Reflections on lessons learnt from failures in projects

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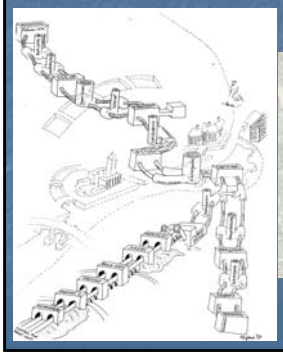
Agenda

- Some simple examples of failure
- What is Project Success?
- Odd one out?
- Problem Solving
- Problem Types
- Conclusions

Case Studies from my direct experience

Copenhagen Metro



Project Complexity - Systems

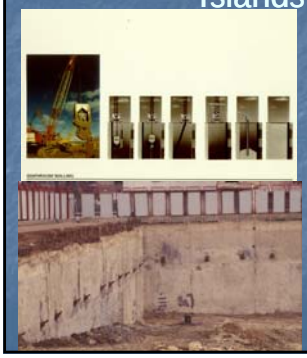
Project Complexity - Behavioural

carillion · SAE INTERNATIONAL · BACHY SOLETANCHE · STRABAG · NCC · ASTALDI · Transport- og Energiministeriet · NFM · ANSALDO · COWI A/S · Ørestadsselskabet

cOMET was a specially-formed working co-operation between six engineering companies from Denmark, England, France, Italy and Austria. These are Carillion PLC (UK), SAE International (France), Bachy Soletanche (UK), STRABAG AG (Austria), NCC Danmark A/S (Denmark) and Astaldi (Italy).

Copenhagen Metro
Islands Brygge (TBM)

Copenhagen Metro
Islands Brygge



Copenhagen Metro
Havnegade Shaft

6.7 billion DKK or 8.7 billion? (30% increase) 2 billion DKK Claimed in 2000 still outstanding

Understanding what is meant by project success is crucial

Heathrow Express Collapse

Record fine after tunnel collapse

One of the worst civil engineering disasters for 25 years. Builder Balfour Beatty has been fined a record £1.2m for the collapse of a tunnel at Heathrow Airport, which put lives at risk and caused the cancellation of hundreds of flights.

The tunnel collapsed in the early hours of October 21, 1994. Fortunately no-one was in the tunnel at the time.

However, the court was told that the collapse could have crushed to death people using the nearby Piccadilly tube line and the judge hearing the case, Justice Peter Cresswell, said it was "luck more than judgment" that this did not happen.

Huge crater

The collapse could have ended in real disaster. The engineering disaster caused a huge crater to appear between the airport's two main runways and caused damage to car parks and buildings. It took months to clear up the damage. The collapse occurred during the construction of a tunnel for the Heathrow Express Rail Link.

Balfour Beatty pleaded guilty to failing to ensure the safety of both its employees and members of the public. Austrian engineering firm Geoconsult, which was responsible for monitoring the progress of the Heathrow Express Link, was also fined £500,000. The judge ordered both companies to pay a further £100,00 each in costs.

Terrible disaster

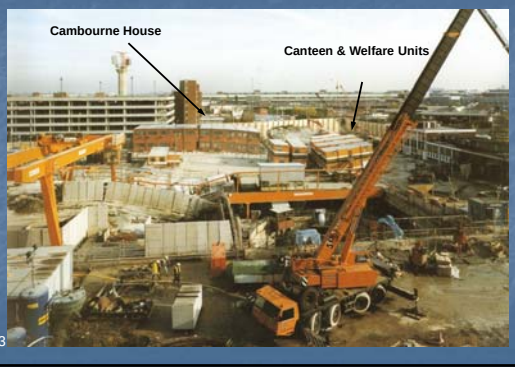
Justice Cresswell said: "This was one of the worst civil engineering disasters in the United Kingdom in the last quarter of a century. The tunnels were being built below part of the world's busiest international airport and there was considerable potential for harm."

Both firms were found guilty of failing "seriously short" of the appropriate standards and reasonable steps, resulting in serious breaches of the Health and Safety Regulations.

Martin Thurgood, of the Health and Safety Executive, told the BBC: "This level of fine sends a clear message to the industry, whether (to) the client's designers, contractors or sub-contractors, that they do need to take full account of workers safety and public safety in the way in which they go about their business."

Balfour Beatty, based in Edinburgh, is one of the UK's largest building groups, and is part of the engineering group BICC. It said it deeply regretted the accident. The tunnel's collapse delayed the opening of the Heathrow Express by six months and caused long hold ups on part of the Jubilee line extension, where engineers were using similar building techniques.

Heathrow Express collapse



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Normal Accidents

A normal accident typically involves interactions that are "not only unexpected, but are incomprehensible for some critical period of time." The people involved just don't figure out quickly enough what is really going wrong. A normal accident occurs in a complex system, one that has so many parts that it is likely that something is wrong with more than one of them at any given time. A well-designed complex system will include redundancy, so that each fault by itself does not prevent proper operation. However, unexpected interactions, especially with tight coupling, may lead to system failure.

Odd one out?

Millennium Wheel 2000

THE MILLENNIUM WHEEL received a further setback today as it was revealed that its opening may be pushed back to February. The delays stem from a problem discovered just before the wheel, or "BA London Eye" as the ad suits prefer to call it, was due to launch on New Year's Eve. Safety officials were concerned with a clutch attached to one of the passenger capsules. A further safety check has discovered that all the capsules' German made clutches are faulty and need replacing. Originally the operators of the wheel, British Airways, had planned to fully open at the end of January. Early rides which were reserved for the media, staff and prize-winners may now be postponed. Paid for rides, due to start at the beginning of February are also in doubt.

14-01-00

London Eye 2006

The London Eye is an observation wheel that completed construction in 1999 and opened to the public in March, 2000. As of June 2007, it is the largest observation wheel in the world, although there are larger ferris wheels, such as The Star of Nanchang, and a contender for the title in the Singapore Flyer due for completion in 2007. The London Eye has become the most popular paid for UK visitor attraction, visited by over 3.5 million people a year

Millennium Stadium

April 2001	Oct 2001
£100m	**£1**

The O'Rourke Construction Group of Essex has finalised details of its takeover of the construction arm of Laing Group for a nominal fee of £1.

O'Rourke was named as preferred bidder last April, when the division was expected to go for £100 million.

However, the price was dramatically reduced as spiralling losses on its fixed-price contracts such as the Cardiff Millennium Stadium came to light. Instead, Laing will take a £30 million disposal loss - the value of its net assets

Sydney Opera House (1960)

- The construction was estimated to take about five years at a cost of A$7 million.
- The government pressured Utzon into starting construction in 1959, two years ahead of the architect's proposed schedule.
- Unfortunately the roof shells were too heavy for the supporting columns that were already built, so these were demolished and rebuilt. These and several other setbacks led to delays and increasing cost overruns.
- In 1965, Australian Premier attempted to force Utzon reduce costs by withholding payments.
- In 1966 Utzon resigned and returned to his native Denmark taking the plans for the interior with him.
- The project was finally completed in 1973. Its total cost amounted to an astronomical A$102 million, almost 15 times the estimated budget.
- The design of the interior never matched the exterior.

Sydney Opera House (1990)

- In 1992, the Australian architects' professional body, which was complicit in his sacking in 1966, awarded the architect a commemorative medal and an apology.
- In 1994, research by architecture student Philip Nobis resulted in an exhibition that showed how the Opera House interiors would have looked had Utzon been allowed to complete the project. This clearly demonstrated that the unexciting interiors, inferior acoustics and other problems would not exist had the architect's plans been implemented.
- In 1999 Utzon, although unable to travel, agreed to collaborate with Sydney architect Richard Johnson on this necessary work with his son Jan acting as a liaison
- On April 7, Jørn Utzon, the architect who designed the Sydney Opera House, was awarded the 2003 Pritzker Architecture Prize
- Its events attract some two million visitors each year, making it one of the world's most popular cultural institutions and an icon for Sydney and Australia.

The Millenium Dome 2001

When historians of the future look back at Britain in 2000 the Dome will figure as a failure. There was that disastrous opening night, when the good and the great had to queue for hours in the cold at Stratford underground station. There were those ridiculous visitor forecasts, drawn up not on the basis of sound research but as the only way to make the books balance. There were too few managers with the right experience and too many meddling politicians, too many changes of mind and too little clarity of vision which is why the Dome ended up as an uncomfortable cross between a theme park and a museum. It was, in truth, far too ambitious. The politicians and the Millennium Commission wanted an exhibition which would encapsulate the very best of modern Britain, a beacon to the rest of the world, the most exciting and enjoyable experience available at the Millennium anywhere. We ended up with a striking upturned wok and the Body Zone, a modest success as an exhibition, a gargantuan financial and political failure - but a wonderful story for journalists

The O_2 2007

A decade on...the Dome finally works. Tonight the Millennium Tent re-opens as the O2 Arena. What has happened inside the Tent is extraordinary, not least because it has been virtually covert. Since there is a roof already in place, construction of a vast 23,000 arena could not be achieved with conventional tower cranes. Instead, tools called stand-jacks were used to build from the ground up. The result is astonishing: if anything, the Tent filled with a building looks more frighteningly huge than it did empty. The arena was designed by HOK Sport, the American specialist architectural firm also responsible for the Emirates Stadium.

Problem Solving

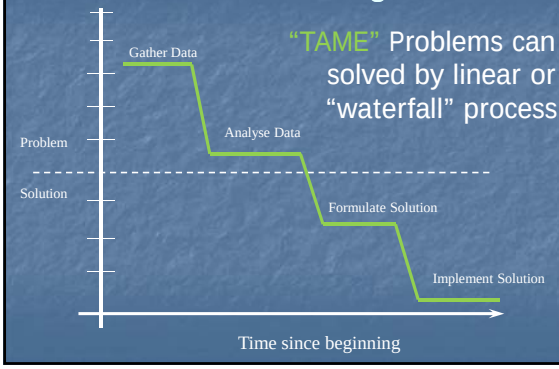
"Successful problem solving requires finding the right solution to the right problem. We fail more often because we solve the wrong problem than because we get the wrong solution to the right problem".

Russell Ackoff, 1974

Problem Types

- Tame Problems
- Systems Complexity
  - Messes (Ackoff 1970)
- Behavioural Complexity
  - Wicked Problems (Rittel & Weber 1973)
- Wicked Messes (Roth & Senge 1996)

Problem Solving



"TAME" Problems can be solved by linear or "waterfall" process

Systems Complexity

- Clusters of interrelated or interdependent problems
- Messes (Ackoff 1970)

"*MESSES*" meet the following criteria:

Organisational Complexity - clusters of interrelated or interdependent problems, or systems of problems.

Messes are puzzles; rather than solving them we ***resolve*** their complexities.

Cannot be solved in relative isolation from one another.

Behavioural Complexity

- Conflicting social ethics and beliefs
- 'Wickedness' (Rittel & Webber 1973)

"WICKED PROBLEMS" are characterised by:

An ***evolving set of interlocking issues and constraints*** - no definitive statement of the problem (no understanding of the problem until the solution has been developed).

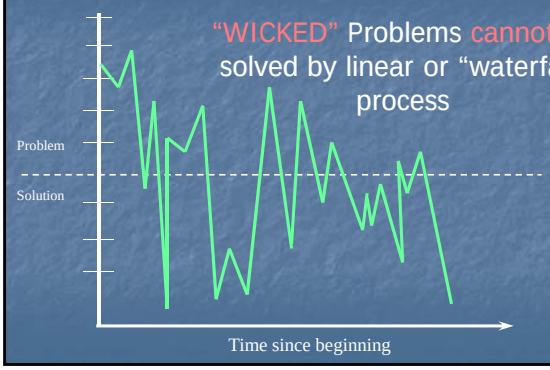
Many stakeholders - the problem solving process is fundamentally social (getting the right answer is not as important as having stakeholders accept the solution).

The constraints (resources, politics) ***change with time*** - stakeholders come and go, change their minds or change the rules.

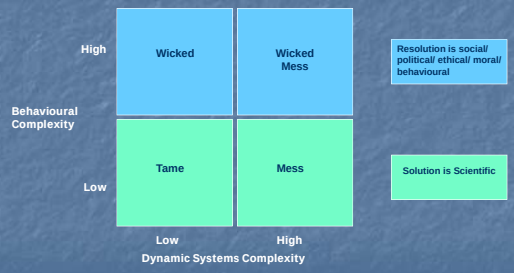
Since there is no definitive Problem there is no definitive Solution.

Wicked Problems

"WICKED" Problems cannot be solved by linear or "waterfall" process



Boston Matrix



Wicked Problem Solving

Resolving **"*WICKED MESSES*"** is "*SATISFICING*"

(H. Simon 1956)

Because of the number of stakeholders, changing constraints and dynamics of the problem, there is no ideal solution-it is "as good as it gets" or "good enough"

The Problem solving process ends when resource (time, money energy etc.) runs out!

Therefore we need a different approach when handling project management with respect to problems which are not Tame

Summary Conclusions

- During strategic & initial (design) stages of project you should expect a predominance of '*wicked*' problems and fewer technical and tame problems therefore communication and understanding is more complex and crucial.
- Need to define success at the beginning in both 'hard' and 'soft' terms.
- Dialogue and understanding (Communication) within workshops is key to managing behavioural risk on projects.
- Need to have the *whole system* represented during early decision making [holistic approach].
- Present project management practices underplay behavioural and systemic aspects.
- The integration of project into business is often ignored

"When all you have is a hammer, everything looks like a nail".

- Japanese Proverb