AE508 Design Project, Spring '04

Executive Summary (5 pts)

Summary of critical margins of safety (5 pts)

Documentation of geometry (5 pts)

Comments on validity of FEM (10 total points)
  Rib web mesh and elements (1 pts)
  Spar web mesh and elements (1 pts)
  Spar caps mesh and elements (1 pts)
  Rib caps mesh and elements (1 pts)
  Materials and properties (3 pts)
  Loads and displacement boundary conditions (3 pts)

Documentation of finite element model (5 pts)
  Verification of finite element model (hand analyses, any mention of convergence, observation of load balance, strain energy ratio) (5 pts)
  Documentation of internal loads (see individual analyses) (5 pts)

As a minimum, I expected the following analyses: (45 total pts)

1) For a critical wing root section perform the following analyses:
   - Upper skin buckling (4 pts)
   - Lower skin sizing (4 pts)
   - Spar web shear buckling (4 pts)
   - Rib web shear buckling (4 pts)
   - Upper skin stringer crippling/buckling (4 pts)
   - Lower skin stringer sizing (4 pts)
   - Upper spar cap crippling/buckling (4 pts)
   - Lower spar cap sizing (4 pts)
   - Fastener spacing along spars/ribs (assume 1/8” solid 2024-T31 rivets, with an allowable of 500 lbs shear per rivet) (4 pts)

2) Sample calculations for above (5 pts)

3) Weight assessment (5 pts)

Conclusions (10 pts)
  - Validity of the design
  - Recommendations for additional study or design changes
  - Proposed weight savings
  - Implemented analytical recommendations

Organization and Grammar (5 pts)

Total: (100 pts.)

Reviewer: None - Do not assume uniform assessment.