

LCA of sand aggregates production from a quarry in Cyprus

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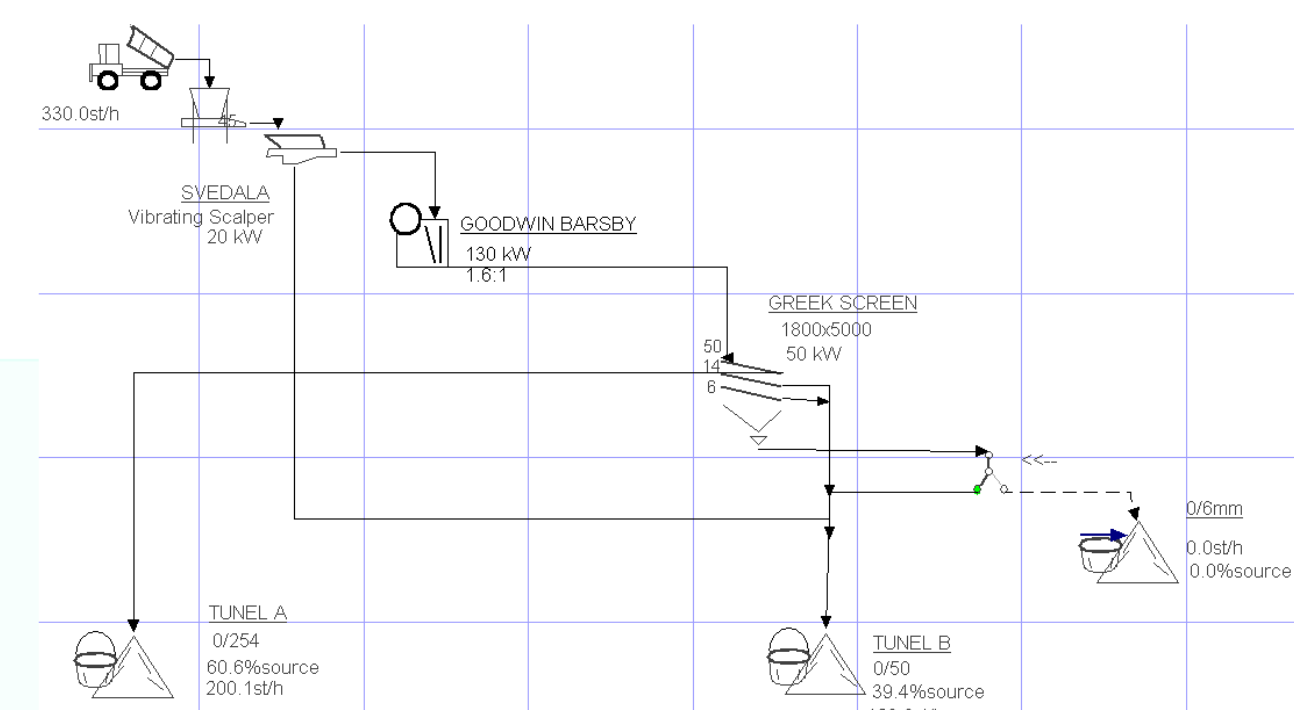


Research area

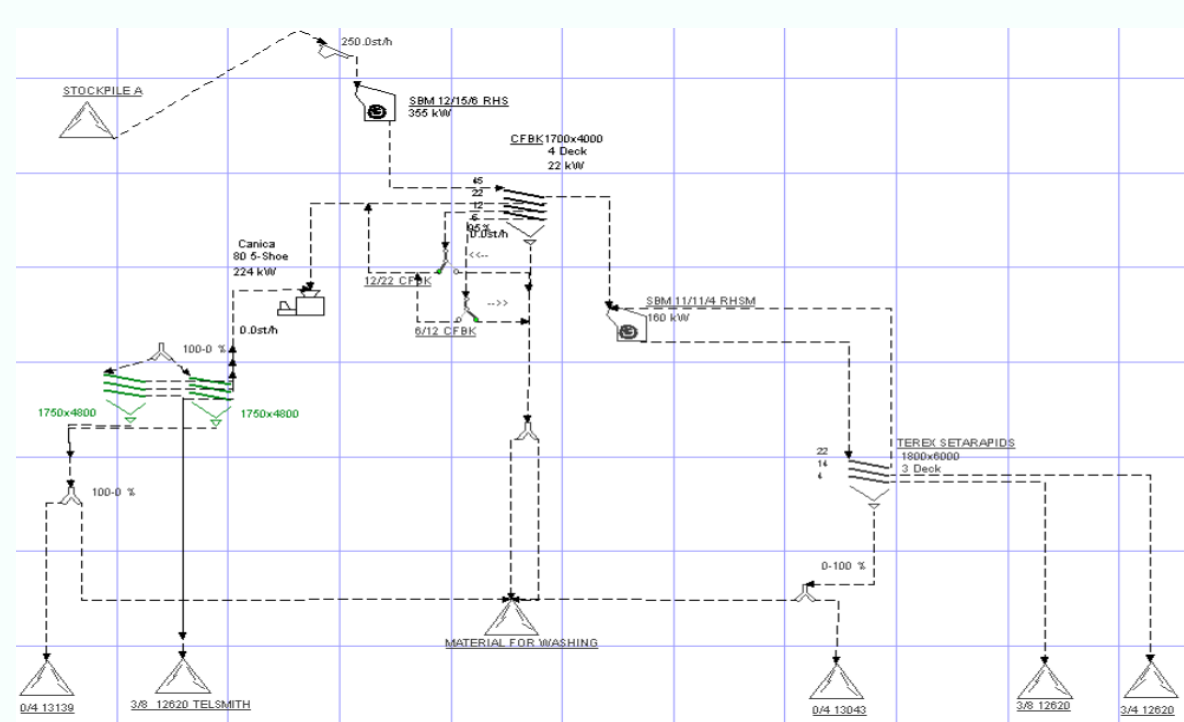
- The present research study provides an overview of a Life Cycle Assessment (LCA) conducted to evaluate the environmental impacts associated with the production of sand aggregates from a quarry located in Cyprus.
- The LCA aims to provide environmental experts with valuable insights into the sustainability aspects of sand aggregate production and identify potential areas for improvement.
- The study investigates the gate to gate approach of sand aggregates, including raw processing and production.

Methodology

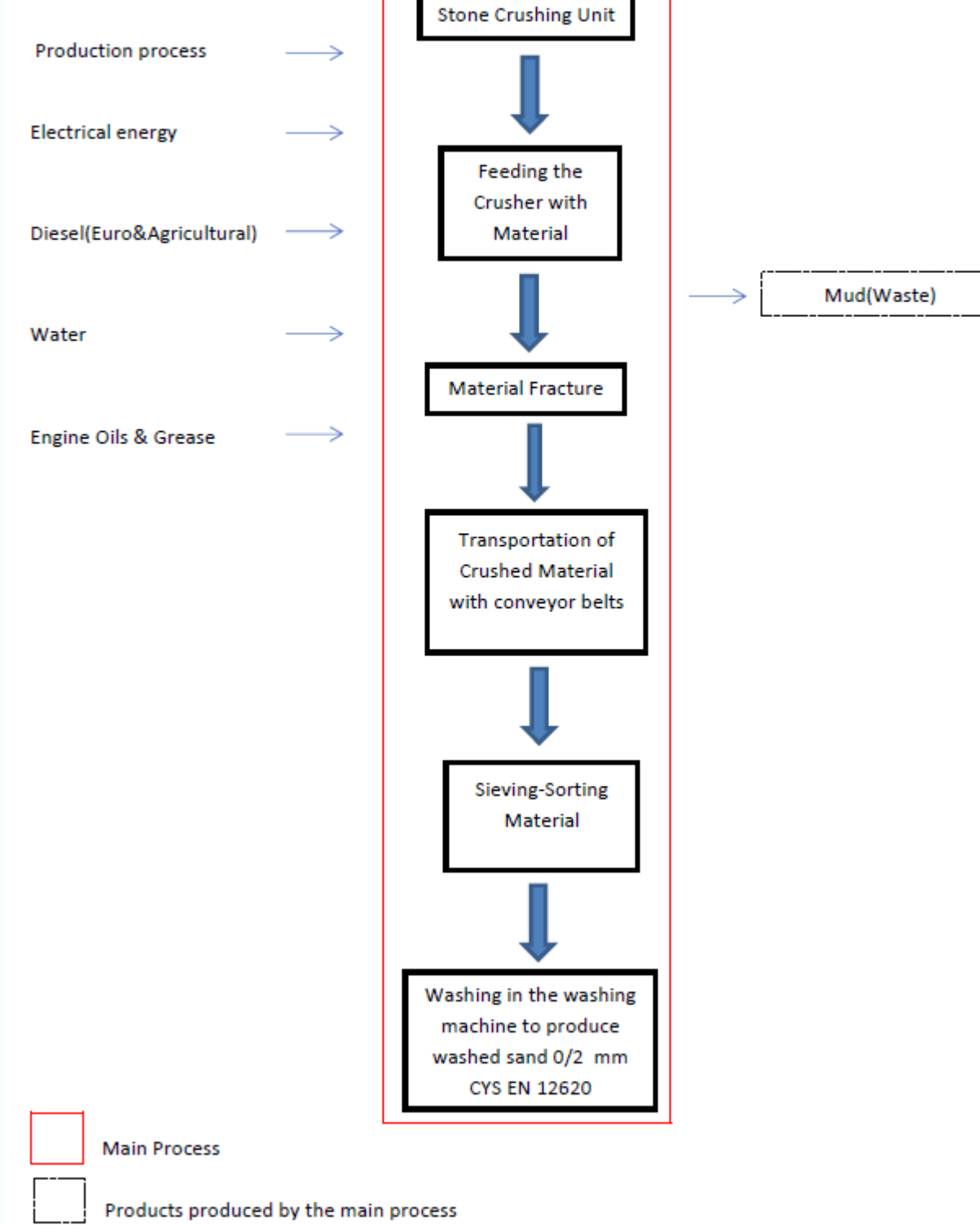
- The functional unit (FU) used in the current LCA for the data collection and inventory formulation was 1t of sand aggregate production.
- Initial data collection involved acquiring detailed information on the quarry's operational processes, energy consumption, water usage, emissions, and waste generation.
- Primary data was supplemented with secondary data from databases to ensure comprehensive coverage (OpenLCA software).
- Three environmental impact categories were calculated in the LCIA including: (i) acidification potential (AP) in kg SO₂-eq·FU⁻¹, (ii) global warming potential (100 years) (GWP) measured in kg CO₂-Eq·FU⁻¹, and (iii) terrestrial ecotoxicity (TAETP) measured in kg 1,4-DCB-Eq·FU⁻¹.



Primary Fracture Line



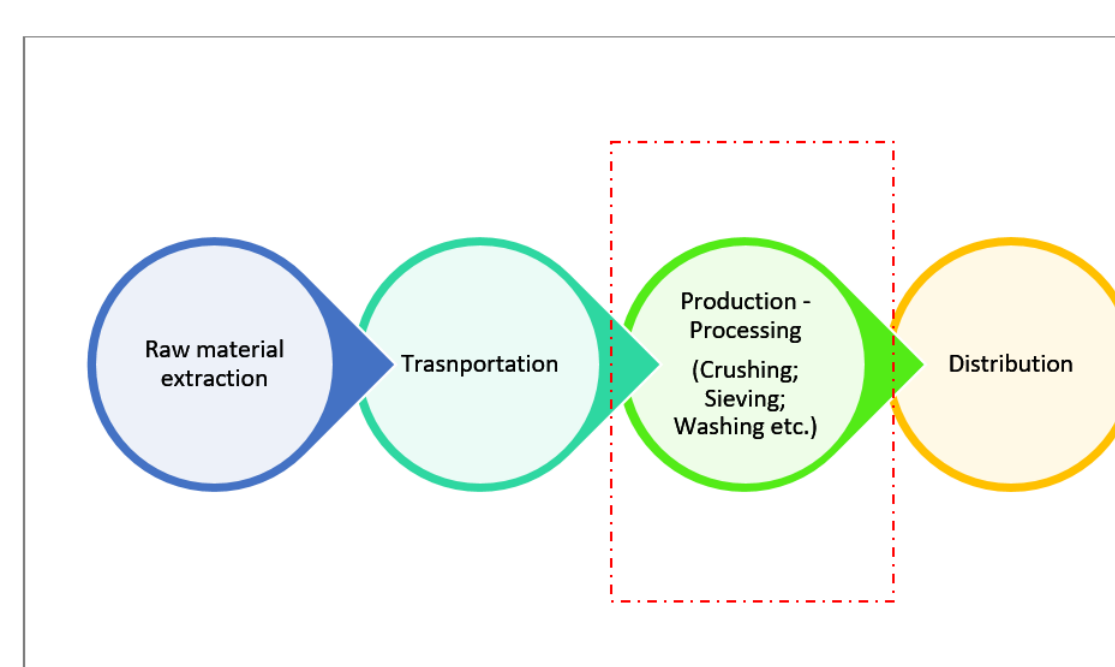
Aggregates Production Line



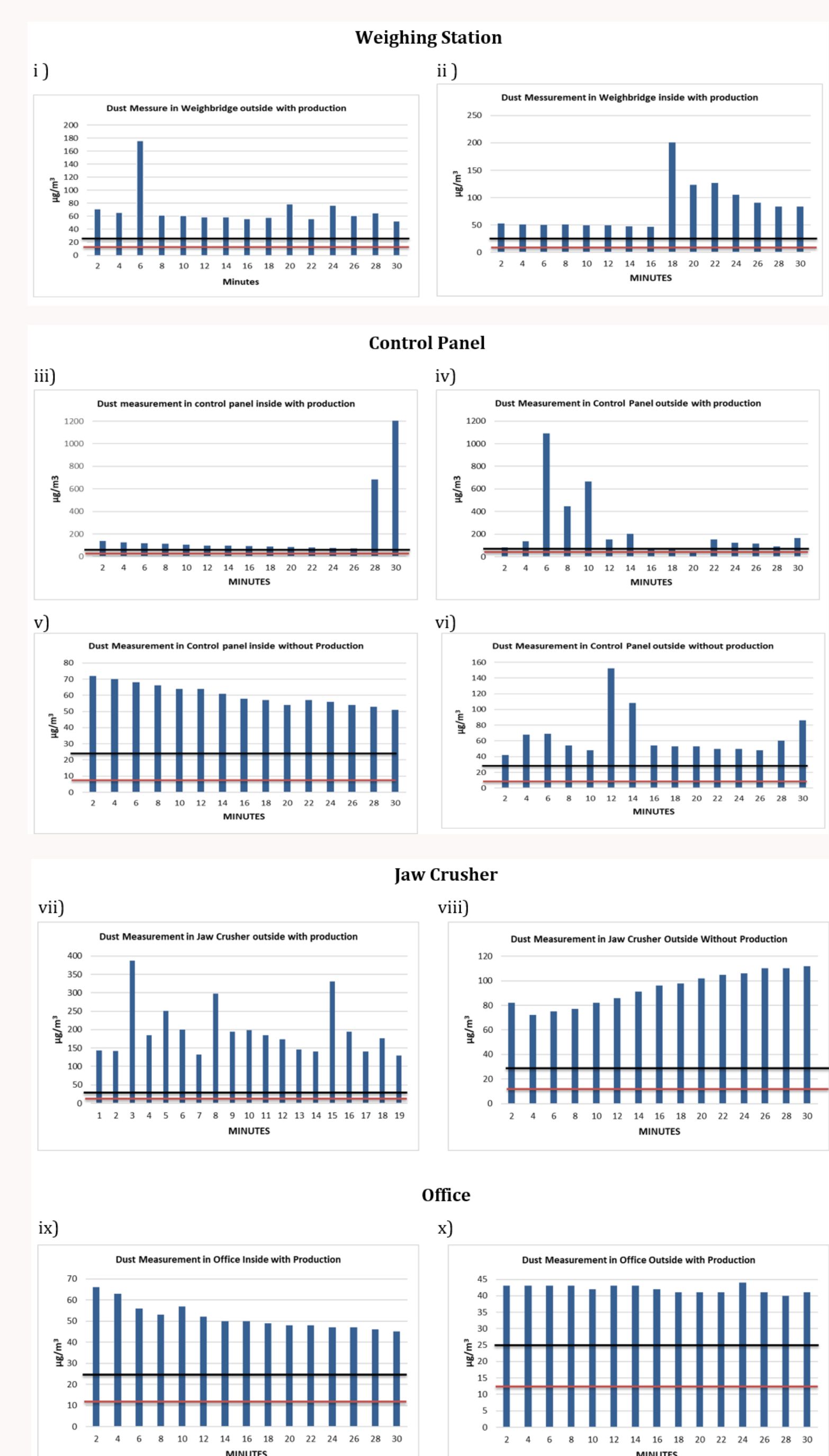
Engine oils	Use
Lubricant Libra 46 HIR	Hydraulic Oil - Movable machinery
Lubricant Libra 68 HIR	Hydraulic Oil - Movable machinery
Lubricant Superturbo 15/40	Engine oil- Diesel engines, Mobile machinery, Generators
Lubricant Cartago 80/90	Gear Oil- In drive systems (chainrings)
Lubricant ATF 3	Automatic n.x. Dumber(Volvo, Aveling)
Lubricant Antifreeze 100%	Radiator movable and stationary machines
Lubricant Serie 3 10W	Transmission- Hydraulic oil in movable machinery
Lubricant Super Tauro 220	Gear Oil- In factory sieves Hydraulic systems
Lubricant Super Tauro 150	Gear Oil- In factory sieves Hydraulic systems
Lubricant EP2 Special Grease	Grease - Sieves
Lubricant EP2/3 General Grease	Grease - In sieves and movable machinery
Lubricant EP00 Special Grease	Grease - In automatic systems pumps



Results:



Category	Impact Results	Unit
Acidification Potential-Generic	2.64E+04	Kg SO ₂ -Eq
Climate Change- GWP 100a	2.81E+06	Kg CO ₂ -Eq
Terrestrial ecotoxicity- TAETP 100a	4475.536	Kg 1,4-DCB-Eq



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