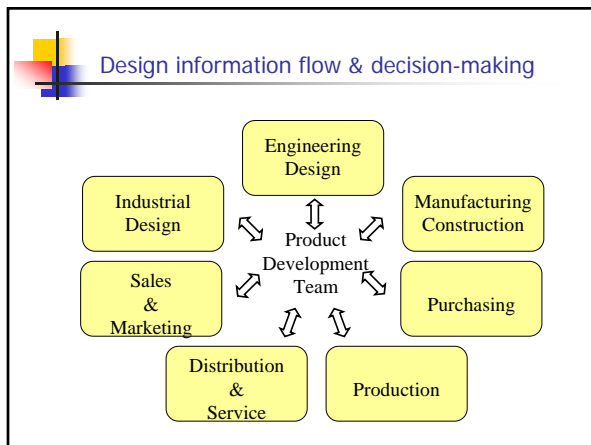
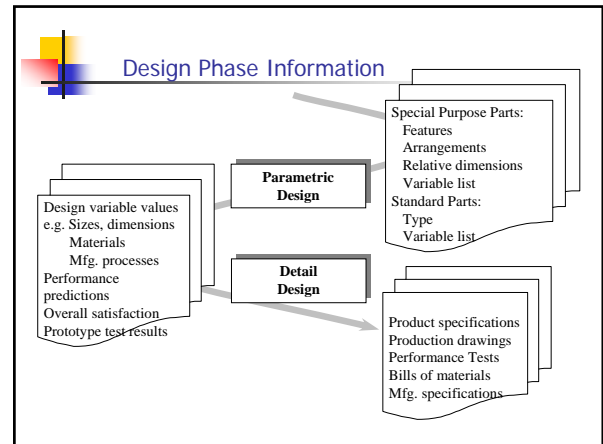


Detail design

- Flow of design information
- Responsibility for "details"
- Graphic communication
- Written communication
- Oral presentations



Sales & Marketing Responsibilities

- Product Warranty
- Shipping
- Warehousing
- Advertising campaign
- Product literature
- Owner's manual (layout, printing)
- Product launch

Industrial Design Responsibilities

- Product trim details
- Finish details
- Ergonomic refinements (e.g. user interface)
- Product packaging (~10% of total cost)

Design Engineering Responsibilities

- Detail design performance analyses
- Preproduction prototype performance tests
- Manufacturing/construction process specifications
- Owner manual(s) (technical: operation/maint.)
- Layout drawing
- Detail drawings
- Assembly drawings
- Engineering change notices
- Patents, trademarks, copyrights



Industrial Engineering Responsibilities

Materials & Product flow
 Facility layout/remodeling
 Material handling equipment
 Inventory warehousing
 Assembly/construction planning (machines & workers)



MFG/CONSTRUC Engineering Responsibilities

Fixture design / fabrication
 Tool design / fabrication
 Process equipment refurbishment/adaptation
 Process equipment acquisition / installation
 Process planning



Purchasing Responsibilities

Vendor qualification, selection, negotiation
 Out-sourcing parts or subassemblies
 Raw materials
 Materials planning
 Quality control (raw materials, sourced parts)
 Make or buy (shared)



Production

Tooling changeover (assist)
 Acceptance testing (QC, SPC)
 Worker training
 Workforce scheduling



Communicating Design Information

Written and Oral Communications
 Email
 Memoranda / Letters
 Phone calls/voice mails
 Reports
 Meetings

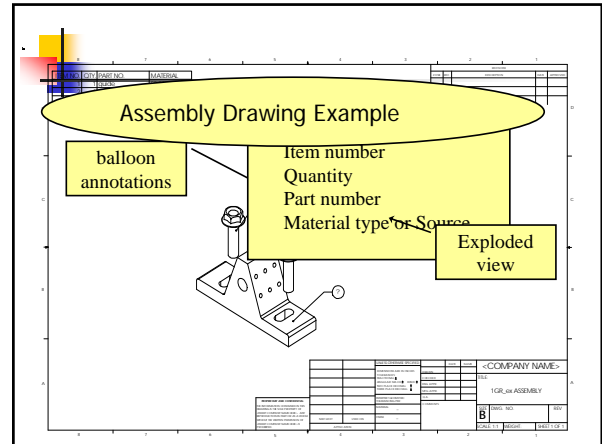
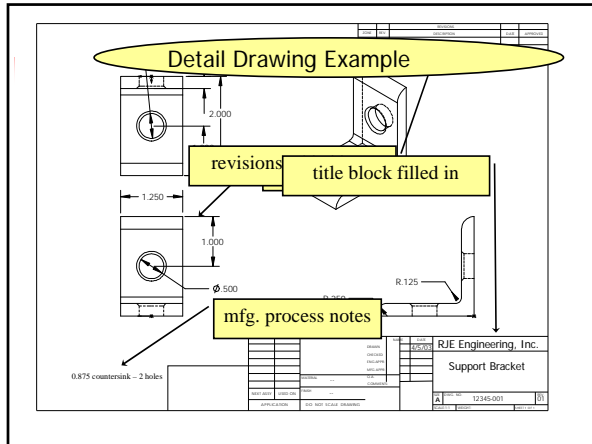
Communicate to all the stakeholders:
 1) often
 2) thoroughly and
 3) clearly.



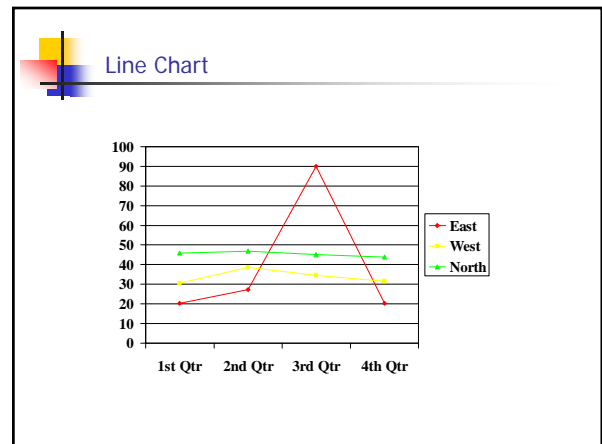
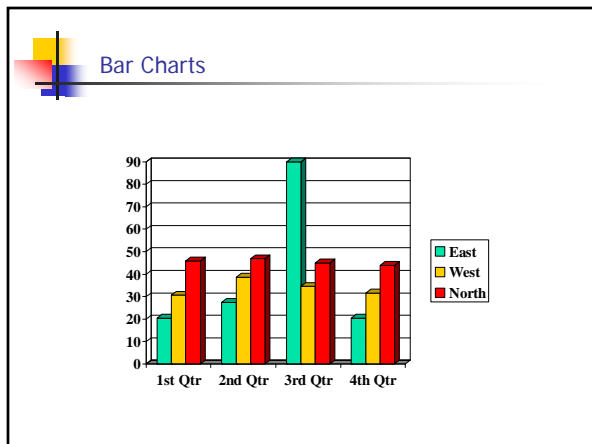
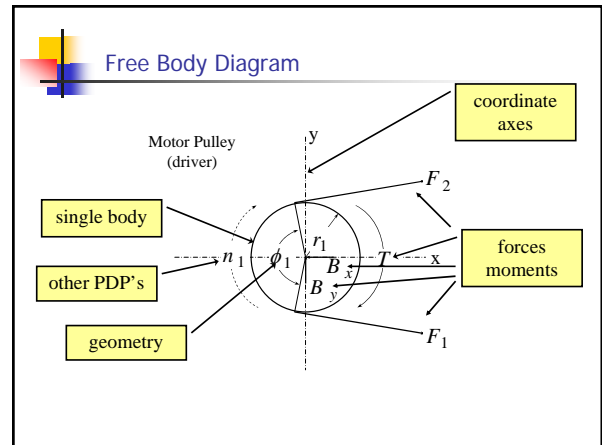
Graphic Communications – Drawings

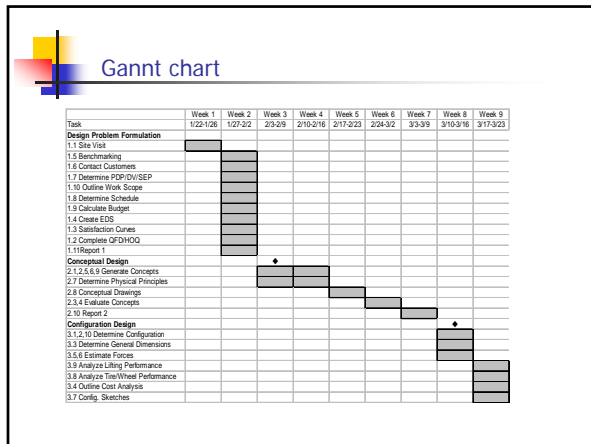
Production / Working drawings

- Detail drawing
- Assembly Drawing
- Bill of Materials (sometimes on Assembly)
- Layout (sketch)



- ### Graphic Communications – Illustrations
- **Charts** - portray relationship(s) among numerical data, for example sales versus time.
 - **Diagrams** - explain how something works or the relationship between the parts. E.g. free body diagrams to analyze static equilibrium forces and moments.
 - **Schematics** - uses abstract symbols. E.g. piping schematic, or electronics schematic.
 - **Figures** - illustrates textual material
 - **Sketches** - hand-drawn preliminary, or rough “drawings”, drawn without the use of drawing instruments.





Written Design Communications

Letters / Email

- Brief communications, often < a page in length
- Sent to a few selected individuals
- On a specific, usually familiar, topic
- Email “letters” are informal in format and typically very brief.

Memoranda

- Longer than letter, from 3 to 9 pages,
- Sent to a broader audience
- Can cover more topics in greater depth than a letter.
- Memoranda often emailed as attachments

Written Design Communications

Test Reports

- Technical reports detailing engineering / scientific tests (on materials, prototypes and or products).
- Can vary in length from few pages to hundreds of pages.
- Contents include sections on: test objectives, test procedures, data/results, summary and recommendations.

Research reports

- Similar to test reports
- But longer in length and broader in coverage
- Include additional sections such as: an abstract, background, literature review, laboratory/test program description and bibliography.

Owner manuals


- Include sections on:
 - Setting-up / installing the product
 - Operating the product
 - Maintaining (i.e. clean, lubricate and adjust)
 - Repair, if necessary.
- Can vary in length from 1 page to hundreds of pages
- Illustrations usually very important

Engineering change notices

- Brief descriptions of changes made to a product (I.e. what, why, how)
- Detailed on a company-approved form
- Authorized (signed) and distributed to all the critical depts.


Project Progress Reports

- Sent to clients and other stakeholders,
- Covers project status re: workscope, schedule and budget.
- Can vary in length from few to hundreds of pages
- Prepared weekly, monthly, quarterly, and annually



Design Reports

1. Introduction
2. Design Problem Formulation
3. Project Engineering
4. Concept Design
5. Configuration Design
6. Parametric Design
7. Prototype Tests
8. Final Design
9. Recommendations and Conclusions




Patent, trademark and copyright information

Drawings, illustrations and textual materials are forms of “*intellectual property*.”

Represent investment of company funds, and as assets, they can be protected by law under:

- patents
- trademarks or
- copyrights




Oral presentations

How can we prepare for an excellent presentation?

- 1) Plan (time, topics, temperament)
- 2) Outline
- 3) Compose
- 4) Rehearse
- 5) Refine


An excellent presentation requires excellent preparation



Plan


Decide on:

- who our audience will be,
- what we wish to communicate,
- why we are giving the presentation, and
- how long it should be.



Outline

Prepare a draft outline of the topics.
If a group presentation, we need to agree upon responsibilities.
Estimate the time to be devoted to each topic.
Break up longer topics into smaller chunks.
Combine or eliminate incidental topics.
Discuss the draft outline with your co-workers.
Confirm the draft outline with your immediate supervisor.



Compose

Use the outline to compose 3x5 (or 5x7) note cards
Write clear and concise statements for major ideas and facts.
Number each card in succession.
Compose clear overhead slides/PowerPoint slides, use font > 20 pt
Prepare videos using CAD animations or camcorder movies
Prepare posters, 35 mm slides, or working models, or demos.



Rehearse

Practice saying the note card phrases.
Give our draft presentation to some friendly coworkers.
Rehearse using the intended room and audio visual aids.
Video tape and critically evaluate our delivery and visual aids.



Refine

Revise or re-write our note cards
Eliminate confusing visual aids.
Refine our visual aids.
Revise presentation room layout or equipment



Execution Guidelines

1. Make our listeners physically comfortable. Seating, lighting, room temperature, noise level and ventilation.
2. Expect & accept that we will be somewhat nervous. Convert nervousness to enthusiasm.
3. Take a deep breath and relax before beginning.
4. Start on time, stick to presentation schedule, and finish on time. Do not go over!
5. Pronounce clearly, sufficient volume, relaxed pace.



Execution Guidelines (continued)

6. Vary the pitch or tone of our voice occasionally
7. Add enthusiasm to our delivery.
8. Use visual aids judiciously (sparingly).
9. Use appropriate gestures and avoid annoying mannerisms.
10. Make frequent eye contact with our audience.
11. Use a pointer when appropriate.
12. Relax and "enjoy the ride."



Summary

- Flow of design information
- Responsibility for "details"
- Graphic communication
- Written communication
- Oral presentations