Positioned Globally
Southeast Asia, China, North America

Composite Solutions Corporation
Auburn, WA, USA

KeenTech Composites Technology Corp.
Xiamen, China

TOPKEY Corp.
Taichung, Taiwan

High Technology, Unlimited Product Capacity, Efficient Management

GLOBAL CAPABILITIES
Topkey
Taiwan, ROC
since 1980
28,305 sq. ft.
160 employees

Keentech
Xiamen, China
since 1988
703,623 sq. ft.
3,500 employees

Composite Solutions
Seattle, USA
since 1995
60,000 sq.ft
35 employees
Value-Added Processes

Topkey / CSC / Customer Joint Business Approach

Design Engineering

Tool Design

Tool Fabrication

Composite Kit-Cutting

Composite Layup

Autoclave & Oven Cure

Press Cure

Trim & Finish

Primer & Paint

Assembly

On-Site Support

All Industrial Customer base
Production Process

Impregnate
Bonding
Sanding & Putting
Kit cut
Trimming / Drilling
Painting
Hand Lay-up
Curing
Decal
Packing
Assembly
Trimming / Drilling

Bonding

Painting

Sanding & Putting
Computer Tomography

- 4X Patient Loading
- Material Uniformity
- Pure Image Quality
- Super Low Al Equivalent
- Low Dose Rate
- Full Scan Area
• Seat Back

  – All Support Tooling Designed & by TOPKEY
  – 3-D Design Build-up by TOPKEY
  – Graphite, Fiberglass hybrid / Phenolic materials
  – Construction: Hollow tube

Requirements
  – FST: Far 25,855
  – Static Load: 300 lbs
  – Fatigue load: 150 lbs / 200,000 cycles
  – 16G
Facilities & Processes

7000 Sq. Ft. Environmentally Controlled Clean Room
Meets All Aerospace Composite Mfg. Requirements

Autometrix - Automated Kit Cut Machine
Automated Material Shape and Orientation Nesting
Interfaces with CATIA and IGES Data
Facilities Overview

Two Full Temperature Range Autoclaves
- Baron 9’D x20’ - 450°F, 150 psi
- Baron 4’D x7’ - 450°F, 90 psi
Automated Cure Cycle & Recording

Three Curing Ovens
- 8’x 16’ & 5’x 8’ - 500°F;
- 9’x 40’ - 375°F

Two Heated Presses
- 500 ton and 50 ton
Quality and Process Approvals

- ISO 9001 Quality Standard
- Boeing/DPD Preferred Supplier Program
  - Gold Supplier
  - Preferred Supplier Inspection Delegation (PSID) Authority
- Multiple Bell Helicopter Composite Fabrication Process Approvals
- Multiple MD Helicopters Composite Fabrication Process Approvals
- Boeing Processes Approvals - Sample Selection
  - Boeing/DPG DPS 1.670 - Laminate Fabrication of Bismaleimide (BMI) / Carbon
  - Boeing/DPG DPS 1.624 - Autoclave Processing of Graphite Epoxy Components
- Sikorsky S2000 Quality and Process Approvals
Tooling Experience

- CSC Tooling Fabrication - Composite Tool Systems
  - Master Models, Plastic-Faced Splashes
  - High-Temperature Layup Molds
  - Ply Layout Templates
  - Hand Router Fixtures and CNC Holding Fixtures
  - Sub-Assembly and Final Assembly Jigs

- CSC Tool Design Coordinates Outside Tool Machining Operations
  - CNC Master Models and Headers
  - Invar Layup Molds
Program Experience
C-17 Lavatory Design Technology

• Designed and Tested by CSC for:
  – Design Loads
  – Shock and Vibration
  – Environmental Criteria
  – Flammability

• New Design Engineered 25% Weight Reduction
  – Fiberglass/Phenolic/ Nomex Sandwich Panels redesigned to Graphite/phenolic /Nomex panels.
  – Weight reduction from 190 lbs to 142 lbs
  – Delta Costs: ~10%

• Fully Integrated Assembly
  – Mortise and Tenon Construction
  – Fully Bonded Assembly
  – Integrates Electrical, Thermoplastic, Metallic and Composite Components

• Delivered Fully Ready for Installation
Program Experience
MD Helicopter

- Tail Boom Assemblies for MD900, MD600N, MD520N
- Includes:
  - Tail Boom Assembly
  - Horizontal Stabilizer Assy
  - Thruster / Rotating Cone Assy
  - Vertical Stabilizers (MD900)
- Graphite/Epoxy Honeycomb Primary Structures
- Delivered as Entire Shipsets
  - Ready for Installation
Bell UH-1Y / AH-1Z Upper Cowling Components
  - Graphite/Epoxy & Graphite/BMI Fairings
  - Honeycomb Stiffened, Complex Curvature

Requirements:
  - UH-1Y Huey
    • 2 Prototype S/S
  - AH-1Z Super Cobra
    • 3 Prototype S/S
  - Production Contracts Pending
Program Experience

- Learjet Model 31/35 Stowage Locker
  - Graphite/Fiberglass/Epoxy Design
  - Coordinated Production Tooling Development
  - Multi-Year Contract
Program Experience

• Sikorsky Helicopter - Black Hawk
  Intermediate Gearbox Fairing
  Tail Rotor Driveshaft Covers
  – Kevlar/Epoxy Integral Stiffened
  – CNC Machined Master Model
  – Complete Tool Design and Fabrication from CATIA Datasets
  – Peripheral Trim and Hole Locations from Customer-Supplied Transfer Media