

ABSTRACT

The aim of this thesis is to design a modern vine grading machine (tipping machine) to be used in the vineyards in Cyprus. The tipping machine must be able to be constructed in Cyprus.

The design of the tipping machine was achieved by the use of the Solidworks design software. All the parts were designed in 3D solid geometry and further static analysis was performed on specific parts using the Finite Elements analysis extension of the software. This further analysis was performed in order to avoid any part failures during operation, so after the analysis some corrections have been done on the parts to make sure we are well within the safety factors and the specifications.

An extensive literature search was carried out to investigate the existing tipping systems, and then sketches were drawn, presenting some initial ideas. Effort was made so that the ideas to be as original as possible, within the specifications of the project. The best idea was chosen and decided to go ahead and start the design.

In the next phase, an initial tipping machine 3D model was designed and optimised and some experimental investigations were made to help the decision on the blade design and motor choice, in relation to torque and revolutions requirements. During design, some components like bearings and belts, motors were selected from catalogues to make it easier to build the system with parts that exist in Cyprus. Of course, most of the parts have to be designed and manufactured in Cyprus.

The final part of the Thesis examined the cost of construction of a prototype, the cost of which was very encouraging and finished with conclusions and discussion for further work.