

MAE 471-02
Group C

14 October 2013

Professor Christiane Beyer
MAE Department, California State University - Long Beach

Senior Design Project - Faceting Machine

Dear Professor Beyer,

Our team is proposing that our time and resources should be dedicated to designing and fabricating a faceting machine for use in the gemcutting trade. Gemcutting mostly consists of cutting facets (small, flat surfaces) onto the gemstone by setting an angle and an index number on the faceting head and then placing the gem in contact with a lapping surface in order to cut the facet. Due to the high level of accuracy and repeatability required by the gemcutting process, the current cost of modern faceting machines place them out of financial reach for many potential customers. Prices of machines currently available on the market range from \$1200 to \$6000+, with the capability of the machines varying significantly. In an attempt to cut costs both in material and production, most modern machines are fabricated out of either aluminum or plastic (depending on where they lie on the price scale). Unfortunately, while these materials are cost effective, neither of these materials are optimal from a mechanical perspective (resisting tool flex and/or wear). Due to the fact that the initial capitol cost of new, professional grade machines are very high, many hobbyists and custom jewelry makers are driven to purchase used machines (with associated high maintenance costs) when first getting into the gemcutting trade.

Our group is motivated to undertake this project because we are convinced that by utilizing efficient design processes and modern fabrication techniques/materials, we can produce a machine whose functionality and quality matches that of high end machines while maintaining a cost point equaling that of the less expensive machines. Currently in United States, there are tens of thousands of people who cut gemstones either professionally or as a hobby. By reducing the price of a professional quality faceting machine, it is our group's opinion that we could increase the amount of people involved in the gemcutting trade by attracting aspiring jewelry artists who cannot afford the higher quality machines currently on the market.

Successful completion of this project would consist of having full documentation for the design and fabrication of the machine along with a working prototype, while keeping costs low enough to be profitable at an estimated MSRP of \$1500 per machine.

Sincerely,

Grgas , Anton

Grgas, Vlade

Harrisgleason, Zane

Chheang, Charles

Choi, Baek Kyu

Nguyen, Nhat Tam