Fleet Readiness Center Southwest

Canopy Drilling Tool

Using a ZeroG Arm and Printed Adaptor to Aid Drilling F-18 Canopies

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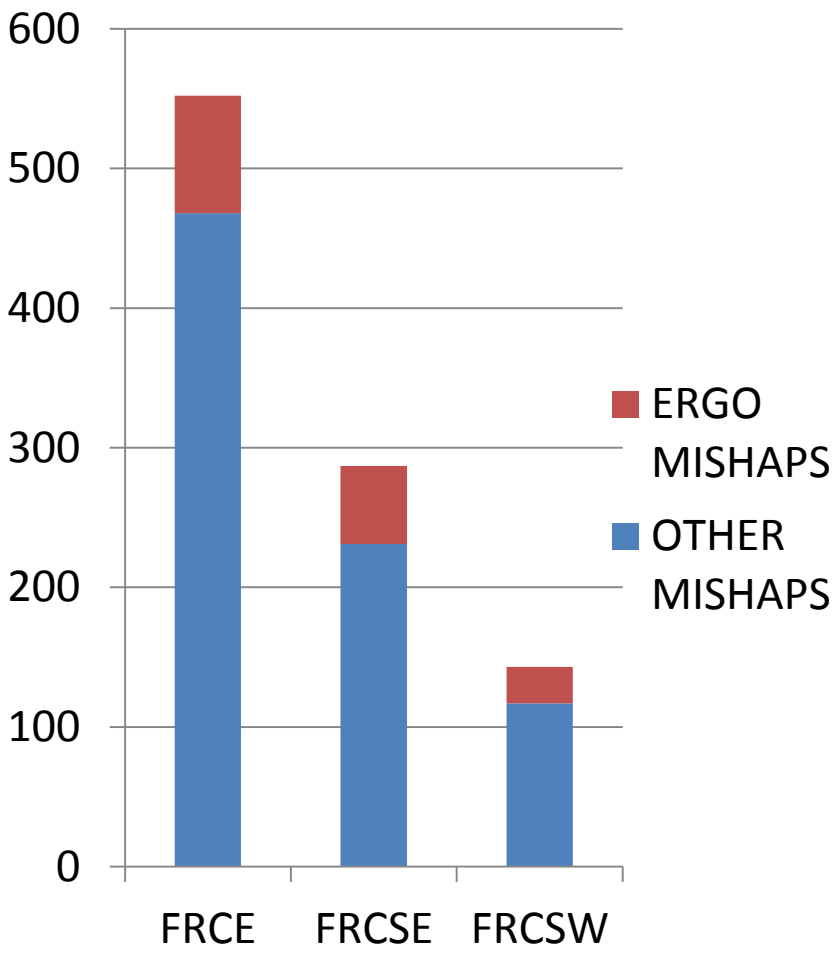
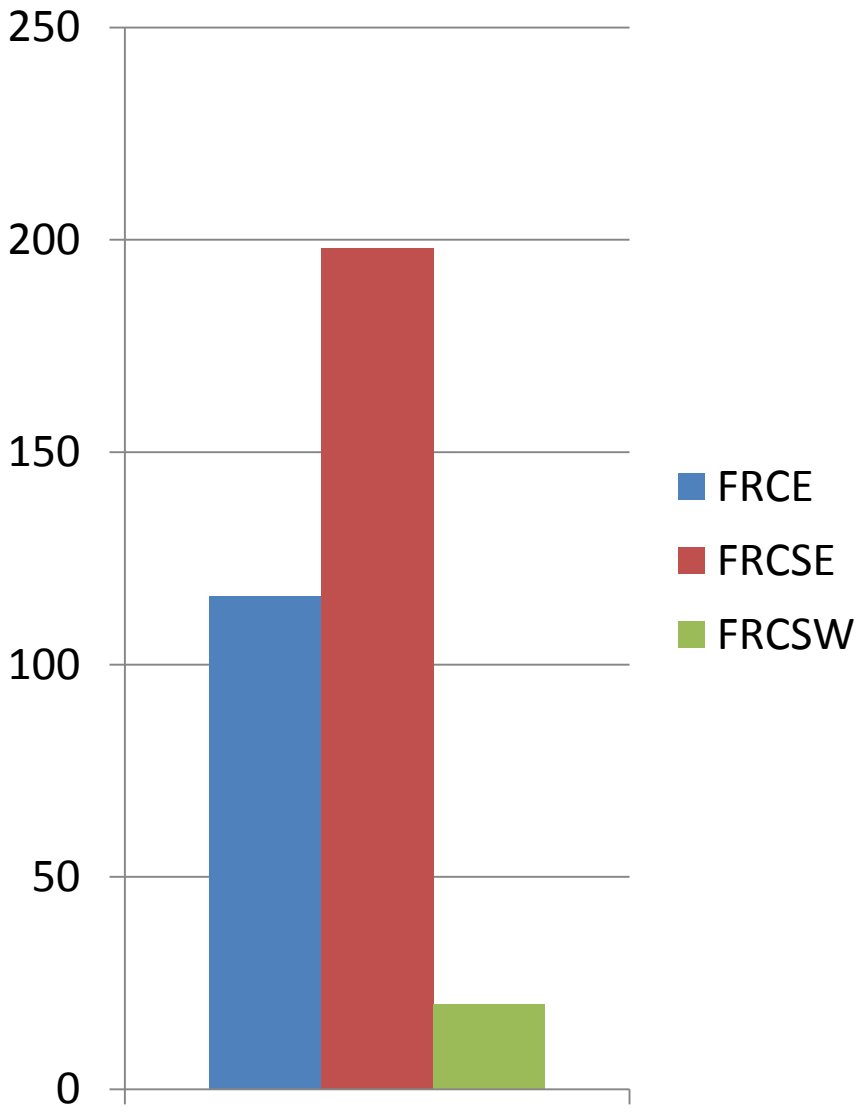
MISHAPS (2014-2015)

- **FRCE**
  - Total mishaps 552
  - Ergo related mishaps 84
  - 15% of mishaps related to ergonomics
- **FRCSE**
  - Total mishaps 287
  - Ergo related mishaps 56
  - 19.5% of mishaps related to ergonomics
- **FRCSW**
  - Total mishaps 143
  - Ergo related mishaps 26
  - 18% of mishaps related to ergonomics



LOST DAYS

- **FRCE**
  - 84 Ergo-related mishaps
  - 116 Lost work days
  - $111, 360
- **FRCSE**
  - 56 Ergo-related mishaps
  - 198 Lost work days
  - $190,080
- **FRCSW**
  - 26 Ergo-related mishaps
  - 20 Lost work days
  - $19,200
- **Total cost to date $320,640.00**
  - Mishaps still incurring lost work days



Ergonomic Program Implementation Plan

RECOMMENDATION:

Invest in one Headquarters billet to manage implementation of an Enterprise Wide Ergonomics Program.

- Expect billet to be a GS-13 or entry level engineer GS-7, KPP 13.
- Billet would include extensive travel (50%) to FRC Sites.
- Tasks:
  - Conduct comprehensive ergonomic evaluations of FRC aircraft repair processes with ergonomic risk factors in coordination with local Ergonomic Program Managers and shop employees.
  - Develop/Implement strategies to eliminate Ergonomic Risks. Employ the latest technology Monitor implementation. Document improvements
  - Communicate and Share Improvements throughout the Enterprise

Canopy Drill (25 lbs)

It would be an understatement to say this drill was not designed with ergonomics in mind.

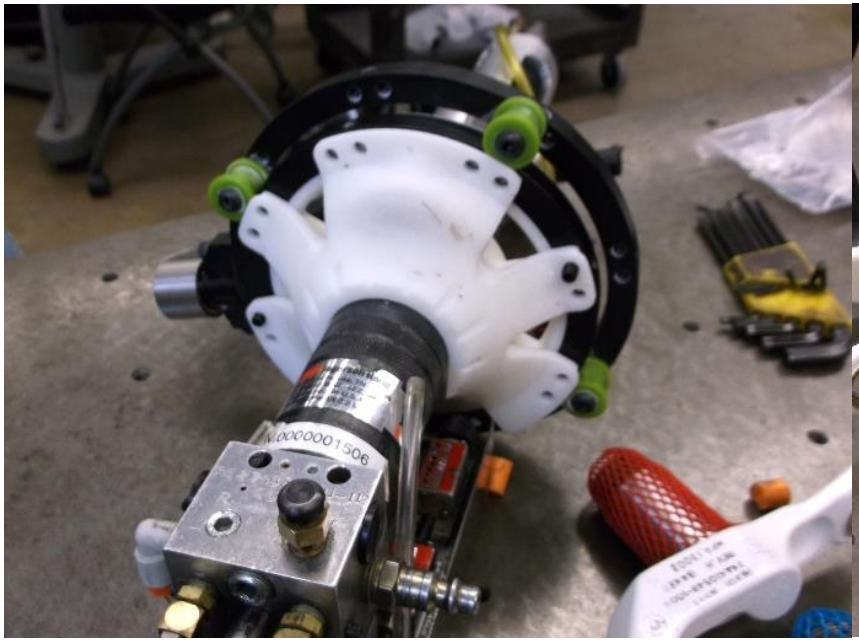
Canopy Drilling Fixture

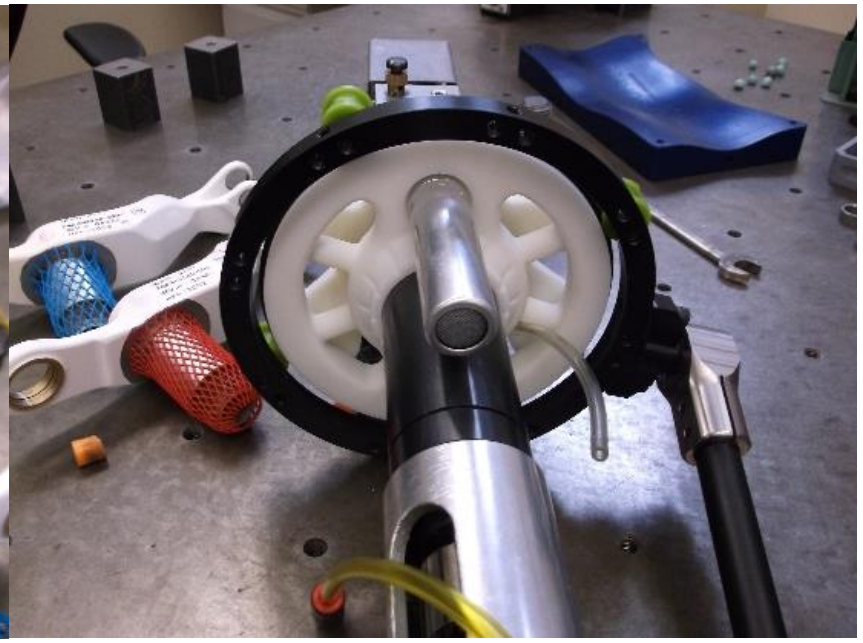
There are 320 holes that need to be drilled per canopy. 6,000 holes per year at our current workload

The Zero G arm supports the weight of the drill and allows excellent mobility.

Many holes are drilled at chest level but some are very difficult to access.

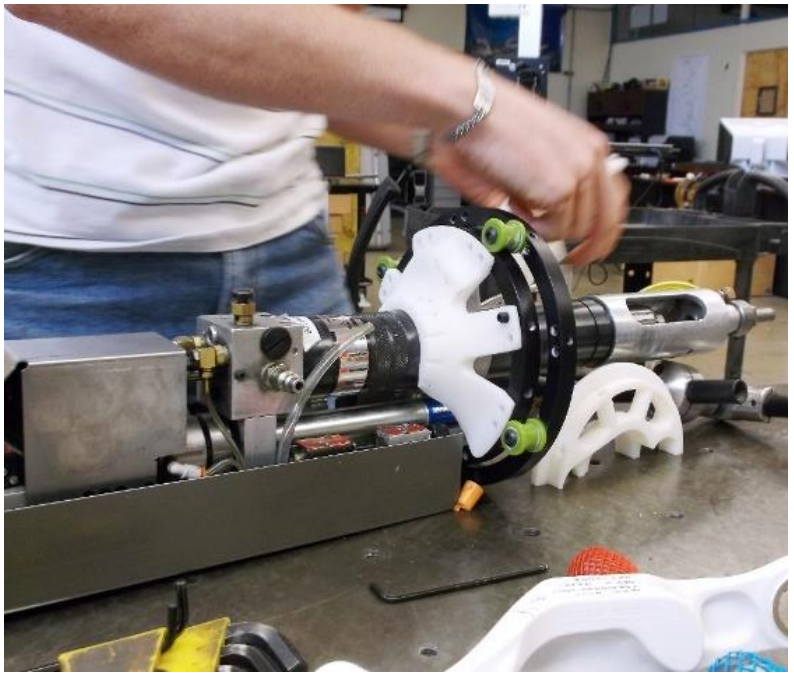
The drill needs to be rotated on it’s horizontal axis to lock into the drilling fixture, and it must be held securely to the arm





The only economical way to do this was print an adaptor (ABS on a FDM machine)

We scanned the drill then printed an adaptor that closely fits the contours of the drill and places the axis of rotation of the drill locking collar in the center of the ZeroG rotating adaptor.



The final tool improves ergonomics, extends fixture bushing life, and improves productivity