Materials

- General Categories (for ease of searching)

Bearings	Drivetrain	Safety
Brake System	Electronics	Sensors
Composites	Engine	Springs
Control Modules	Fluids	Steering
Controls	Misc.	Tires
Dampers	Raw Materials	Wheels

- Some Examples:

  - Raw Materials – Steel, Aluminum, Titanium

  - Composites – Carbon Fiber, Honeycomb, Foam

  - Tires – 13" Hoosier, 10" Hoosier, 13" Goodyear

  - Wheels – BBS, Keizer, JongBloed

Processes

- General Categories (for ease of searching):

Basic Forming	Electrical - Connections	Joining
Composites	Electrical - Layout	Labor
Electrical - Attach Wires	Electrical - Prep	Material Removal
Electrical - Bundle Install	Electrical - Wire in Connector	Sheet Materials
Electrical - Bundle Processing	Fasteners	Tubing

- Some Examples:

  - Basic Forming – Die Casting, Sand Casting, Powder Metal

  - Composite – Lamination, Oven Cure, Autoclave Cure

  - Joining – Sewing, Welding

  - Material Removal – Turning, Facing, Milling, EDM, Cutting

Process Multipliers
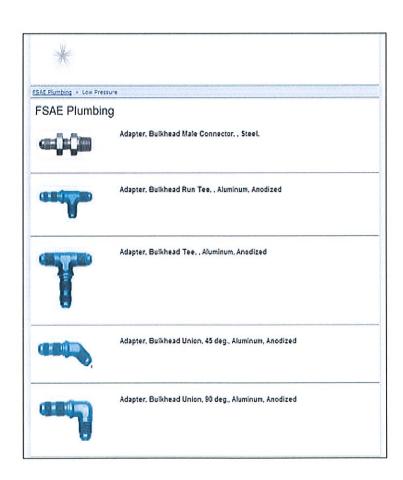
- General Categories (for ease of searching):

Assembly
Fastener Installation
Drill, Tap
Machining

- Some Examples:

  - Assembly – Length, Disassemble

  - Fastener Installation – Engagement Length

  - Drill, Tap – Hole Length

  - Machining – Material Type → Similar to machinability index for different materials

Fasteners & Plumbing

- Plumbing generally comes from Aeroquip catalog but many other suppliers listed

- Plumbing fittings are listed in the Materials Table

- Fasteners costed by:
  - Grade
  - Nominal thread size
  - Length

FSAE Plumbing ▸ Low Pressure

FSAE Plumbing

Adapter, Bulkhead Male Connector, , Steel.

Adapter, Bulkhead Run Tee, , Aluminum, Anodized

Adapter, Bulkhead Tee, , Aluminum, Anodized

Adapter, Bulkhead Union, 45 deg., Aluminum, Anodized

Adapter, Bulkhead Union, 90 deg., Aluminum, Anodized

Tools versus Tooling

Tools

- Tools refer to hand or power tools used to assemble the vehicle.
- The costs of these tools **are not included** in the Cost Report.
    - The effect of the tools used for assembly are captured in the process tables for labor as different costs are given based on the tools used for assembly.

Tooling

- Is the production tooling associated with processes that are specific to the part geometry.
    - Examples
        - The dies to stamp a chassis bracket.
        - The dies for die casting or injection molding
        - The dies AND patterns (cores) for sand casting
        - The jigs for welding or brazing
        - The tools (molds) for lamination

    Note: The press used to stamp the bracket is not to be included, and is considered production equipment which is not part of the Cost Event.

- The costs of **Tooling** must be included in the Cost Report.

Tooling

- General Categories:

Die Casting
Lamination
Plastic Injection Molding
Powder Metal Forming
Sand Casting
Welding, Brazing

- Tooling is process specific and goes only with the processes that require it.

- Column "F" in Process Table labeled "Tooling Required" will have "Yes" if needed. Blank means "No".

Cost Tables - AIR's

- Add Item Request (AIR) can be done electronically at fsaeonline.com

  – Note: all information input into form is viewable by all teams.

- Items considered extremely proprietary may have AIR's submitted to katklauz@aol.com in an Excel format, but final results will always be published to the public tables.

- Providing all required information will speed up the cost verification process

- Status of the AIR can be seen in

  – "View eAIR Master Table & Committee Decision".

  – "Final Cost" column has official results which can be used in the Cost Reports.

Part Numbering System - Appendix S-2

All assemblies and parts in the BOM **must** have a part number using the following convention:

- Competition Code – Date Code - Car Number – System Designation – Base Number – Suffix

- Competition Code – A code for the competition entered. Refer to A2.6.

- Date Code – Last two digits of the year of the event.

- Car Number – A three (3) digit number assigned to the car for the specific event

- System Designation – A two (2) letter code for the system under which the part is associated. These can be found in Appendix S-3.

- Base Number – Five (5) digit numbers assigned at the student's discretion. For assemblies this becomes a four (4) digit number with preceding character of "A".

- Suffix – Two character code showing part change history. These are provided for student use only so if desired all can be "AA".

- For example, a part entered into the chassis section for car number 27 competing at an event with code "FSAEM" that the students have decided is part one would be:

    FSAEM – 13 – 027 – CH – 00001 – AA

Part Numbering System - Cont'd

- In the Hard Copy version of the Cost Report the competition code, date and car number fields of the part numbers do not need to be printed.

- In the Electronic Version of the Cost Report they DO need to be included in the digital files submitted.

- The event code and car numbers are for SAE use when the different digital files are combined into the master database.

- All fasteners in the BOM must have a part number using the same convention as parts.

- All fasteners use system code "FS" even though they are included in the BOM under the part and assembly where they are used.