



# Civil Engineering Session

## K'Nex Bridge Activity

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# Civil Engineering?



Civil Engineers design & build structures to support the progress of human civilization!



# Civil Engineering Sub-disciplines?



First thing you do after waking up ....

**Use the Toilet!**

## Environmental Engineering



Other Environmental Engineering work



Dump Areas



Environmental Assessment



Waste Water Treatment Plant

# Civil Engineering Sub-disciplines?



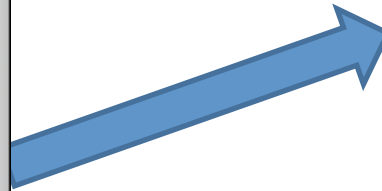
SECOND thing you do after waking up ....

Take a shower (water!)

## Water Resources Engineering



Water Resources (Lakes, Rivers, ....)



Water Demand

(Houses, factories, ....)

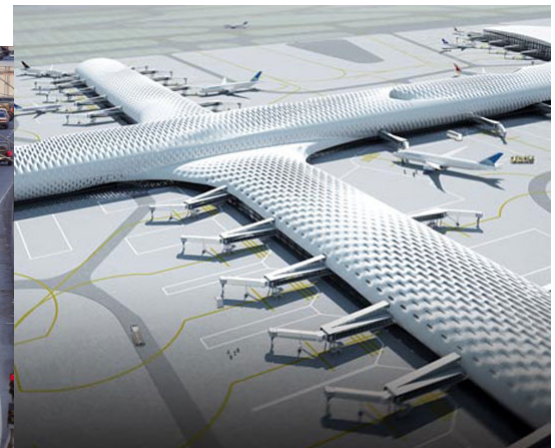
# Civil Engineering Sub-disciplines?



How do you go to School?

Transportation (car, bus, train, ...)

## Transportation Engineering



# Civil Engineering Sub-disciplines?

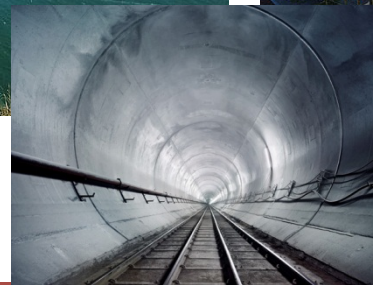


Where do we live, study, and work?

Buildings (homes, offices, .....)

## Structural Engineering

Other structures: bridges, tunnels, tanks, stadiums ....



# Civil Engineering Sub-disciplines?



What is wrong with this tower?

**Soil Stabilization!**

**Geotechnical Engineering**



Beaver Dam!



**Earth Dam**

# Civil Engineering Sub-disciplines?



Who constructs all these structures?

**Contractors!**

## Construction Engineering



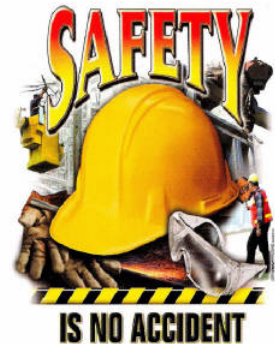
Time



Cost



Crews



# Civil Engineering Sub-disciplines?



**Environmental Engineering**

**Structural Engineering**

**Geotechnical Engineering**

**Water Resources Engineering**

**Transportation Engineering**

**Construction Engineering**



# ***K'NEXercise***

## **Pedestrian Bridge Construction**

- Critical need for a pedestrian bridge across El Camino Real between CalTrain and SCU.
- Traffic Engineers have noted a distinct **safety concern** for pedestrians
- Traffic Engineers have also noted light signal timings to allow for pedestrian crossings delays traffic.

# You are the Contractor!



- Costs = labor + materials
- Must adhere to provided plans
- Purchase materials from K'NEX
- Labor costs = \$10/person/second
- Any bridge that fails the load test or does not meet project specifications is disqualified
- Lowest successful cost is the winner

- **Bidding is 30 minutes**
  - read contract directions
  - study plans
  - submit first order
- **Delivery and Inventory**
  - delivery of parts
  - may inventory parts, but cannot connect any parts
- **Construction**
  - Running clock \$\$\$
  - Quality control
- **Load test**

# ***K'NEXercise***

## **Pedestrian Bridge Construction**

# ***Bidding***

***K'NEXercise***  
**Pedestrian Bridge Construction**

***Delivery &  
Inventory***

***K'NEXercise***  
**Pedestrian Bridge Construction**

# ***Construction***

***K'NEXercise***  
**Pedestrian Bridge Construction**

# ***Load Testing***



## Follow Your Heart & Passion!

## Best wishes for your future career!

