Paper Outline:

Topic : Brooklyn Bridge

1. Project Requirement:
2. Objectives: need a bridge to connect New York to Brooklyn

* East river crossing was difficult if not impossible in the winter
* Traveling time was too long
* City growth accommodation needed

1. Constraints: not easy to build because of complex surroundings

* Water surface: 800 - 5,600 meters
* Water deep: 80 - 92 feet
* A lot of sediments in the deposit because of tides

1. Project: build a suspension bridge
2. Scoping:
3. Stakeholders:

* US Government
* NY State
* City of New York & City of Brooklyn
* New York Bridge Company Investors
* The Public

1. project manager: John Augustus Roebling and his son, Washington Roebling
2. description of the project proposal: suspension bridge
3. Planning:
4. the work of the project:

* Span of 1600 feet
* Bridge would be 135 feet above mean high tide
* The Bridge would have 2 lane roadways suspended from two 276 feet stone towers
* Use steel instead of iron
* Include a cable pulled train
* Include a pedestrian walkway

1. Estimating it would last 5 years
2. Estimating cost $10,800,000 in which $7,000,000 would be the spent on the bridge and $3,800,000 on the land required.
3. Governance:

* Prominent Engineers reviewed the plans
* Congressional approval required
* State charter granted to "New York Bridge Company"
* Project Manager(s)
* New York & Brooklyn
* 8 trustees from each city

1. Estimating risk:

* Technical risk: first suspension bridge more than 500 meters
* Project management risk: 5 years mean many changes
* Organizational risk: more than 2,500 workers and involved many departments
* External risks: weather decided outside project

1. Launching:
2. Recruiting the project team: assigned Kinglsey & Keeney Contractor Firm to concentrate on hiring the work force
3. Setting up work schedule
4. Communication and Change Management:

* Met with engineer team regularly
* Gave progress report to the stakeholders
* Any changes from the original plan needed to be accompanied by a detailed report
* Changed details of the truss work to make sure 135 ft. clearance was adhered with minimal impact to the project
* Requested 1000 tons of steel to stiffen the roadway

1. Monitoring and Controlling
2. Many changes (problems ---solutions)
3. Problem: The death of John Augustus Roebling

Solution: his son, Washington Roebling became the project manager

1. Problem: cannot reach the depth of foundation for Brooklyn Tower which was designed first

Solution: adjusted according to the fact and Brooklyn Tower could have a sallower foundation

1. Problem: Caisson led to a disease and death

Solution: ignored it

1. Problem: Government requested an increase of 1.8 meters in height at the central clearance of the bridge and the bridge from 28.8 meters to 30.6 meters

Solution: accepted them

1. Problem: Washington Roebling became crippled

Solution: his wife shared his work

1. Human Resources:

* At any given day, there were about 600 men working on the bridge.
* More than 2,500 men were involved in the work in the caissons.
* 100 men would quit a week, but 12 per 1 were willing to take the job.
* Workers ethnic background was prominently Irish, Italian, German, and Russian.
* Workers were paid about $2 dollars per day, with an increment of $2.75 per day after a strike.
* Between 20 and 30 people died from accidents and effects of the construction of the bridge. The bridge company didn’t take an official tally of the deaths.

1. Time Management

Schedule

* + - * Project Started in 1867
      * Construction started in 1870
      * Construction completed in 1883
      * Original completion time estimate : 5 years
      * Actual completion time: 14 years
      * Almost 3 times more than estimates

Delays

* Accidents
* Financial
* Labor
* Project Changes
* Materials

1. Cost Management
2. Cost Schedule

* Original Cost was $7 Million, and land about $3.8 M = 10.8 Mil
* Roebling estimated the Cost to end up $9.5 M or over by $3 Mil
* When Completed the total cost was $15.5 Mil over by $4.7 Mil

1. Why Cost went up?

* Increase size and clear height

- Width from 80 to 85 ft.

- Height clearance to 135 ft.

- Cost $413,000 or %8

* Materials

- Steel instead of Iron

* Unanticipated costs
* Funerals, general superintendence, legal expenses, others
* Labor salary

- From $2 a day to $2.75 a day

* Losses occasioned by delays in construction

- Fires, cables, climate

e. Risk management

* Foundation Type
* Depth of foundation
* Caisson

Risks:

\*Fires

\*Disease

* Strength of cables

1. Quality management

Wire Fraud: Lloyd Haigh the provider of the wire for the cables

substituted substandard wire.

* Quality Control

After inspecting the material of the wires, the inspectors concluded that the material was faulty and that the strength of each strand of wire did not meet the original requirements.

* Quality Assurance

\*Roebling decided to add 150 wires more than planned.

\*Roebling simply decided to modify his original

specification(process) in order to improve the strength(quality)

of the strands

1. Procurement management

* Constant supervision of how the materials were made.
* Roebling also traveled around and took notes observing how material needed for the bridge was used in other projects

1. Closing

* 2 (276 feet) Towers made of Limestone and Granite
* 2 Anchorages
* 4 Supporting cables
* 7 Traffic lanes
* 4 for Carriages
* 2 for Trains
* 1 Promenade

1. Assess the project’s success

* Completion time : 14 years (NO)
* Total Cost: $15.5 M (NO)
* All features and functions delivered (YES)
* Connect with my project: conflict lead to problem. How do I solve this?