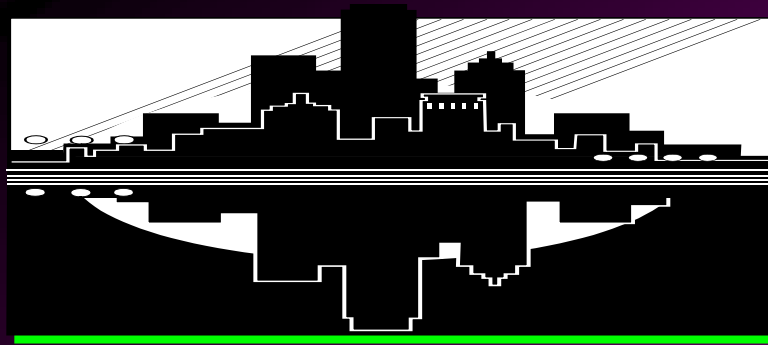


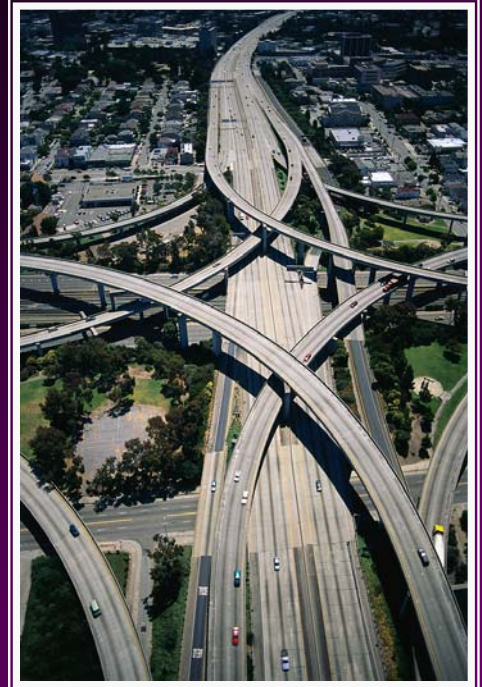
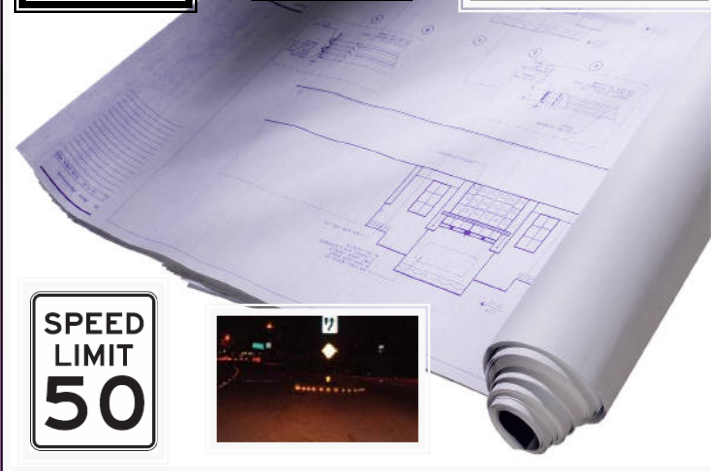
CAREERS IN TRANSPORTATION & ENGINEERING

Presented by:

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City of Santa Ana, CA
Public Works Agency,
Traffic & Transportation Engineering





What is Engineering?



The application of:

scientific & mathematical principles
to obtain practical ends for the

Design, Construction, or Operation of
efficient, economical, & environmentally sound
Structures, Equipment, or Systems for

Just about **EVERYTHING AROUND YOU!**
involves Engineering

What Are the Branches of Engineering?

Four Main Types of Engineers

Civil -

Buildings, bridges, transportation, traffic, water, soils, environmental, planning, tunnels, soils, seismic, airports, construction, surveying, foundations, ITS, retaining walls, sound walls, grading, transit, railroad & highways...



Electrical -

Computers (hardware/software), electronics, electrical designs for buildings, lighting, and transportation systems, systems design, & intelligent transportation systems (ITS)...

Mechanical -

Automobiles, engines, airplanes, space shuttles, design of heating & cooling systems & mechanical systems for buildings...

Chemical -

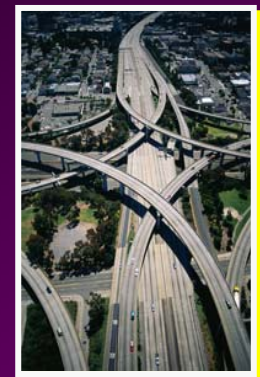
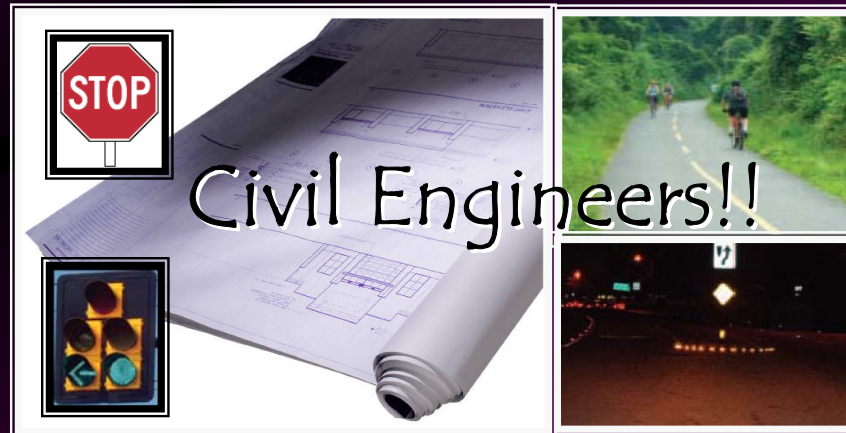
Chemistry related products, environmental, toxic waste, & petroleum related products...



What is Infrastructure?

All roads, structures, bridges, pipelines, channels, traffic signal & communications cabling/conduit, drainage & sewer/sanitary pipes, water lines, storm drains, and rail lines, etc. Our society depends on infrastructure for the transportation of people & products.

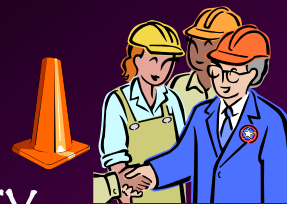
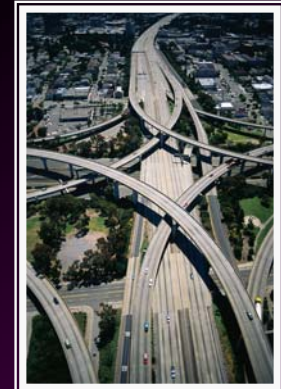
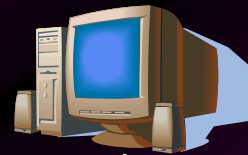
WHO TYPICALLY DESIGNS INFRASTRUCTURE?





Where Does An Engineer Work?

- Outdoors—"in-the-field"
- In an office
- At a factory or manufacturing plant
- In a lab
- At a research center
- At a university or college
- At a construction site
- For a governmental agency
- For a private consulting firm
- Or start your own business



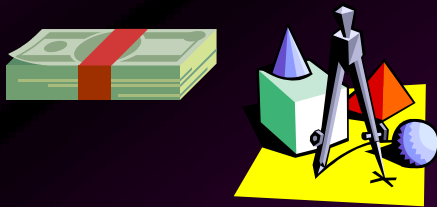
Career Options in Transportation

- Be a City Traffic Engineer /Transportation Manager
- Be a Traffic Engineering Consultant
- Design Freeways, Mass Transit, Rail or Street Projects
- Design Traffic Signal, Striping or Traffic Control Plans
- Design High Tech Intelligent Transportation Systems
- Work in/Operate a Traffic Management Center
- Conduct Traffic & Parking Studies
- Become a Professor (Need Master's Degree +)
- Work at a Research Facility
- Invent New Innovative Products/Devices
- Become an Expert Witness in Transportation
- Manage Large or Small Projects
- Run Your Own Engineering Business



Opportunities in Transportation

- Local & State Funding Increased \$\$—Need for Engineers
- Many are Retiring—Leaving a Gap in Engineering
- Development Projects Still Active—Economy Affects
- Early Management Opportunities Likely
- Can Work With the Public Directly or Not
- Qualified Engineers to Help Recommend Standards
- Diverse Career & Unique Transportation Challenges
- Salaries on the Rise....\$135,000 by 2009 for Senior Civil Engineers at City of Santa Ana & Other Increases



*Proposition 42, Measure M,
State Bonds 1A & 1B & the
Public Wants Improvements!!*

Steps to Becoming An Engineer

- Obtain a Bachelor's of Science Degree (4+ years)
- Pass the "Engineer-in-training" exam*
- Accrue engineering experience
- Pass the professional engineer's (P.E.) exam*



NOTE: Once you pass the P.E. exam, you become a licensed engineer in the state you took the exam. Having a P.E. license allows a person to sign and approve (stamp) plans. It is a license which indicates a person is authorized to practice in engineering, kind of like how a doctor or lawyer is licensed to practice in their professions.

THE P.E. = THE "BAR" OF ENGINEERING

** Although the P.E. is not required for some areas of engineering, best to get it in case future career switch & if every you may be designing or approving design plans.*

Getting Started--Engineering Internships

- Participate & Volunteer in ITE & ASCE & Other Engineering Organizations—**Network, Network, Network!!**
- Get to Know Your Professors & Professionals in the Field
- Ask Questions & Seek Advice
- Build Good Relationships With Other Students & Beyond
- Obtain Engineering Internships & Volunteer if Necessary
- Get Work Experience & Build Communication, Writing & Customer/Service/Sales Skills.... Sometimes it is Less About the Technical & More About People & Negotiation Skills
- Strive for Balance!! **Schedule Relaxation & Play too!**



Applying for the Job!

Resumes:

- Show What You Have Done in the Active Voice
"Led," "Participated in," "Initiated," etc.
- Keep the Same Tense Throughout
- Review & Recheck So No Spelling/Grammatical Errors
- Attend Workshops
- Should Not Be More Than One Page Early In Career!
- Be Truthful
- It is Often Your First Impression
- Show Volunteer Work & Breadth of Skills
- Show Leadership & Teamwork

Applying for the Job!

Interviewing:

- Share Your Skills & What You Have Learned & Done
- Be Aware of Interviewer's Body Language
- Show Genuine Enthusiasm But Don't Be Desperate
- Think About What Employers Want! (Motivated, Honest & Dedicated Employees With People Skills Who Have Initiative & Are Problem Solvers, Rather Than Problem Creators!)
- If You Haven't Done Something, Don't Say You Have. Instead Suggest How Other Skills Might Relate to the Skills Being Sought Out—DON'T Try to B.S. Anyone! Instead, Just Get Your BS!! 😊
- Learn From Every Interview (Good or Bad)
- Good Eye Contact & Try Not to Overstress Yourself!
- Remember, Interviewers Are People Too!

Civil Engineering Skills

& For All Engineers....

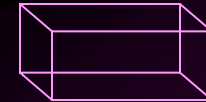
Drafting ability --



Plan View
or TOP View



Side View



3-D View

- Ability to read design plans (blue prints, etc.)
- Reasonable mathematical and scientific competency
- A logical mind
- Field, construction, and surveying experience = A plus!
- Computer ability – AutoCadd, Intergraph, Microstation, spreadsheets, etc.
- Should have a visual sense – Perhaps you enjoy reading maps & are practical in how you do things. You may also have a good sense of direction.

Seek **engineering internships** while in college or in the summers. Volunteer if you have to! Companies & governmental agencies often **hire interns**.

To become a P.E., make sure your engineering school is "ABET ACCREDITED." Talk to counselors & attend orientation programs for additional information.

Traffic Engineering—Special Skills

- Communications Skills: Verbal & Written
- Dealing With the Public--When Angry—It's Not Personal
- Sales Skills: Removing Objections & **Feel, Felt, Found**....
- Presentation Skills, Powerpoint & Speak So Can Be Heard!
- Mix Between Technical/Science & Human Behavior/Psychology
- An Underestimated Profession Which is Surprisingly Broad!
- Fun & Challenging!

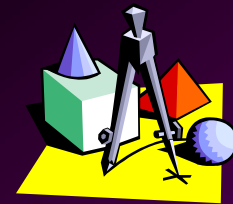


THERE IS A LOT TO DO & GET DONE!!!

Phases of a Large Project

To Be Planned & Built—Why So Long?

- Planning
- Environmental studies EIS/EIR
- Conceptual design
- Preliminary engineering
- PSR, PR, preferred alternative studies
- Final design (PS&E phase), the plans used for construction
- Construction of the infrastructure
- As-built survey and plans to confirm what was actually built.



SEISMIC DESIGN: Design of structures so that they will not collapse under an 8.0 (richter scale) earthquake.

Paying for Engineering Degree

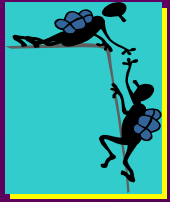
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Don't Let Money Stop You!

\$

- Apply for **scholarships** and **grants**
- Take required college entrance exams, PSAT, SAT, ACT, etc...
- **Work!** It builds your **resume** and your **character!!!**
- Start at a junior college first if money is an issue and transfer for your last 2 years to an "**ABET**" school
- Good grades in high school can help lead to scholarships (talk to your counselor)
- Borrow if necessary –student loans are a great deal & pay off!
- Plan ahead and save now too! It's worth it!
- Take drafting classes, etc.
- There's also plenty of **writing** in engineering
- Stick with your **math/science** classes even when tough
- Good **communicators** are needed in Engineering!

▪ **GOOD LUCK & GO-FOR-IT!**



Engineering Career Steps



Overcoming Challenges!

- You Apply for but Don't Get Your First Engineering Job:
Don't Fret—Learn From Both Good & Less Pleasant Situations
- You Work Somewhere But Don't Have A Fully Positive Experience:
Learn How You Would Have Handled Things Better as An Employee, Team Member & Future Manager or Supervisor
- You Don't Get a Promotion You Were Qualified For:
Be Open to How You Can Improve For the Next Time—Learn From ALL Disappointments. Remember That Less Pleasant Experiences Just Make You a Stronger Person!
- Keep Your Cool & Calm Even in Tough Situations:
If Upset, Don't Immediately React, Step Back & Let Things Settle Before Planning an Appropriate Reaction or If it is Best to Let That Go
- If Having a Tough Time at Work or in a Class:
Get Assistance/Tutoring & Work With Others to Identify & Overcome Obstacles



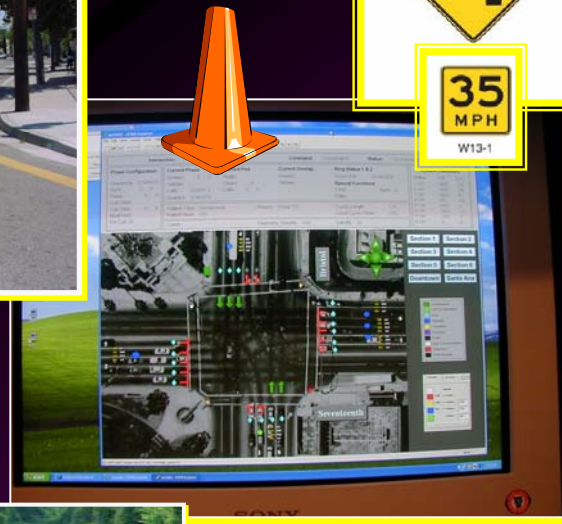
Always Try to Understand the Perspective of Others & Your Employer

Careers in Transportation & Engineering

THE TRAIN OF TOMORROW?
How About TODAY!



Questions?



Careers in Transportation & Engineering

Best Wishes in Your Career!



GOOD LUCK & GO-FOR-IT!

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