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Engineering Terrorisms

Technological ingenuity, innovation and impact in urban terror 1807-2011

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What contributions to terrorism has engineering provided? Discussing 9/11 Chandra Mukerji (2003) stated that the WTC buildings had been made "vulnerable to a social type that has until recently seemed impossible in the culture: the terrorist engineer." However, this is not correct as the engineer as well as artifacts of engineering have been central throughout modern terrorisms (Fridlund 2007). To sketch this historical role of engineering to terrorism four cases of (urban) terrorism are discussed, exploring engineering as technological ingenuity in the form of engineering knowledge and technological expertise, as technological innovation focused on the novelty and conservativity of the technologies used, and finally as technological impact in the way it effected on subsequent technological development and material artifacts.

There are hundreds of definitions of terrorism and the one used here is rather politically neutral and fits with history. It defines terrorism as "violence or its threat intended as a symbolically communicative act in which the direct victims of the action are instrumentalized as a means of creating a psychological effect of intimidation and fear in a target audience for a political objective", (Jackson 2011) defining it as an instrumental tactic used by states - as in our first case - as well as non-state groups alike.

Copenhagen 1807

Terrorism's modern emergence as an intentional strategy and tactic is generally considered to be the French Revolution's 'Reign of Terror'. Its character of state terrorism it shares with the 1807 Bombardment of Copenhagen, a successful assault where British military bombarded the besieged capital into surrendering the city and the nation's fleet (Fridlund 2011). This is sometimes referred to as the first urban terror attack against civilian targets as it used primary symbolic instrumental violence rather than functional military (Fridlund 2011)., i.e. it was used to create as stated above, 'a psychological effect of intimidation and fear in a target audience for a political objective,' in this case ensuring Denmark's fleet would not support Napoleon.

The technological dimension of the Bombardment was traditional as well as innovative. The dominant technology used in the bombardment was ordinary siege technologies in some 14.000 metal balls, explosive and incendiary bombs from cannons and mortars -- but the British added a new terror technology in the form of some 300 'Congreve rockets' carrying explosives or incendiary materials. Rockets, used against British in colonial wars, had from 1804 been appropriated and adapted by William Congreve, at the Royal Arsenal at Woolwich, who for the early 19th century was more or less an engineer, educated at Cambridge and the Royal Military Academy before being attached to the Arsenal. At Copenhagen the rockets were operated by a special group of civilian experts under Congreve's direction and one rocket importantly succeeded in burning down the city's cathedral which assisted in the city surrendering.

The bombardment impacted both civilian and military Danish technologies. New Copenhagen buildings after 1807 were built to impede the spread of urban fires. Among the military impacts were that Denmark had to use small navy vessels to replace its former large navy ships and that it like other countries set up their own rocket corps.

Fig. 1 *Celebrating engineering terrorisms. Commissioned portrait by James Lonsdale of William Congreve and his rocket corps at the Bombardment, next to screen-grab from a 2002 al-Qaeda produced video with a celebratory Osama bin Ladin voice-over showing "Engineer Mohamed Atta's Regiment" that attacked the Northern WTC building (Sources: Royal Danish Naval Museum website & The Internet Archive)*

St Petersburg 1881

Sub-state rebel terrorism first emerged in 1870s Russia with the first self-identified terrorist organization. This was the social revolutionary party *Narodnaya Volya* (The People's Will)which since 1879 had waged a failed assassination campaign against Czar Alexander II before their success in 1881.

Narodnaya Volya's attacks were technologically pioneering to terrorism. Among its several members trained in science and engineering the engineering and medical student Nikolai Kibalchich was central. Kibalchich led the group's bomb development which used self-manufactured gelignite, a powerful industrial blasting dynamite invented in the 1870s by Alfred Nobel. Except for an insurance fraud attempt in 1875 to use a dynamite bomb to sink a cargo ship, dynamite had not been used as bombs. The group's failed attempts can be said to have followed industrial mining practice in using dynamite in stationary bombs and mines buried under railroads, bridges, streets and rooms where the Czar was expected to pass. But it was not until Kibalchich designed a small dynamite hand-grenade that the two engineering students Nikolai Rysakov and Ignacy Hryniewiecki with two grenades killed Alexander II when he rode his steel-enforced carriage through St Petersburg (Fridlund 2007).

Following this dynamite bombs were used by political militants such as Fenians, anarchists and social and anti-colonial revolutionists and by the early 1900s dynamite bombs and the "Russian Method" of terrorism were global phenomena. (Anderson 2005, Jensen 1981, Marks 2002, Knepper 2010) Locally, in St Petersburg assassinations targeted more government officials leading to increased protective measures with government officials arming themselves or using various personal protective devices. Furthermore, a large church was built around the czar's assassination spot.

Fig. 2 *Public and personal material impact of terrorism. Church erected on Alexander II:s assassination spot next to an early 20th century steel-enforced briefcase used by government officials in St Petersburg as protection against terrorist assassinations. (Photos by author)*

Washington DC, New York and Shanksville 2001

The four terrorist attacks on September 11, 2001 were preceded by a long harbored fear of a new catastrophic terrorism with terrorists' use of weapons of mass destruction to kill thousands of people. But when realized the new terrorism was actually not using any of the expected terror technologies such as cyber terrorism or chemical, biological, radiological or nuclear (CBRN) weapons. On the contrary it was based on a very traditional and often less lethal terrorist tactic in the form of airplane hijacking. But it was actually by innovatively reconfiguring that tactic and the technology of passenger jets that terrorist engineers inaugurated a new post-9/11 era in the history of terrorism.

Key perpetrators of the 9/11 attacks had formal or informal engineering training. The terrorist engineers Osama bin Ladin and Khalid Sheikh Mohammed were both part of conceiving the plan of innovatively reconceptualizing and reconfiguring an airplane passenger jet into a "human cruise missile" through suicide hijacking with trained pilots (Hoffman 2006). Also three of the terrorist pilots of the hijacked planes Mohamed Atta, Ziad Jarrah and Marwan al-Shehhi had finished or were enrolled at the German Technical University of Hamburg-Harburg. In addition, the pilots had acquired advanced technical operational skills essential for the attacks through pilot education and by practicing on commercial flight simulator technologies. The weapon technologies used in the attacks were however available commercially, either as simple box-cutters and knives or as explosive gasoline-filled airplanes. And with the exception of the failed attack on the US Capitol Building, that was foiled through passengers' use of mobile phone technologies, the attacks succeeded or surpassed their primary aim. It is likely that, in addition to civil engineering structural knowledge primarily among bin Ladin and Atta, such engineering skills as logistics, project management and structured problem solving was key to the attacks' outcome.

The technological scale and scope of the impact of the attacks has been overwhelming and difficult to summarize or analyze comprehensively. Globally, it greatly contributed to 2000s wars in Iraq and Afghanistan with their vast material impacts as well as the introduction of a number of technological protective measures and restrictions primarily to international financial, information, communications and transportation infrasystems.

Locally, in addition to the new skyscrapers built in New York and the rebuilding of the Pentagon, there has been nation-wide efforts to introduce security technologies to protect institutions and the public such as various security bollards, barricades, magnetometers, CCTV cameras and surveillance systems. However, some of these local protective measures have been scaled back and some expected national changes - like stricter building codes - have not materialized. Finally there is also a discernible 9/11-effect on international engineering and technological research as well as on patents directed towards terrorism-related topics (Fridlund & Nelhans 2011a, 2011b, 2011c).

Oslo and Utøya 2011

The Norwegian terrorist attack in 2011 differs in important ways from the previous cases. Despite initial claims and fears it appears that only one individual terrorist, Anders Behring Breivik, was responsible for the attacks. Nevertheless, he succeeded in effectively using traditional and tried terrorist technologies – in the form of a deadly car-bomb – exploding at the government offices in Oslo and gun shooting at a political youth camp on the island Utøya – to generate national terror and trauma as well as debate nationally and internationally about his ideological grievances.

The attacks also differed in combining two different terrorist violence and terrorist technologies. For the Oslo bombing Breivik used one of urban terrorism's "brutal hardware and quotidian work-horses" (Davis 2007) in a 'traditional' improvised time-fused car bomb and for the island massacre he used a semi-automatic pistol and semi-automatic rifle. He also differed in lacking any formal technical training or education that beyond providing him with computer experience prepared him for designing the fertilizer-based car-bomb. He appears to be self-taught as a bomb-maker and primarily using information found on the Internet together with practical tests. In addition he gained further training and preparation from attending shooting club practice and from playing the combat simulation game *Call of Duty: Modern Warfare*. The majority of the technology used – fertilizers, the car, the gun and the rifle – were commercially available and legally acquired. The manufacture of a functioning car-bomb appears to have followed rather traditional lines except for the design of the detonator where he is supposed to have done innovative development work (Bjørgo 2012).

It is still too early to analyze the attack's technological impact but certain is that the government headquarters in Oslo has to be repaired and possibly relocated and that Oslo is going to introduce a higher number of bollards as protection against car bombs. Furthermore also a video game used by Breivik in his preparations was removed by a large chain from their stores while it is not known if new regulations will be introduced to restrict access to guns.

Engineering and terrorism

All in all, what these cases demonstrate is that such man-made disasters as terrorism attacks are engineered and technological through and through and like other instances of engineering that means to combine traditional and novel technical materialities and social operating procedures in new and efficient ways to accomplish ones' own or others ideological projects.

Whether we like it or not, terrorism and engineering share aims in wanting to change our world and disrupt our agreed ways of living our lives by putting forward new better ways of doing things. And like in engineering in general there are often vehement and violent disagreements about what those 'better ways' are and mean.

References

Anderson, Benedict. 2005. *Under Three Flags: Anarchism and the Anti-Colonial Imagination.* Verso.

Bertho Lavenir, Catherine. 2002a. "Bombes, protes et pistolets: Les âges médiologiques de l'attentat," *Cahiers de médiologie*, 13: 17-35.

Bertho Lavenir, Catherine. 2002b. "Bombs, Printers, and Pistols: A Mediological History of Terrorism" , *History and Technology*, 19: 54-62.

Bjørgo, Tore. 2012. Personal communication.

Davis, Mike. 2007. *Buda's Wagon: A Brief History of the Car Bomb.* Verso.

Fridlund, Mats. 2007. "Helvetesmaskinerna: Terrorismens teknologi från giljotinen till videokameran", in: *Terror-ismer,* Per Vingaard Klüver, Helle Møller, Espen Kirkegaard Espensen, & Anne Sørensen, eds., *Den jyske Historiker* 115: 127-151.

Fridlund, Mats. 2011. "Buckets, Bollards and Bombs: Towards Subject Histories of Technologies and Terrors", *History and Technology* 27: 391-416.

Fridlund, Mats & Gustaf Nelhans. 2011a. "Terrorens ingeniørkunst: Teknik og videnskab efter 11. september", in Malene Fenger-Grøndahl, ed., *11. september: Verdens tilstand ti år efter.* Aarhus & Köpenhamn: Aarhus Universitetsforlag, 263-279.

Fridlund, Mats & Gustaf Nelhans. 2011b. "Science and 'The 9/11-Effect': The Mutual Shaping of Terrorism, National Security, and Scientific Research During the Last Ten Years", *Science Progress,* Washington DC: Center for American Progress. www.scienceprogress.org /2011/09/science-and-the-the-911-effect/.

Fridlund, Mats & Gustaf Nelhans. 2011c. "Naturvetare i kriget mot terrorismen", *Tvärsnitt: Tidskrift för humanistisk och samhällsvetenskaplig forskning* 33(3-4): 80-84.

Hoffman, Bruce. (2006). *Inside Terrorism* (2nd ed). Columbia University Press.

Jackson, R., 2011. 'In Defence of "Terrorism": Finding a Way through a Forest of Misconceptions', *Behavioral Sciences of Terrorism and Political Aggression*, 3(2): 116-130.

Jensen, Richard Bach. 1981. "The International Anti-Anarchist Conference of 1898 and the Origins of Interpol", *Journal of Contemporary History,* 16: 323-47.

Jensen, Richard Bach. 2004. "Daggers, Rifles and Dynamite: Anarchist Terrorism in Nineteenth Century Europe", *Terrorism and Political Violence,* 16: 116-53.

Knepper, Paul. 2010. *The Invention of International Crime: A Global Issue in the Making, 1881-1914.* Palgrave Macmillan.

Marks, Steven G. 2002. *How Russia Shaped the Modern World: From Art to Anti-Semitism, Ballet to Bolshevism*. Princeton University Press.

Mukerji, Chandra. 2003. "Intelligent Uses of Engineering and the Legitimacy of State Power", *Technology and Culture* 44: 655-676.

Royal Danish Naval Museum. 2007. *1807 – The Bombardment of Copenhagen and the Rape of the Navy*. www.orlogsmuseet.dk/1807_online/pics/142_s.jpg.