



Introduction to Engineering

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Professor & Coordinator

Engineering Science / Civil Engineering Technology



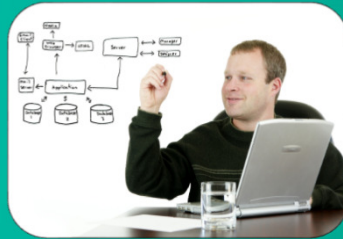
Overview

- What is engineering?
- What is the job outlook for engineering?
- Does the engineering profession pay well?
- How do I become a licensed engineer?
- What are some engineering student resources?
 - Scholarships
 - DaVinci Engineering Learning Community
 - Engineering website
 - Classroom ipads
 - Online/hybrid courses



What is Engineering?

Engineers apply math and science for the betterment of society through:



Design



Manufacturing



Research & Development



Management



Continual Improvement



Logistics

Above all, engineers are problem solvers who make things work better, more efficiently, quicker and cheaper.

Reference: Northeast Tennessee University

Engineering Disciplines:

MAJOR DISCIPLINES:

- Mechanical Engineering
- Electrical Engineering
- Chemical Engineering
- Civil Engineering
- Industrial Engineering

OTHER DISCIPLINES :

- Automotive Engineering
- Aerospace Engineering
- Agricultural Engineering
- Biomedical Engineering
- Computer Engineering
- Environmental Engineering
- Materials Engineering
- Nuclear Engineering
- Robotics Engineering
- Safety Engineering

Civil Engineering

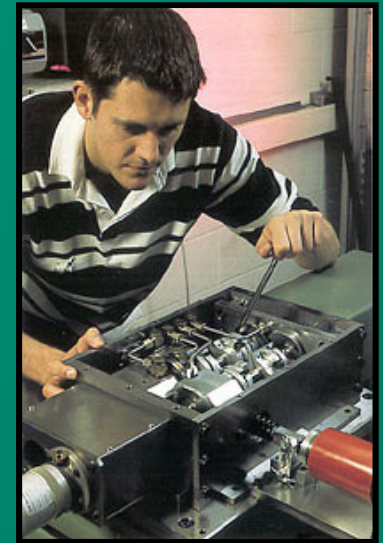
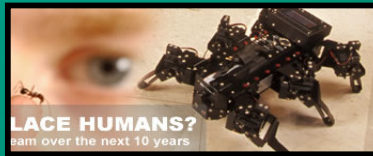
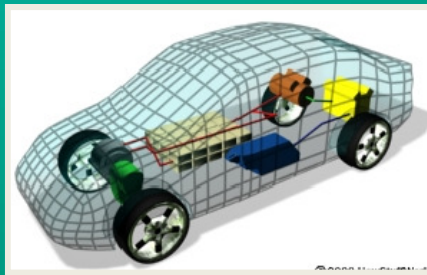
❖ Design solutions to cope with many of our planet's most serious problems

- air quality issues
- decaying cities, roadways and bridges
- clogged airports and highways
- polluted streams, rivers and lakes



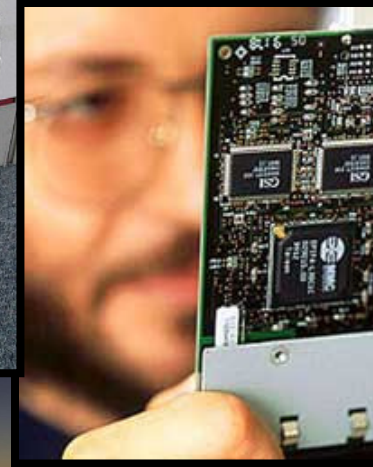
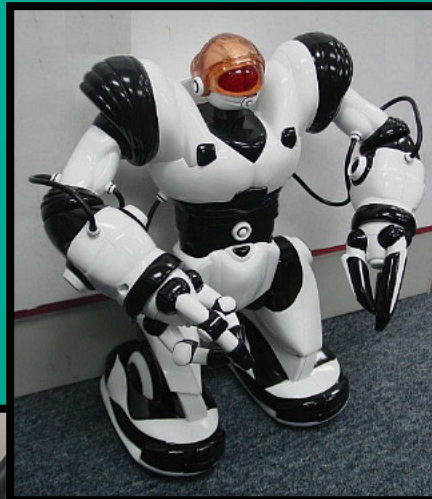
Mechanical Engineering

- Perhaps the broadest of all the engineering disciplines in its range of activities
- Concerned with design, manufacture & operation of a wide range of components, devices, or systems:
 - microscopic parts (nanotechnology) to gigantic gears
 - heating, ventilation, refrigeration
 - manufacturing equipment (tanks, motors, pumps)
 - laser technology
 - biomedical applications
 - automotive industry
 - computer-aided design, automation, robotics



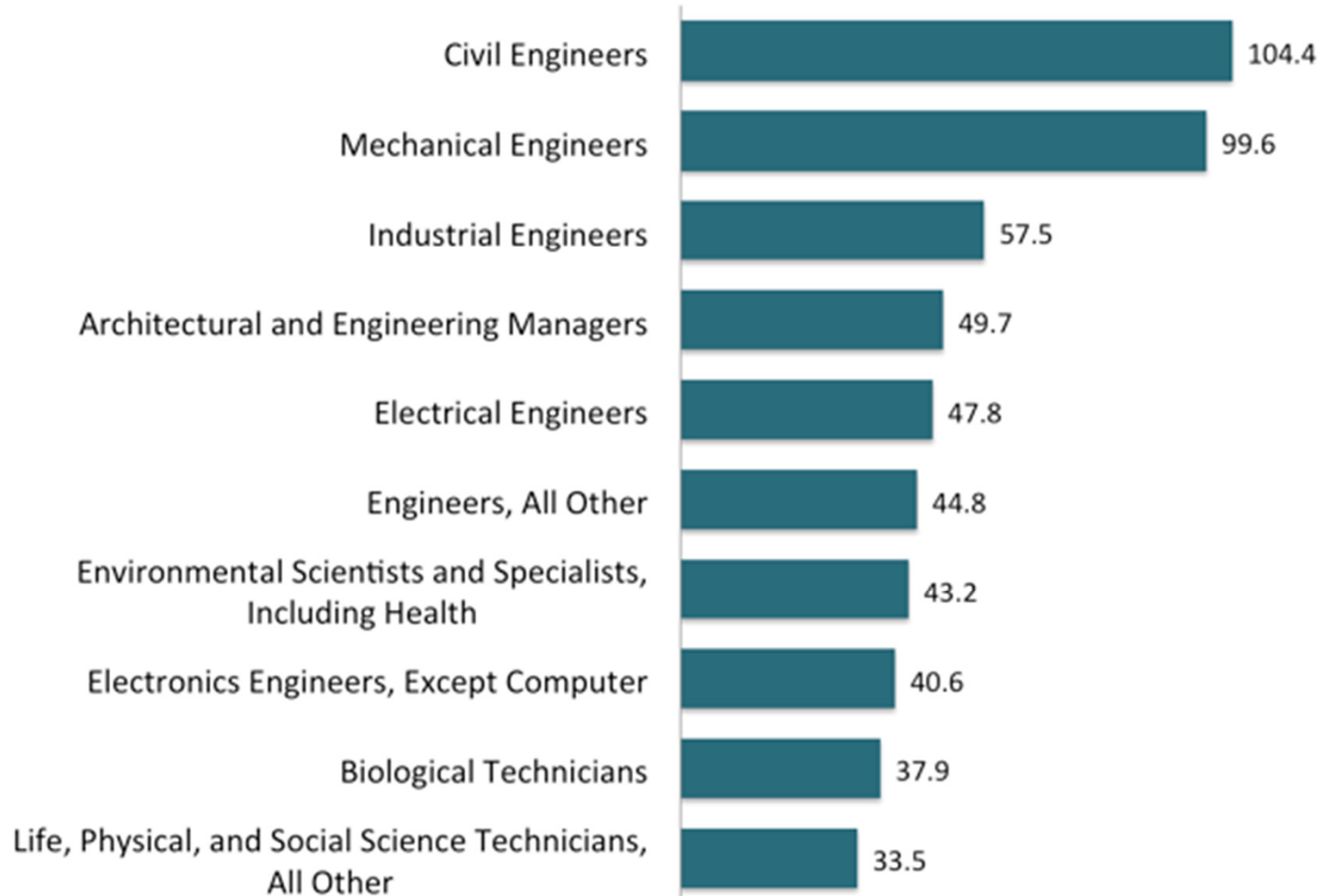
Electrical Engineering

- Apply specialized skill to the design, manufacture, application, installation, and operation of electrical products and systems.
- Play a role in almost EVERYTHING we interact with on a daily basis. They design smaller, cheaper, and better:
 - cell phones
 - computers
 - power systems
 - appliances
 - robots



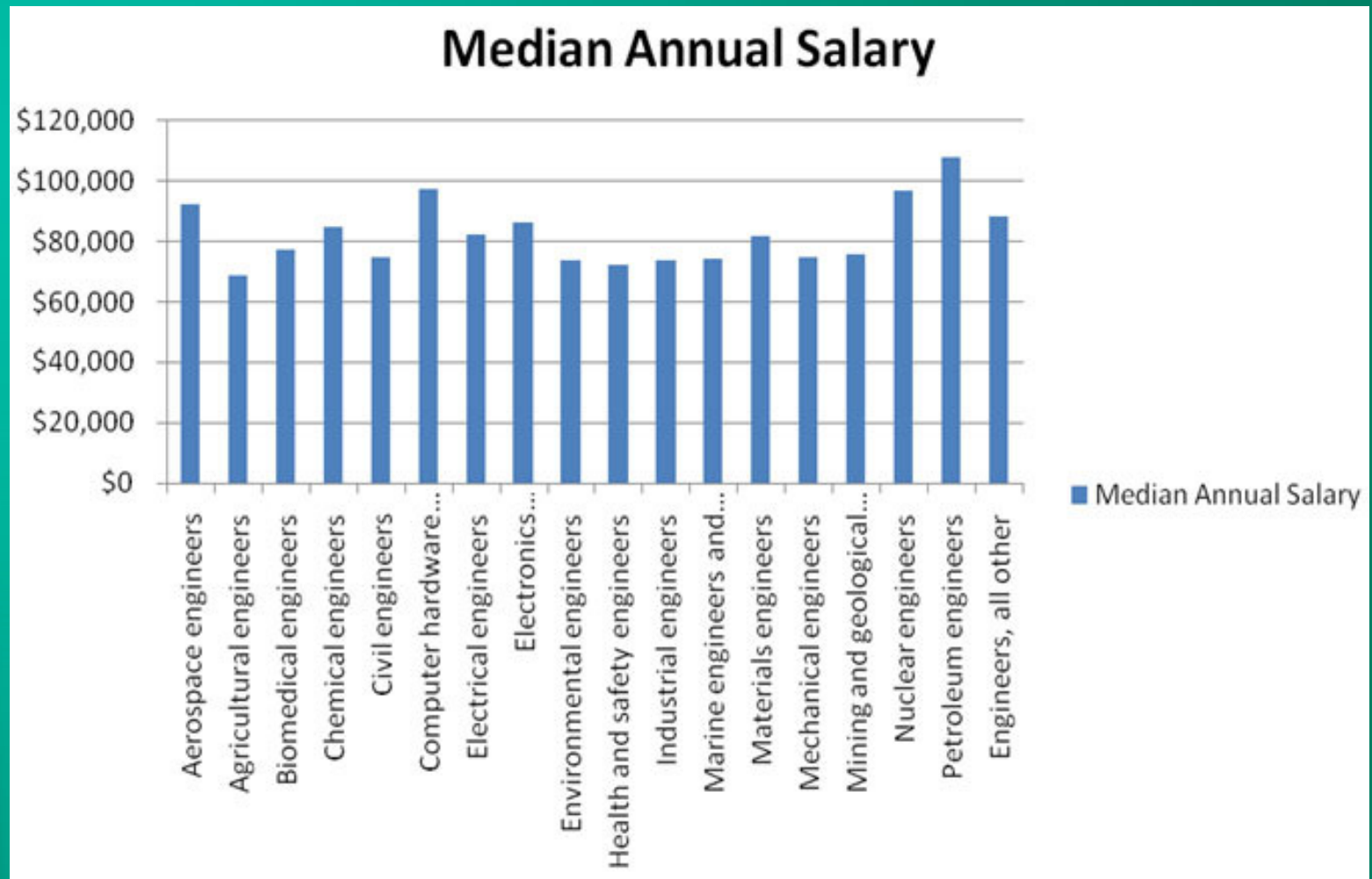
Engineering Job Outlook

OCCUPATIONS WITH THE MOST JOB OPENINGS (in 1000s)



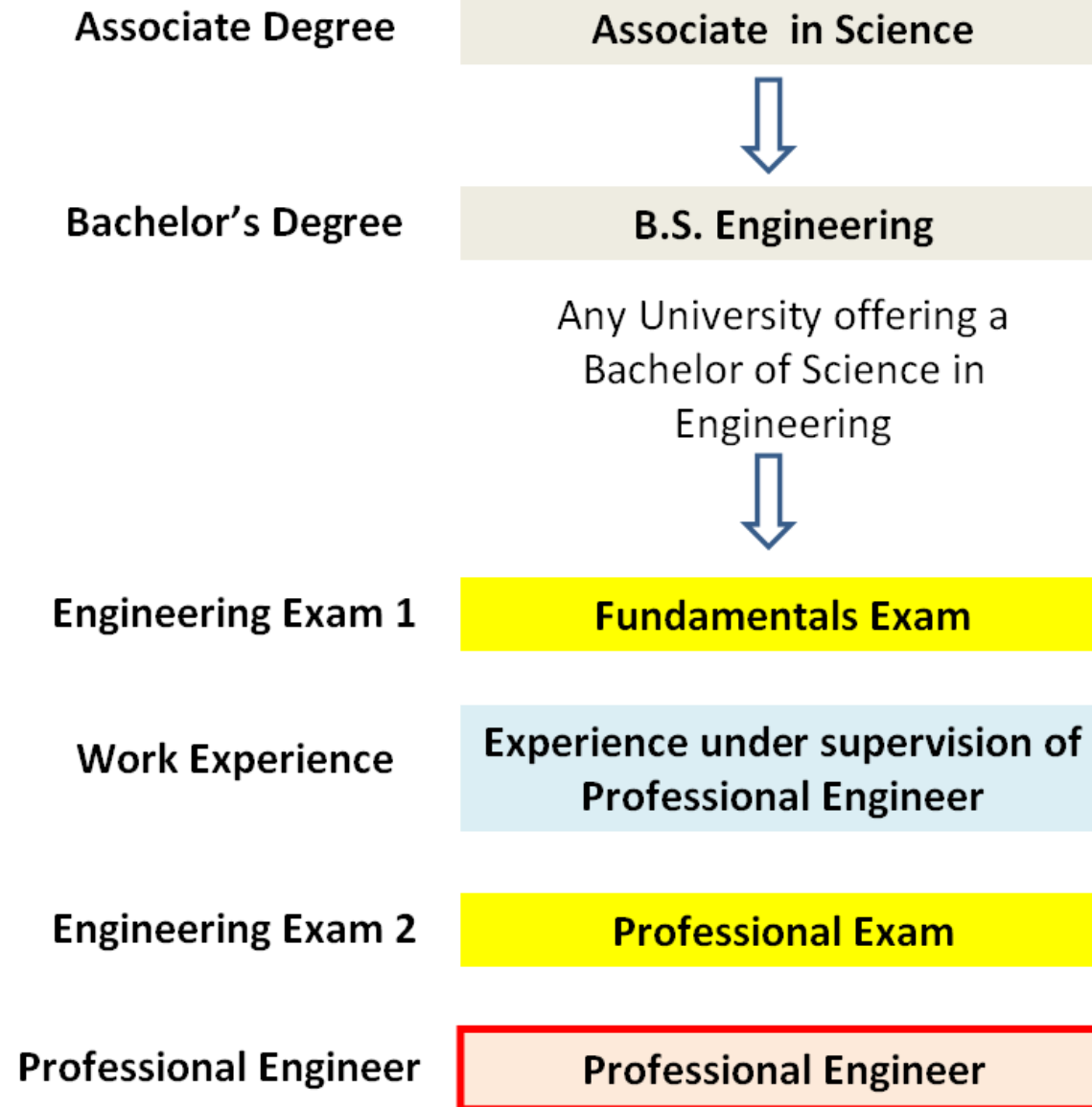
Reference: ctetrailblazers.org

Does the engineering profession pay well?



Reference: grabcad.com

The Path to Engineering



Professional Engineers and Land Surveyors Laws. (2011).

Scholarship:

- MCCC S-STEM Scholarship Program (SAMS) Scholarships for Advancing Mercer STEM Students
- Five year, \$600,000 program designed to provide scholarships to financially needy STEM majors (biology, chemistry, physics, computer science, engineering, technology, or math)

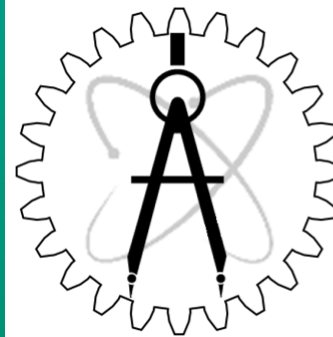


DaVinci Engineering Learning Community



Students are be able to:

- Attend engineering conferences and meetings
- Attend engineering field trips
- View engineering project presentations by guest speakers
- Participate in a student chapter of an engineering society
- Participate in weekly learning communities and study sessions



DaVinci
Engineering Learning Community



Engineering Website:



ENGINEERING SCIENCE and CIVIL ENGINEERING TECHNOLOGY at Mercer County Community College



[Program Coordinator](#) [Program Descriptions](#) [Introduction Presentation](#) [Advisement Package](#) [Professional Licensure](#) [Our Labs](#) [Articulation Agreements](#) [Course Offering Schedule](#) [Student Resources](#)

Engineering Science and Civil Engineering Technology

Welcome to Mercer County Community College's Engineering Science and Civil Engineering Technology Page. We hope this site will provide an introduction to our programs and to the engineering profession. Thanks to the college's commitment to our programs, we've seen significant enrollment increases in recent years. We look forward to welcoming you to a challenging and rewarding career in engineering. Please feel free to contact me if I can be of assistance.

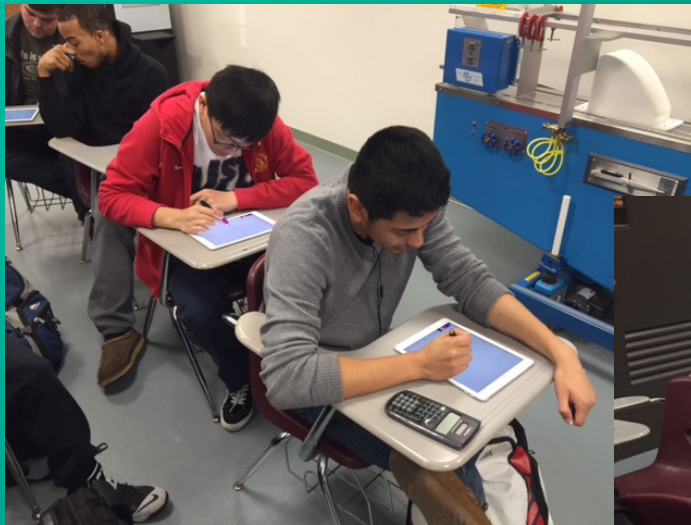
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Engineering Technology Video Discover Engineering and Technology Careers



Classroom ipads:

- Interactive, engaging learning environment
- Capture and review/discuss student-generated material



Online/hybrid courses:

Using the Ultimate Strength Design Method, design a simply supported rectangular reinforced concrete beam for the loading shown. DL= 3 k/ft, LL=4 k/ft, L=25', fy=60 ksi, f'c=4,000 psi. Design for bending only. (assume DL included the beam weight) DL = Dead Load; LL = Live Load

$$\rho \longrightarrow \frac{Mu}{\phi b d^2} \quad (\text{Table A.13})$$

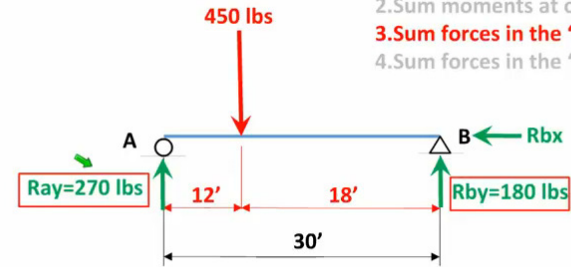
ρ	$\frac{Mu}{\phi b d^2}$
0.0123	657.7
→ 0.0124	662.3

(Table A.13)

$$\rho_{ave} = 0.01235$$

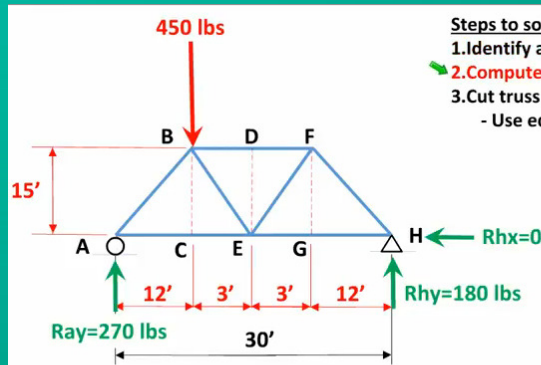
Steps to solve for reactions:

1. Draw free body diagram
2. Sum moments at one support
3. Sum forces in the 'y' direction
4. Sum forces in the 'x' direction



Sum Forces in the 'y' direction (assume up +)

$$+ (R_{ay}) - (450\text{lbs}) + (180\text{ lbs}) = 0 ; \quad R_{ay} = 450\text{lbs} - 180\text{ lbs} = 270\text{ lbs}$$



Steps to solve for reactions:

1. Identify any zero force members
2. Compute reactions
3. Cut truss to find member forces
 - Use equilibrium equations



Mercer Majors:

- Engineering Science
- Civil Engineering Technology
- Electronics Engineering Technology
- Advanced Manufacturing Technology
- Building Construction Technology

NJIT

The College of New Jersey

RUTGERS



**FAIRLEIGH
DICKINSON
UNIVERSITY**

Rowan
University 

A detailed technical drawing or blueprint is visible on the left side of the slide, partially obscured by a white curved graphic element. The drawing shows various lines, dimensions, and annotations, typical of an engineering or architectural plan.

Contact Information

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