

How the West was Won: A Deconstruction of Politicised Colonial Engineering

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Abstract

History has taught us that the Global North's attempts to 'civilise' the rest of the world's population, both now and in colonial times, have been fraught with difficulty. This paper argues that this difficulty is mainly owing to the political standpoint and positioning of our perceived engineering and technical superiority. A failure to recognise this viewpoint and to change the way in which we work together—in a global sense—to solve issues such as climate change, threatens our ability to survive as a species. Political standpoints on such issues still assume a superiority of governments in the Global North. This paper retraces colonial engineering projects, mainly directed from the UK, that failed to consider the development of other populations in the world, and their needs. It is also posited that our exploitation in the Global North, which assumes historical superiority as a basic premise, will fail in tackling major issues. Change is needed through a decolonisation of engineering projects, and western engineering curricula that are used to train future professionals. Evidence of the impact of decolonisation on the engineering discipline itself is scarce, but nevertheless, a response is needed to ensure that a more inclusive curriculum and narrative is developed.

Keywords: decolonisation, engineering, history, technology, curriculum, development

ENGINEERING COULD be said to be the embodiment and symbol of civilisation, in the buildings, bridges, engines, wind turbines, solar panels, ships, aircraft, cars, trains, computers and many other technical achievements of historical and modern times. Engineers themselves can be agnostic to concepts of decolonisation, however, seeing technology as almost separate from those that use it and the way it is carried out, and more about how things are made and developed. The practice of teaching engineering in universities in the Global North takes little account of the development of the West, inasmuch as it is predicated on the subjugation and exploitation of what we now call the 'developing' nations. We sit in the present time with many historical symbols of this development which, although representing great technological leaps forward (for example, in construction—buildings, bridges), they also represent in some way the ill-gotten gains of colonisation. Moreover, once in receipt of this perceived wisdom and technological advancement, the West has seen fit to impose these technological developments

back on 'developing' countries—in a post-colonial reaffirmation of our perceived superiority. This approach is often without recourse to consider how this might impact local traditions, people's right to their environment and cultural capital, as well as neglecting countries' abilities to develop and to have developed their own technology. Symbols of the Global North's development, then, are not only politically charged but they also carry a weight of their colonial past and context. Some of this imposition continues to the present day, with new policies on climate change and also government funding programmes that issue a call to assist the developing world. The unquestioned view of a developed versus an undeveloped, or 'developing' world is part and parcel of what would be challenged in a decolonised engineering curriculum.

Case studies of colonial engineering projects serve as a guide not only to the mistakes of the past, but as a lens onto future projects and western standpoints on technology. Perhaps one of the best examples in this respect of colonial engineering has been the

building of the Suez Canal. The building of the canal, in the nineteenth century, was objected to by the British and in fact was deemed impossible as an engineering endeavour by them.¹ This engineering impossibility was a thinly veiled political resistance, rather than being based on any engineering technical issues. Britain did not want a canal to be built within an occupied territory—at that time the French were technically in governance and in fact built the canal with Egyptian labour. Britain did not want to occupy Egypt itself, but was very protective of the route because of its interests in trade from India, and its control of that territory.² It was in part an engineering development that led to a change in British attitudes about the canal after it had been built, namely the triple marine engine and water condensers. This technological breakthrough dramatically increased traffic through the canal, particularly increasing the competitiveness of steamships over sailing boats, thereby overcoming the uncertainties of the winds in the Red Sea. The vast majority of transit through the canal was British; the shipping tonnage in 1870 was 436,609, increasing to 5,074,809 in 1882 and over 20 million tonnes annually before the First World War. In 1875, Disraeli's government purchased a 45 per cent share in the canal, following an inability of the then owners to pay debts incurred by poor financial planning and bad luck. Britain effectively inherited the hard labour of the preceding years of construction, largely borne by forced labour on the local population. This was in spite of Britain's previous apparent opposition to the use of forced slaved labour throughout the building of the canal. There is no doubt, however, that the subsequent use of the canal helped to further colonise African countries, and Britain then attempted to impose its colonial credentials to further political gain, a all the way through to the Suez crisis in the 1950s. This chain of politically charged events seems hardly surprising given the strategic importance of the canal to world trade, and it offers an example of a deeply divisive engineering project that cannot be separated from its impact on the world stage. Interestingly, the political will for engineering changed at different times during the project,

which led to attempts to suppress the build that had no basis in technical considerations.

This historical example serves as a reminder of the disconnect that exists between engineering and politics, but we would be wrong to assume that similar disconnects do not exist today. Mike Muller from the University of Witwatersrand has written about decolonising of engineering in South Africa, in particular, water projects in that region. He speaks of problems with the inheritance of colonial decisions made in the past, with new elites taking poor decisions over projects and not basing decisions on engineering expertise. He states that such decisions 'raise(s) sharp questions about the role of engineers in a 'post-colonial' South Africa. Should they simply serve the new leaderships and build whatever they are told, regardless of better options? This lived reality of many government technicians surely does not represent decolonisation.'³

One of the problems that Muller highlights is the differing timescales between engineering and politics. While engineers might plan decades ahead, politicians are often more concerned about immediate impact, particularly on a voting population and their grip on power. In respect of colonial lessons to be learned, he also says that 'While the past obviously influences the future, it is useful to maintain separate perspectives, to avoid the trap of path dependence. Otherwise, if future strategies are primarily a response to the past, the past will continue to determine the future'.⁴ This is a theme we will return to when discussing the West's approach to climate change.

Path dependencies also exist in the hierarchies imprinted into societies by the colonising powers. One path dependency that is a common approach of the 'coloniser' is to build infrastructure within the country, and follow this with exploitation and extraction of value. There are imprinted hierarchies and 'racial ordering' that exist in many countries—such as Nigeria—that as white-western engineers, we do well to learn more about what happens when 'imposing' technology. Structurally internalised racisms are endemic because of colonisation, and in the postcolonial world, have impacts today which are felt acutely by the local population and are hard to shift from the collective mind. Our

understanding in the Global North is not properly attuned to situations that may be interracial, complex, geo-politically specific, and based on many hundreds of years of historical colonisation and postcolonised neglect.

Many myths exist surrounding Britain's own contribution to colonial engineering and its impact on the world stage. It is perhaps not surprising that a recent government poll, conducted in relation to current attitudes to colonisation of the past, showed that by a majority of three to one people thought that the British Empire was something to be proud of.⁵ In these pre-Brexit, perhaps soon to be post-Brexit times, it is hardly surprising either that political parties might use this public-sway as ammunition to garner support for a resurgent Britain. The poll also showed that people overwhelmingly thought that British colonies are now better off because of colonisation (by 45 per cent to 15 per cent), and some 35 per cent still wished we had an empire. Perhaps some of these beliefs are based on misconceptions of the infrastructure that we supposedly developed to build that empire while we were a colonial power. The idea that we can once again 'rule the waves' and export our great nation to the rest of the world persists as a concept, if not in actuality, but certainly in our positioning of the postcolonial collective mind.

An example of an historical misconception that perhaps fuels these modern-day attitudes are the railways in India. The building of the railways in India was cited by the poll as one of the major contributions to the country, so it is worth exploring their history in a little detail. The truth is far more nuanced, and not evidenced by the positioning of a far superior occupying power over a less developed occupancy. The railways themselves were conceived by the East India Company, whose sole purpose was to benefit 'the commerce, government and military control of the country', not the common people.⁶ The railways also had a major impact on the people of Britain, particularly those who invested in them, providing a healthy return. Investors got a doubling on their investment, paid from Indian, not British, taxes.⁷ As already intimated, the sole purpose of the infrastructure was to benefit the occupying powers, with human cargo being

a second thought. Racist approaches to their use, and also their running, prevailed. Second class carriages were inadequate in size, resulting in overcrowding for the local and largely non-British population. Non-whites were not permitted to work on the railways either, at least not as ticket collectors or operatives, but herein lies another hidden truth of the railway infrastructure: Indian mechanics became so adept in the workshops in the 1800s during the building of the railway infrastructure that they soon became able to make better and more competitive engines than those being made in Britain.⁸ This led to legislation being imposed to prevent competitive production. As an addendum to the story, many of the practices of the Indian engineers were later co-opted into modern day production methods—a lasting legacy for engine manufacture in the UK today.

Another historical perspective that deserves mention is the import of non-white colonial expertise. When the Empire Windrush docked into the UK on 21 June 1948, among the occupations listed amongst its largely Caribbean passengers were engineers. These engineers were brought to the UK to help rebuild a postwar Britain, but even before they landed there was much political hostility to their entry to the UK, with fears that they would take the jobs of white British workers and take over British society.⁹ This fear is a common theme when attitudes to immigrant populations are studied historically—and also in the present time. Engineering as a profession has very large skill gaps, which cannot be 'plugged' by the UK's native population alone. According to the UK government's own study, there is a need for 186,000 skilled recruits each year until 2024.¹⁰ Engineering UK put the shortfall of UK graduates in engineering at 20,000, which is probably a conservative estimate. This means that there will surely be a reliance on imported skills if we are to sustain our lead in areas such as composites engineering (my own discipline of engineering), for instance. This could be plugged with a greater emphasis on curriculum change, and decolonisation is one way to achieve this, since it would attract a much more diverse range of graduate engineers onto our courses. But placing them in front of a

white-western directed curriculum will not achieve this.

So, what of the discipline of engineering itself? How is it responding in the West to a decolonisation agenda, and who is best placed to decide how that is done? With some irony, this article is written by a white westerner, which does beg the question as to who defines the agenda, and does that matter? In other disciplines, such as social sciences and politics, it has been said by non-white authors that the whole decolonisation issue holds personal and professional resonance.¹¹ Having to navigate two worlds—where the subject of the academic discourse and person(s) undertaking the study are representative of the group—is a commonly reported experience, particularly by women of colour.¹² Positioning of white authors on decolonisation is fraught with issues, and perhaps not something to be covered here, though the obvious deficiencies of such an approach should be acknowledged. An informed decolonised approach to engineering needs the thread of experience of the colonised and postcolonised. As Noxolo insists, ‘there are material conditions of experience out of which both postcolonial and, crucially decolonial, writings emerge’.¹³ But is engineering the same as other disciplines, and are the elements of its curriculum so tangibly tied to a personal experience? It would seem so from an historical perspective, but also in a modern context there are elements of engineering that need more of a global conversation and dialogue, and less of an imposition and framing of the subject by a white-western dominated train of thought.

Research funding in the science and engineering discipline within the UK is an area that has in recent years positioned itself with an almost colonial superiority; in particular with reference to the Global Challenges Research Fund (GCRF). The announcement of the funding itself in 2016 was worded as follows:

The Global Challenges Research Fund (GCRF) is a new Resource funding stream announced as part of Spending Review 2015. It provides an additional £1.5bn of Resource spend over the next five years to ensure that UK research takes a leading role in addressing the problems faced by developing

countries. This fund will harness the expertise of the UK’s research base to pioneer new ways of tackling global challenges such as in strengthening resilience and response to crises; promoting global prosperity; and tackling extreme poverty and helping the world’s most vulnerable.¹⁴

The very wording of this statement suggests that the West (in this case the UK) has the answers to an impoverished developing world. The funding allocation focusses on stereotypical ‘issues’ that are often only perceived. These deficit models of intervention are common, and the ‘white saviour’ approach to their implementation is an easy trap to fall into. This is not to critique projects that have been undertaken; more the positioning of the West and its perceived unique ability to address the issues. The scheme itself does require the funded groups to engage locally with agencies in the countries where projects are being developed. This approach is not without some of the issues that have been already shown to exist, and have existed historically, playing heavily on the success of the research. This then begs the questions of who is involved in the research and who actually benefits from the findings academically. This very subject has been recently discussed in the area of field ecology, but little has been discussed in this respect within the engineering field.¹⁵ Beneficiaries of GCRF funding are often perceived as the populations of the countries with the ‘issues’, but two-way benefits to academic publication are not easy to ascribe, since different drivers and cultures may exist. Critiques of the GCRF programme in the context of a colonial approach are few and far between. Noxolo, however, points out that

the material concern is that the GCRF throws substantial amounts of money behind a colonialist approach that, as seen in the 2015 White Paper, views knowledge as something to be extracted and applied, resulting in measurable ‘impact’ in relation to global challenges, and with the emphasis on value for money for the UK taxpayer¹⁶

This approach of knowledge extraction, with the primary beneficiaries of the research being the UK-based academics, has parallels with many of the colonial engineering

projects highlighted so far. Some approaches to a decolonisation of engineering in South Africa have been discussed, where incorporation of elements of social justice are included in order to enhance wider participation from a much more diverse cohort.¹⁷ These approaches in a UK context have not been widely adopted or even discussed in much detail. The Royal Academy of Engineering recently issued a report entitled *Designing Inclusion into Engineering*.¹⁸ The report, while not actually using the term 'decolonisation', does discuss topics around the 'socially responsive engineer' and models to incorporate diversity within the curriculum. But does this social responsiveness alone go far enough? With ever increasing numbers of international students on courses in the UK, it is high time that curricula and research programmes are given more relevance, and that will mean wider discourse and equitable contributions from the countries of origin into these programmes. Another approach to decolonising curricula, though with reference to the sciences, has been suggested by Gill. Here, the approach is to use interdisciplinary treatment, which Gill reminds us 'emerged through ethnic studies, black studies, and women's studies in the '50s, '60s, and '70s as a means of critiquing power in the face of disciplinary mechanisms that reproduced certain relations of power'.¹⁹ Interdisciplinary approaches, argues Gill, do not simply take two disciplinary methodologies and merge them.²⁰ Considerably more radical questions and approaches are developed in an interdisciplinary approach, and this may be a way to counter the positioning issues of an engineering curriculum based on colonial thought. Positioning of the West as a 'superior' and relatively more advanced will not hold sway in a truly interdisciplinary curriculum, nor is it a true reflection of the modern or the historical world. The time for a change in this approach is now, and greater efforts should be placed on this change.

On diversity within the engineering profession itself, there is a lack of non-white and female professionals. Fewer women and BAME (Black-Asian-Minority-Ethnic) engineering graduates choose to go into an engineering profession upon graduation and the numbers of non-white students has remained

fairly static (fewer than 2 per cent of academics in engineering are black, for instance).²¹ Surely this cannot be remedied with an insistence on a curriculum that posits the West as superior in its development, focussing on the triumphs of its engineering capability. Greater emphasis must be placed on achievements and influence of other countries on the West's development, making engineering progress more relevant to all. More two-way learning on issues such as climate change will be necessary for workable solutions. An almost historical straight line can be drawn through the enslavement of the Global South by colonial powers, leading to the latter's enrichment and ability to industrialise, and therefore to be one of the primary contributors to climate change. Engineering clearly played a huge part in this development, and yet it is rarely taught or positioned in this way. Decoupling engineering in the present, from its past, will be required in order not to repeat the same mistakes. Moreover, the impacts of climate change are in essence a 'racist crisis', as Sealey-Huggins points out, with non-white populations bearing the brunt of its effects and consequences, and yet not having the 'power' within a structurally racist system of oppression. Indeed, 'Dominant accounts of climate change too frequently rest upon an amnesia about the social relations emerging from imperialist and colonial projects'.²²

Engineering challenges around issues such as climate change demand governments and technical experts to work together, with the best decision-making tools developed on an equal basis, and not unduly influenced and imprinted by the colonial past. Those path dependencies highlighted by Muller must be deconstructed and revaluated. Cultural capital and indigenous knowledge must be built into a decolonised curriculum. The narrative of how the West was won, with engineering playing the larger part, is politically charged and skewed in favour of the protagonist. How countries of the Global North and South deal with this colonial legacy will weigh heavily on the future. As engineering professionals and educators, it is our responsibility to begin the journey of engaging in this discourse, and to begin programme of decolonisation if we are to affect the life chances of the human population. Only by

doing this can we come up with the necessary diverse solutions to the problems we face. These will involve technical solutions from a much wider range of engineering professionals and other disciplines to navigate colonial imprints and structures.

Key recommendations

- Implementation of a decolonised engineering curriculum that takes account of the true picture of the development of countries in the Global North, and acknowledges the real contribution of the Global South on progress in the discipline;
- Wider discourse and a global conversation on what decolonisation in engineering means;
- Use of historical perspectives within the engineering curriculum;
- Inclusion of a wider set of engineers from different countries in western curricula;
- Repositioning of western engineering in terms of its dominance on the world stage;
- Less reliance on colonial positioning of the past, influencing future decision making on engineering projects.

Notes

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