090-PEP

Design of a Diesel Engine for a Heavy Duty Amphibious Tracked Vehicle

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A design of a diesel engine for a heavy duty amphibious vehicle was implemented. The vehicle specifications are: maximum length 13 m, maximum width 3.4 m, draft 1.8 m, mass of the vehicle with loading 42.5 ton, maximum speed in the sea 10 km/h and the maximum speed on the land is 55 km/h. The engine power needed to drive the vehicle was calculated from the vehicle resistance in the sea and the vehicle resistance on the road. The propulsive power needed to drive the vehicle in the sea was found to be 160 hp while the power needed to drive the tracked vehicle was found to be 710 hp. After estimating the power, the following was implemented: design of the thermal cycle, kinematics and dynamics analysis, Piston design, connecting rod design, and crank mechanism design. The designed engine is 4-stroke, V-type , water-cooled Supercharged, and direct injection diesel engine. Number of cylinders 8, Compression ratio 18, Maximum power 710 hp (510 kW) at 2400 rpm, the excess air factor (α)=1.15 and supercharging pressure (1.121 bar). The piston diameter 150 mm, stroke 180 mm, clearance volume 0.183 mm3, swept volume 3.118 mm3.