned above, the saving of pollutants in quantities is as follows:<br>1. The reduction of CO2 for lubricants for the whole waste is equivalent to **356 kg/ year**. |

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| **other success evidence:** | 2. The reduction of CO2 for chemical waste is equivalent to **5,157 kg/year.** |
| **Please identify the sustainability goals (SDGs) and the specific targets achieved in the described case:** | Goal 3: Good health and well-being (target: reducing illnesses and deaths from hazardous chemicals and pollution)<br>Goal 6: Clean water and sanitation (targets: improve water quality, wastewater treatment, protect and restore water-related ecosystems)<br>Goal 9: Industry, Innovation and Infrastructure (targets: upgrade all industries and infrastructures for sustainability; enhance research and upgrade industrial technologies)<br>Goal 12: Responsible consumption and production (targets: achieving the environmentally sound management of chemicals and all wastes throughout their life cycle; reducing waste generation through prevention, reduction, recycling and reuse; encourage companies to adopt sustainable practices)<br>Goal 14: Life below water (target: Reduce marine pollution) |