**The Brooklyn Bridge**

**The problem:**

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

**Solution:**

* Project plan:

Build a suspension bridge to connect New York to Brooklyn.  
Span of 1600 ft.  
Bridge would be 135 ft. above mean high tide  
The Bridge would have 2 lane roadways suspended from two 276 ft. stone towers  
Use steel instead of iron  
Include a cable pulled train  
Include a pedestrian walkway  
Would be a Toll Bridge

* MOV

New York and Brooklyn united  
Travel between the 2 cities quicker/easier  
-Not hindered by weather  
-More people could cross at a time  
Good source of revenue

* 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

* Stakeholders

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

* 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

* Human Resources

Committee will take care of all job placements, and assigned Kinglsey & Keeney Contractor Firm to concentrate on hiring the work force.  
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.

* 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

* Cost Management

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

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



* Risk

Measured

-Qualitative (metrics/based on ranking)

-Quantitative(mathematical models)

-Foundation Type  
 -Depth of foundation  
 -Caisson - A structure which is hollow inside and allows people to work underwater by providing a pressurized environment allowing to work in it.  
 Risks:  
 \*Fires  
 \*Disease  
 -Strength of cables

* Quality

Quality Control

-Looks at specific results to see if they conform to the quality standard.

Quality Assurance

-Focuses on the quality process improvement.

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

Procurement

* -This area focuses on a set of processes performed to obtain goods or services from an outside organization.

&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

**Deliverables**

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

**Was the project a success?**

\* Completion time : 14 years

\*Total Cost: $15.5 M

All features and functions delivered