

ME 4171 – Environmentally Conscious Design & Manufacturing (Bras)

Assignment – Aircraft Fuel Tank Production Pollution Prevention

A local company manufactures a wide variety of fabric fuel tanks for use mainly in the aircraft industry. The main reasons for using fabric in the construction of these tanks are durability and shape requirements imposed by aircraft design.

The construction process involves first obtaining the fuel tank dimensions and shape and feeding that information to a cutting device which then cuts cardboard into the appropriate sizes. These cardboard pieces are then assembled to make the desired tank building form. Plaster forms are also used in the construction process. These are built using fiberglass forms.

The assembled cardboards form is then suspended by a hoist to allow for access to all sides of the cardboard form. The cardboard form is then sprayed with a spray release so that the cardboard form can be removed from the tank without damaging it once the construction is complete.

The fabric tank is then constructed on top of the cardboard/plaster form using pieces of fabric attached together with a solvent based adhesive. The adhesive is applied to the fabric by hand.

The constructed tank is then cured. After the curing process is completed, the form is stripped out from the inside of the tank. The tank is then cleaned and reworked and tested to insure integrity. Once the integrity of the tank is confirmed, the tank is ready to be shipped.

- a) Draw a process diagram for the fuel tank production. (10 points)
- b) Create a mass balance for each of the production stages. (15 points)
- c) Identify pollutants. (10 points)
- d) Identify and discuss options for pollution prevention. (15 points)