REMOTE INTERFACE TO TRACK PROCESS AND MATERIAL DATA FOR THE TAILORABLE UNIVERSAL FEEDSTOCK FOR FORMING PROCESS (TuFF)

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Introduction

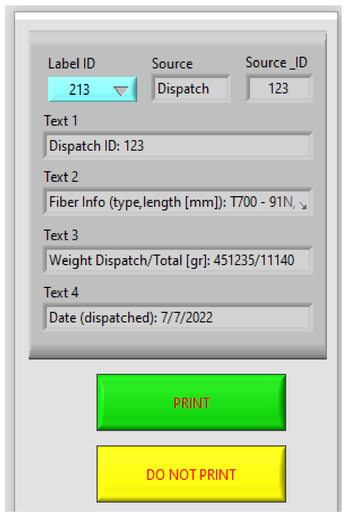
- TuFF is a new process developed at the Center for Composite Materials (CCM) to align short fibers producing high fiber volume fraction composites.

- The resulting carbon fiber composite has full retention of mechanical properties and enables fabrication of complex-geometry parts.

Objective

- To create a relational database that tracks
  - incoming materials
  - process data
  - coupon information

  using the developed Graphical User Interface written in LabVIEW.



Data Collection

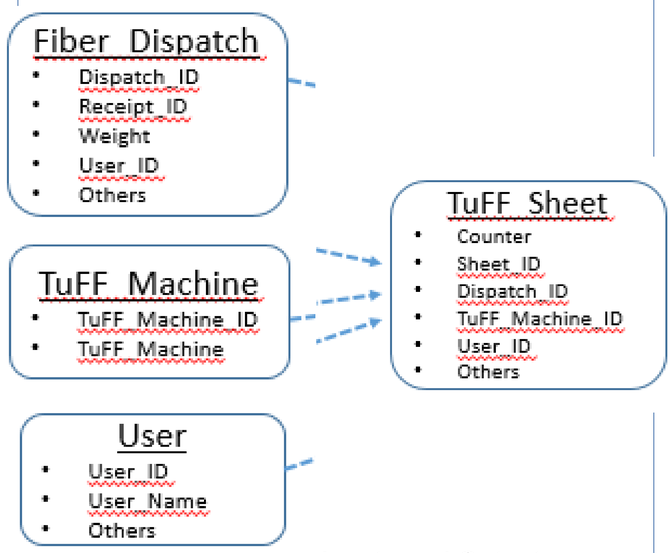
- The data can be used to establish relatio nships between material/process data and performance leading to optimum process specifications in the future.

LabView GUI of Sheet Production

- This enables tracking of
  - material usage
  - relate processing parameters to performance
  - creates the database to apply big data approaches in the future
- The data being collected is specially for the Sheet Production step of TuFF, which includes the
  - TuFF Machine (TuFF 1 or TuFF 2)
  - Dispatch ID
  - Pump and Belt Speed
  - Manual or Machine work
  - Date, etc

Process

- The TuFF Process starts off with the material inventory, where a dispatch ID tracks the usage throughout the process.
  - The ID is used throughout the entire TuFF database process.
  - This includes which machine was used to convert the fibers into sheets and eventual prepreg
    - Process info such as belt and pump speed, etc. Is stored
  - Multiple entries of the same sheet ID would identify hybrid material production
- Queries are being used to select appropriate entries that simplify operator input selection such as dispatch ID, machine type, etc.
- The data can be used to keep track of material and process data and to relate quality to process conditions
  - That will allow us to track material usage, relate processing parameters to performance



Sheet Production Inputs and Outputs

Summary and Further Studies

- A graphical user interface is important to allow the process operator to enter information while still maintaining relational information throughout the database
- The software is used to continuously collecting data from material delivery thru conversion into parts
- For example, aligned TuFF sheet production data includes what fibers source, operator and process information

250gsm quasi-isotropic [0/90/45/-45]s laminate

Acknowledgements

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TuFF Tailored universal Feedstock for Forming