# Design and Fabrication of low abrasive water jet cutting head

## Abstract

Material cutting is one of the main functions in any production company. With the passage of time technology is being advanced and companies want to reduce the time of operation and waste which results due to traditional and inefficient cutting methods. Water jet cutting is proved to be an effective technology for processing various engineering materials. Almost all traditional machining processes utilize mechanical energy and require tools to perform shear operation. Contact between tool and work piece produces a heat affected zone which causes distortion of tool and work piece material. Pure water jet cutting technique is used to cut soft materials like paper, foam, leather, rubber, beef, and food.

Abrasive particles are added to water jet stream to cut harder materials like metals and ceramics and the technique is named as abrasive water jet. Principle of working for both AWJ and PWJ is same. In Water jet cutting, the energy of the rapidly moving jet and abrasives particles is utilized and then applied to the work piece causing micro-erosion (the wearing-away of deposits on the work piece surface by the action of high-speed water jet and abrasives). The water used works as a cooling agent of cutting edge and prevents heat generation which ultimately results in strong cutting edge. Water jet is stress free process which makes it beneficial in the conditions when high accuracy is required and where residual stresses are undesirable.

In this project we have designed and fabricated low-pressure abrasive water jet cutting head. Creo5.0 is used for drawings. Furthermore, project is fabricated as per design specifications. Our project is able to cut soft materials like rubber pad, bread bun, thermoplastic, sponge and soup. Additionally, gasoline engine of 6.5 hp is used as a power source for Triplex plunger pump.