Engineering

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Investigation of How it Works

- Lawnmower
- Ryobi Drill/Battery

Engineering Achievement

What Engineering Achievement that has had a Major Impact on Society?

Let’s Go Looking

Six Types of Enginee

1. **Civil Engineers**
   Structural: Design and build structures, skyscrapers, bridges, transmission towers, large industrial plants, equipment, space stations, aircraft, rockets, etc.

- Geotechnical: Design and build earth structures, soil mechanics, foundation analysis, dams, embankments, retaining walls, landslide prevention and earthquake analysis.
- Environmental: Design and build waste water treatment plants, design ways to clean up environment (air and water pollution, hazardous waste), prevention of ecological disasters.
- Transportation: Design, build, and operate facilities for various modes of transportation such as highways, airports, railroads, and waterways. Design facilities for pedestrians, bicycles, and mass transit.

Water Resources: Design and build water supply systems for irrigation and cities. Solve flooding problems by building dams, levees, etc. Dams are used for hydropower, recreation, etc.

Six Types of Enginee

2. Mechanical Engineers

Heating, Ventilating, and Air Conditioning (HVAC): Design and build these systems for buildings and vehicles.

- Machines: Design machines to do work in factories, turbines, internal combustion engines, etc.
- Automobiles & Aircraft: Design power systems, mechanisms, and structures for these.
- Robotics: Design and build robots for manufacturing plants.
- Energy Systems: Study ways to be more efficient, new ways to generate energy; wind, solar, etc.
- Materials: Designing and using exotic mat composits, "intelligent" materials, polerme (plastics), etc.

Six Types of Enginee

3. Electrical & Computer Engineers

Computer Design: Design and build computers, memory systems, etc.

- Communications: Design and build systems to allow people and machines to communicate.
- Controls: Design and build robotic systems and control systems to enhance human accuracy and/or strength.
- Electronics: Design and build microchips, solid state electronics, logical circuits, etc.
- Electro Optics: Using lasers and light for transmitting data, guidance systems (missiles and smart bombs), medical imaging devices, infrared imaging systems, etc.
- Power Systems: Design and build electrical generating plants and transmission systems.

Six Types of Engineers

4. Industrial & Manufacturing Engineers: Manufacturing Processes: Design and build efficient manufacturing process, using automation, plant layout, quality control, production and inventory control, and systems engineering. Design ergonomic systems.

- Move Resources: Design optimal ways to move resources (FED-EX uses them to transport their packages better).
- Robotics: Design automated manufacturing, storing, etc., systems.
- Project Management: Manage projects and people

Aero Manufacturing Option: Utilize manufacturing techniques, materials, etc. to design and improve the production of aircraft and space vehicles.

Six Types of Engineers

5. Agricultural and Biosystems Engineers
Machinery Systems: Design and develop products and systems for food, feed, and fiber production.

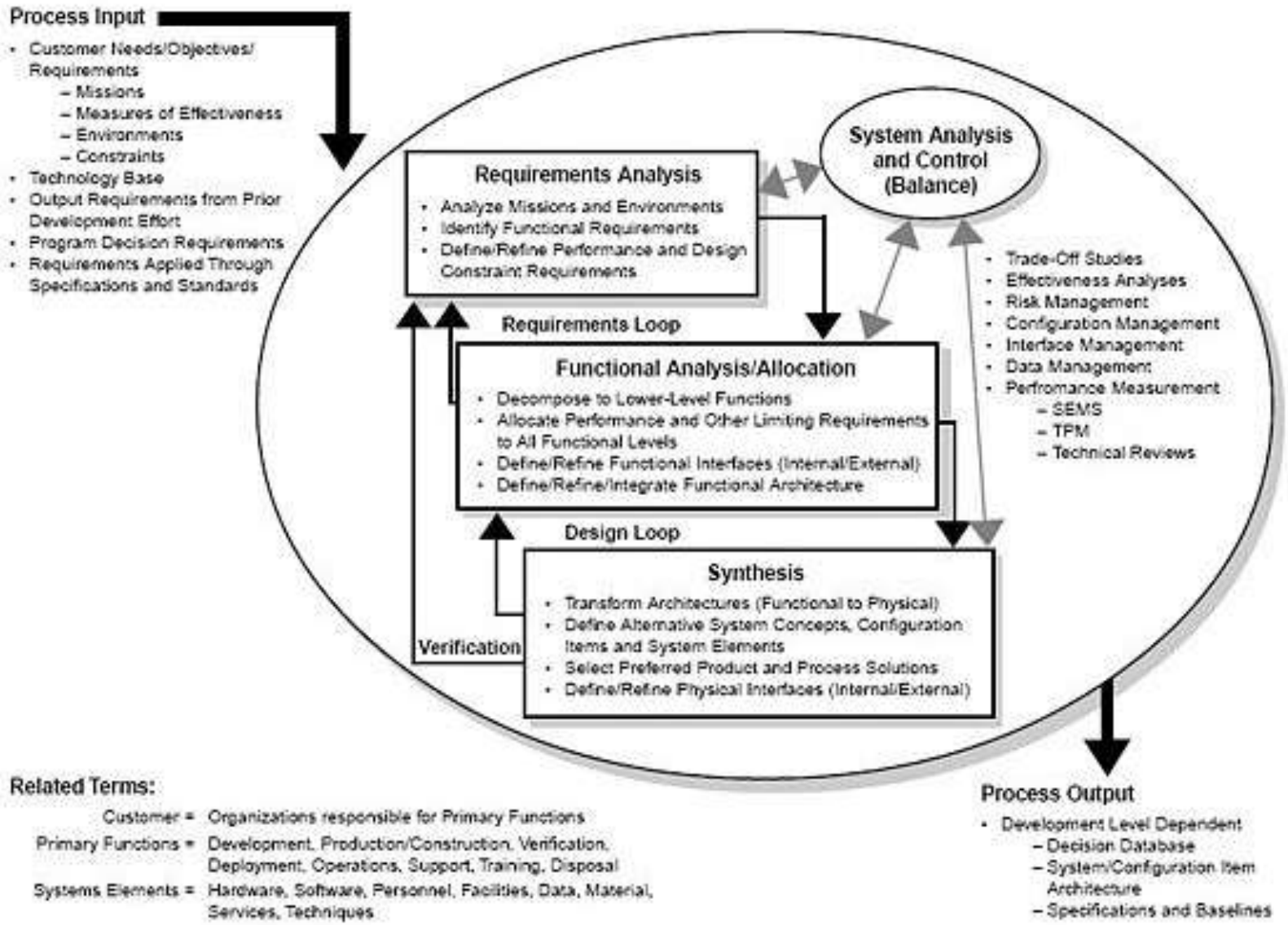
- Natural Resources: Create solutions for environmental and resource management issues affecting soil, water, and air.
- Biomaterials/Food Processing: Design and develop processes and systems for food, and non-food uses of agricultural and related biomaterials.
- Biotechnical Systems: Design and develop commercial products and processes based on applications of biotechnology.

Six Types of Engineers

6. **Construction Management and Engineers**
   Construction Engineers:

- Design of temporary structures and systems to aid in the construction of infrastructure, municipal, industrial and environmental projects.
- Often support traditional design functions of Civil Engineering primarily in structural applications (design options often include electrical and mechanical to support electrical and mechanical construction)
- Requires knowledge of the functional areas of engineering design and project management applied to construction operations and construction methods.
- Construction Managers:
- Primarily responsible for the organization and optimization of resources required for executing construction projects.
- Construction management education has three components: technical knowledge of materials and methods, construction management requirements, and business management.

Systems Engineering Approach



Using The Systems Engineering Approach

What could have made our last camp out better?

What Things Could we Do at our Overnighter at Antelope Island during our next Campout?

What kinds of things should we focus on for additional campouts?

Understanding Electronics

- How does sound travel from one mobile telephone to another?
- How is a mobile telephone designed for its use?
- How is it durable?
- See sound recorder.

Moving People

- How do people in our community get to work?
- What are the differences between the slow and fast sections in our community?
- How can it be improved?

Engineer's Code of Ethics

Engineering is an important and learned profession. As members of this profession, engineers are expected to exhibit the highest standards of honesty and integrity. Engineering has a direct and vital impact on the quality of life for all people. Accordingly, the services provided by engineers require honesty, impartiality, fairness, and equity, and must be dedicated to the protection of the public health, safety, and welfare. Engineers must perform under a standard of professional behavior that requires adherence to the highest principles of ethical conduct.

Engineers, in the fulfillment of their professional duties, shall:

1. Hold paramount the safety, health, and welfare of the public.
2. Perform services only in areas of their competence.
3. Issue public statements only in an objective and truthful manner.
4. Act for each employer or client as faithful agents or trustees.
5. Avoid deceptive acts.
6. Conduct themselves honorably, responsibly, ethically, and lawfully so as to enhance the honor, reputation, and usefulness of the profession.