Engineering Action: Tackling Homophobia in Engineering

A joint report by the House of Commons and InterEngineering reviewing barriers to inclusion for lesbian, gay, bisexual and transgender (LGBT) engineers and prospective engineers and the associated negative affect this is having on productivity in industry.

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Alec Shelbrooke MP

InterEngineering

Connecting, Informing and Empowering LGBT Engineers and Supporters

Dr Mark McBride-Wright CEng MIChemE

Engineering Action: Tackling Homophobia in Engineering

"It came as a genuine surprise to me to read in an engineering journal that in this day and age such a high level of homophobia can exist in a professional, white collar sector. This report not only highlights this problem, but also lays out a proactive approach for the sector to tackle this issue.

It is apparent that most people would be shocked if they realised that their behaviour could not only be deemed, but actually is, homophobic bullying, especially to those who are grappling with the decision to come out.

The basis of this report is to recommend that these attitudes, and indeed this behaviour, can be transformed through proactive, educational teamwork and leadership. Companies which have adopted such an approach have seen an almost 30% increase in productivity as a direct result of a happier and more cohesive workplace. In this day and age, such antiquated views about people's sexuality should only be something we read about in the history books. It is my ambition that over the coming years someone's sexuality will not be stigmatised in the workplace, be in the office or on site, and people will speak freely about their family lives without fear of ridicule and bigotry. This is especially important when you consider the need to recruit almost a million engineers over the next decade if Britain is to remain a world leader.

Many people would not consider themselves to be bullies, and indeed would recoil at the thought. Therefore programmes which highlight how damaging and hurtful certain attitudes and phrases could be will be one of the biggest steps to improving the workplace environment for all employees."

Alec Shelbrooke MP BEng

"As a graduate trainee engineer at BP in the 1960s, it was immediately obvious to me that being gay in business and most definitely in the oil business, was unacceptable. Even as chief executive of BP in the 21st century, I was worried coming out of the closet would damage critical business relationships.

It seemed to me that keeping my professional and personal worlds separate was better for each of them. In hindsight, I was very wrong. During my career at BP, the environment for LGBT people underwent profound change, but being in the closet prevented me from seeing this clearly. Hiding my sexuality made me deeply unhappy, and I was a more reserved leader as a result.

This report explores the consequences of failing to create an inclusive work environment. It shows that when people are not comfortable bringing their whole selves to work they do not engage, and productivity suffers as a result. The engineering industry is an integral pillar to the UK economy; it employs several million people and is the foundation of innovation and growth. Getting inclusion wrong therefore carries a huge cost to our society.

On the up-side however, the evidence shows that companies that engage employees most effectively, putting inclusion at the heart of their business model, see a 2 per cent outperformance over their competitors, year-on-year. With this in mind, this report offers some very helpful guidelines for companies, industry organisations and government, to help our engineering industry become a champion of LGBT inclusion and an even greater competitive force as a result."

Lord Browne of Madingley

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"When the Royal Academy of Engineering hosted an event on 'LGBT in Engineering' in 2014, it occurred to me that our community had never been pro-actively approached by engineering firms. LGBT diversity in both the banking sector and the law sector have improved dramatically since outreach initiatives began around 2005. Engineering is a similar heritage industry for the UK which contributes a lot to the UK economy, yet we lag significantly behind other sectors.

I founded InterEngineering to connect, inform and empower LGBT engineers and supporters. Our aim is to provide resources to early-career engineers who want to champion change from a grassroots approach, and we also work with senior executives in engineering firms to advocate change from top-down. This is all with a view to achieving a cultural change at middle-management level where managers understand the importance of diversity to an organisation.

This report is a call-to-arms for firms and institutes to become more aligned and pro-active in addressing LGBT diversity in engineering. I challenge all firms and institutes to enter Stonewall's Global Diversity Champions program and the Workplace Equality Index"

Dr Mark McBride-Wright CEng MIChemE

Acknowledgements

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With thanks to:

Lord Browne of Madingley, House of Lords

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1 Executive Summary

Note: "Homophobia" is used throughout this report to refer to homophobia, biphobia and transphobia. Where additional issues exist for the Trans community, these are highlighted.

- **The Engineering industry is losing a potential £11.2 billion due to lesbian, gay, bisexual and transgender (LGBT) engineers remaining in the closet due to a 30% reduction in productivity.**
- Engineering is behind the curve in terms of equality and diversity for lesbian, gay, bisexual and transgender (LGBT) people. A culture of homophobia and transphobia have become embedded among workers and this is having a negative impact on both workers and productivity.
- Engineers are afraid to come out for what they perceive to be both personal and professional risks in the workplace. The subtle atmosphere is interspersed with openly homophobic incidents that are swept under the rug, leading to people putting more of their efforts into concealing their true identity and suppressing their private lives when at work.
- Significant fears are also held by people if they were to come out as LGBT and the effect that this homophobic culture would have on their career progression.
- Surveys have shown that around half of LGBT people employed in Engineering are now choosing to remain closeted. A lack of visibility is created that feeds on itself as fewer people feel confident enough to come out and act as role models to others.
- The personal mental health risks that accompany trying to hide sexual identity from co-workers is a key reason that change needs to be enacted. Studies estimate that the side effects of the stress that is felt when trying to disguise their sexuality can take up to 12 years off their lives [1].
- Businesses that employ engineers also suffer as a result of the homophobic culture causing LGBT employees to remain closeted as the energy expended in hiding sexuality can reduce someone's productivity and engagement at work by up to 30% and could also reduce the productivity of those working around them [2].
- Engineering employers have the potential to generate an additional £27 billion per year from 2022 which is equivalent to the cost of building 1,800 secondary schools or 110 new hospitals. If the UK is to benefit economically from this, the UK will need to meet the forecasted demand for 257,000 new vacancies in engineering enterprises in the same timescale [3]. The lack of LGBT diversity as a result of latent homophobia is jeopardising this aim as potential LGBT engineers are being pushed towards more inclusive sectors.
- A clear set of goals needs to be established and universally adopted by engineering companies and supported by institutes to ensure that there is a reversal of the outdated attitudes that are preventing acceptance of LGBT people in Engineering. Diversity and inclusion programmes, 'allies', LGBT role models, unconscious bias

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training and reverse mentoring should be implemented to ensure homophobia is eradicated from Engineering.

- The private sector has the ability and incentives to act where government may find it difficult –politically, economically or otherwise. If government and the private sector work together, they can jointly bring about even better improvements for LGBT people [4].
- Diversity of thought at leadership level has been shown to lead to more inclusive workplaces and thus contributing to a more successful company performance.
- Companies that visibly support LGBT diversity often see benefits of an inclusive business culture encouraging other underrepresented groups. In Engineering, this includes woman.

Recommended measures engineering companies should implement:

1. Establish a diversity and inclusion policy;
2. Get the Board on-board;
3. Employee resource groups;
4. Role model programs;
5. Reverse mentoring;
6. Unconscious bias training;
7. Ally / supporter programs;
8. Supply chain requirements;
9. Share best practice;
10. Flexible policies for working overseas; and
11. Survey workforce and collect data to monitor over time.

Recommended measures engineering institutes should implement:

1. Diversity and inclusion requirements for approved corporate partner programs;
2. Diversity and inclusion award at annual awards ceremonies;
3. Uphold diversity and diversity and inclusion values globally as they expand across geographies; and
4. Survey global membership to track issues.

Recommended measures the Government should encourage / mandate that Engineering firms should:

1. Publish best practice guidance specifically for Engineering;
2. Be more active in implementing diversity & inclusion initiatives;
3. Implement supply chain requirements;
4. Collect data on the workforce on invisible minorities; and
5. Be more vocal in supporting LGBT engineers.

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2 Introduction

Across a range of sectors, there has been a notable growth in the implementation of equality and diversity programmes across firms of various sizes. Big players in the worlds of business, politics and law have all made significant strides in promoting diversity among their companies and between their employees. Gender, race, disability and LGBT equality have become the norm rather than the exception and companies have seen increasing diversity and productivity of their workforce increase as a result.

The Engineering industry is on a similar path, though it is still significantly behind other industries. An industry long considered to have been for men only, it has recognised the need to encourage greater interest in engineering careers amongst the female population if it is to meet the required significant flow of engineers by 2050 to remain competitive in the market, as laid out in the 2013 Perkins Review [5]. No longer does it want to be seen as a sexist industry where the typical employee is by default male.

Unfortunately, the same cannot be said for homophobia and transphobia in Engineering. InterEngineering is a not-for-profit organisation which aims to connect, inform and empower lesbian, gay, bisexual and transgender (LGBT) engineers and supporters. The organisation provides resources to early-career engineers to champion grassroots change, and liaises with executives and Engineering institutes to champion change top-down in engineering organisations. The goals is to embed change at middle-management level to improve diversity and inclusion. Since the launch of the network in December 2014, InterEngineering has worked with multiple engineering firms and institutes on improving LGBT diversity and inclusion in the workplace. InterEngineering received a copy of the supplementary comments from the "Attitudes in Construction" survey conducted by the Architect Journal [6]:

"It's not a secret that the Engineering industry has a lack of diversity in many areas, such as the small amount of female professionals operating within this industry; however, the other areas have been more actively and publicly tackled than LGBT diversity."

Discriminatory attitudes towards LGBT engineers have no place in today's society, yet they continue to blight the sector, contributing to the growing opinion that the Engineering profession is being left in the past. Just three companies that employ a large number of engineers were featured in the leading LGBT rights charity Stonewall's 2015 Workplace Equality Index: BP, EDF Energy, and the Armed Forces.

Surveys conducted within the sector to gain the views of LGBT engineers indicate that this problem is rooted far deeper than would be expected of such a highly-regarded profession. Less than half (46%) of gay engineers said they would be comfortable being out about their sexuality in the workplace [6].

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This report will:

1. Present the issue of homophobia in Engineering and the extent to which it exists;
2. Outline the reasons why change is needed in the industry and the benefits this will bring; and
3. Establish a plan of action from key stakeholders in Engineering including Engineering companies and institutes.

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3 Impact of LGBT Inclusion on Productivity of Engineering Industry

3.1 Engineering Industry in the UK

Each year, Engineering publishes data on the UK's Engineering sectors. The latest publication [3] shows that in 2013, the UK had over 565,000 Engineering businesses identified as within the Engineering footprint through the Standard Industrial Classification. These Engineering enterprises make up a quarter of the UK's businesses.

Engineering employs around 5.4 million people in the UK across all functions. In the year ending March 2013, UK Engineering businesses had made a turnover of £1.1trillion accounting for 24.5% of UK annual turnover.

Engineering is therefore a key industry for the UK and is a main contributor to the nation's wealth, and also a key industry in which people are employed. Table 3.1 lists key contributions to the UK economy from Engineering by sector.

Table 3-1: Data from EngineeringUK Annual Digest 2015 [3]

Sector	Enterprises	as %	Employment	as %	Turnover	as %
Manufacturing	124,250	21.6	2.38 M	43.8	£532 Bn	45.5
Information and communications	159,905	27.7	998,000	18.4	£176 Bn	15.1
Construction	152,730	26.5	949,000	17.5%	£145 Bn	12.4
Mining and quarrying	1,290	0.2	58,000	1.1%	£87.5 Bn	7.5
All other industrial groups	138,270	24	1.04 M	19.2%	£228.5 Bn	19.5
Total	**576,445**		**5.425 M**		**£1,169 Bn**	

3.2 LGBT in Engineering

As outlined above, Engineering employs around 5.4 million people in the UK across all functions accounting for 17.4% of the UK workforce ((5.4 million/30.98 million) x 100) [7]. Issues affecting the productivity of the workforce affect the economic output of the industry. Since homophobia in Engineering is an ongoing issue, this needs to be urgently addressed.

Understanding and solving the problem of homophobic attitudes requires an understanding of exactly who is affected by a widespread intolerance of LGBT employees within the Engineering industry.

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It is essential to consider the full LGBT spectrum of people when discrimination becomes a problem. A survey conducted into a sample group of 279 engineers found 6% state that they were LGBT, fitting in line with the UK government's estimation that 5-7% of the UK population is LGBT [8].

The study further demonstrated that of these people, 53% of LGBT respondents said that they were not open about their sexuality in the workplace, or were 'closeted'. A stark contrast appears when we compare this to the UK national average where figures show 34% of the UK population chooses to remain in the closet [8].

Further surveys demonstrated that 46% of participants would like to be out more but feel their work culture would not work positively [9]. This may be fuelled by the stereotypically 'macho' atmosphere that is attached to working in Engineering and especially Construction. Figures show that less than half of all gay engineers are comfortable being open about their sexual orientations with their immediate colleagues and this number falls to just 8% among those working on construction sites [6].

From Table 3-1:

- 100% of UK engineering workforce contribute to total £1,169 billion turnover
- 6% of UK population is LGBT. Assuming engineering sector has same composition of UK population, there are 0.06 * 5.425 million = 325,500 LGBT engineers.
- Overall turnover contribution from LGBT staff = 0.06 * £1,169 billion = £70.14 billion.
- If 53% of total LGBT engineers remain in the closet, 0.53 *325,500 = 172,515 LGBT engineers in the closet.
- Contribution to turnover from closeted LGBT engineers is 0.53 * £70.14 billion = £37.17 billion.
- Assume closeted engineers are 30% less productive [2], there is a **potential productivity loss of** 0.3 * £37.17 billion = **£11.2 billion from LGBT engineers remaining in the closet.**

Below are some supplementary comments from the "Attitudes in Construction" survey conducted by the Architect Journal [6]:

"Attitudes on site are about 15 years behind those in the office."

"I find the office environment completely different to the site environment. Inclusivity is encouraged in the office, whereas on site the fear/hatred/bigotry is palpable."

"Would consider coming out as gay to some close colleagues in my team/department… certainly would not be open about my sexuality if I ever work as a contractor on a construction site."

Lingering sexism also has an influencing role in the industry with lesbian and transgender engineers at a particular disadvantage from a classically straight-male dominated profession.

3.3 Productivity Plan

The Government has laid out its belief in the importance of productivity to the UK economy through its 2015 productivity plan: "Fixing the Foundations: Creating a more prosperous nation" [10].

"Higher productivity increases household incomes. Productivity is the single most important determinant of average living standards and is tightly linked to the differences in wages across countries" [10].

"Rising employment has been a major source of growth, but over the longer term, productivity is the more essential ingredient. UK productivity has persistently lagged behind other major economies and although it grew in the decades before the financial crisis, it has stalled sharply in the wake of the crisis" [10].

Individuals working in open, diverse, inclusive environments have higher levels of engagement and satisfaction, leading to greater productivity. They are more likely to speak up with suggestions to improve performance, and to "go the extra mile" and contribute to the culture of the company [11].

Targeting homophobia in the Engineering sector will fit in with the Government's aim to increase the productivity of the UK economy as this will the reduced productivity that accompanies peoples' decisions to remain in the closet. We estimate that if homophobia were to be totally eradicated in the workplace, the industry would stand to generate up to an extra £11.2 billion for the UK economy.

The above figure is based on the current UK workforce. EngineeringUK [3] notes that between 2012 and 2022 the UK will need 1.82 million people with engineering skills. The Perkins review [5] notes engineering has a "leaky pipeline": many students who study science and mathematics do not continue to study engineering at university; of those who do, a portion do not seek a career in the engineering sector after graduation. We need to be attracting the best talent to the industry in order to remain competitive. Students and current engineers may be attracted to other sectors due to the improved status of diversity and inclusion, and so this is an issue the industry urgently needs to address. This is compounded with 62% of current graduates who are out at university go back in the closet when they start their first graduate job [12].

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4 The Heart of the Issue

4.1 Explicit abuse

"The opprobrium… on site is just as rife in the office, with whispering campaigns, remarks like "backs to the wall boys, he's coming" equally common."

"The fear, hatred and bigotry is palpable."

"The gay movement is on the march. It is assertive, it proselytises."

Explicit homophobia is the most obvious form of discrimination within the industry. Jokes and slurs targeted at gay employees are a commonly reported factor that are especially prevalent on building sites, and also throughout offices. Over half of lesbian, gay and bisexual white-collar employees have reported harassment as a result of their sexuality in the workplace, having been snubbed or slighted at work.

Open homophobia, particularly expressed from a manager can be a serious problem as the tone is set for the whole office, but also increases the professional risk of coming out as gay as the employee's sexuality may act as a barrier to career progression and promotion. When surveyed, 33% of LGBT engineers reported that the felt their sexuality had acted as a barrier to their career progression [6].

It should also be noted that transgender employees face the most severe consequences for coming out when it comes to explicit abuse. One company in the US saw 90% of its transgender employees report harassment and discrimination over their sexuality and/or gender identity [13]. A further half also felt they had been fired, not hired or overlooked for promotion as a result of their sexual identity.

4.2 An underlying current

Homophobia is one of the few aspects left directly unchallenged on site. Racism was rife in the 1980s, and this has been significantly reduced due to it being challenged. While explicit abuse is the most obvious form of homophobic discrimination, it is the tacit, latent homophobia that shows where the problem is so deeply ingrained in the Engineering industry. Only 7.7% described open abuse and discrimination at work, but many found there was a subtler undertone within the industry as noted in comments from the E&T survey [9]:

"It's almost too subtle to describe."

"Casual homophobia is common in the Engineering industry…"

Casual jokes without intent, comments made in passing, or the use of the word 'gay' as an insult or to express frustration are all commonly reported in Engineering. Many who engage

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in this form of discourse see comments as 'banter' and may be a result of the 'macho' culture that is expected within the Engineering and Construction industries.

People who can be identified as homophobic may also express this in clever, concealed ways that may jeopardise engineers who choose to come out, such as through peer reviews or denial of career progression. A Human Rights Campaign survey found that 48% of LGBT workers felt enforcement of the non-discrimination policy depends on the supervisor's own feelings toward LGBT people [2].

This adds to the professional risk that is seen to exist by LGBT employees when they are considering whether or not to come out in the workplace. The possibility of harming their careers because of tacit homophobia within a workplace setting can lead to LGBT people choosing not to come out as a result and therefore suppress their sexuality and private life.

Unconscious biases can also play a role as a result of a generalised heterosexual bias in society. Social experiments have found that gay men with the same CV are 40% less likely to be accepted for interview than a straight male. In Europe, gay men can be found to earn between 7 and 15% less than their straight counterparts on average [13].

A further dimension of underlying homophobia faced by lesbians and bisexual women is the instance of men being fascinated by their sexual orientation, in addition to the fear of homophobic rejection [13].

Ignoring the problem contributes to a homophobic atmosphere as much as engaging. By not challenging employees on their comments and remarks at work, a ripple effect results in the attitudes eventually becoming embedded within an office, site or company.

4.3 'Anti-gay' Laws

As a global industry, engineering firms in the private sector requires employees to work across the globe, and this can lead to logistical issues for LGBT engineers in countries that still have homophobic laws. 77 countries continue to outlaw homosexual acts between consenting adults, with the risk of deportation and imprisonment. In five of these countries the offence still carries the death penalty [13].

For example, in Uganda, attempts have been made to reinstate the death penalty and a poll showing that 96% of Ugandans believe 'homosexuality should not be accepted by society' [14]. In 2014 a now defunct Ugandan newspaper ran with the headline: "EXPOSED! Uganda's top 100 homosexuals" [15]. In Russia, under Putin, widespread homophobia has been exploited for political popularity in the case of the 2013 'Homosexual Propaganda Bill' which outlaws teaching 'homosexual behaviours' to minors.

In the United States laws protecting LGBT employees from workplace discrimination are murky at best. Only 21 out of 50 State Legislatures have passed laws preventing such practices

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and repeated attempts to pass a federal law in Congress have failed in the House of Representatives.

These laws create an additional facet of personal and professional risk for LGBT engineers working overseas, particularly when working on projects in the Middle East or Africa and working with local companies who will not respect LGBT staff. Engineering institutions are advising employees to take caution over their behaviours while working on projects in foreign countries [16].

4.4   Invisibility breeding invisibility

Visibility problems within the Engineering industry have heightened the homophobia problem that it currently faces. Many involved in the field have noted a lack of coverage of LGBT issues within diversity and inclusion programmes that have covered other topics such as gender discrimination. In programmes where LGBT issues have been covered, the other areas have been tackled more actively and publicly than LGBT diversity.

Lack of awareness among the workforce can be a contributing factor of the casual, tacit homophobia that is endemic in the Engineering industry. Through not being made aware of LGBT issues, employees are unaware of the impact negative language has on those around them and the negative connotations it perpetuates. Employees should challenge unacceptable behaviour it when it is witnessed in the workplace, and engineering firms should enforce zero tolerance policies.

"I have never heard any specific equality goals aimed towards LGBT employees."

Lack of communication and education has been responsible for a permanent undercurrent of discrimination has led to the invisibility of any LGBT figures at the top of the Engineering world. The absence of open role models in an industry can put off LGBT employees with no one to aspire to, nor give them the confidence to come out in the workplace.

"The industry has NO lead figure who is from a LGBT background who can share experiences, promote the attitudes towards sexuality and inspire those recently joining the industry."

A senior Electrical Engineer at Arup, a leading Civil Engineering firm, described how she decided to work in Building Services as she felt that Engineering would be too unaccepting. The main reason – she could not find a lesbian role model in Engineering [17]. The story is similar for transgender people with many citing a lack of influential transgender figures as a reason for not coming out.

Employees can feel isolated if they have no superiors to look up to, reinforcing the perceived professional barriers associated with coming out. Instances of engineering firms with over 300 people on site in a relatively open minded atmosphere have still reported not having openly LGBT staff. This suggests people are either choosing not to come out, or LGBT people are not being attracted to Engineering [18].

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5   Why Change is Needed

We have identified two broad areas where the improvement of attitudes towards LGBT employees in Engineering can be beneficial to the industry as a whole.

5.1   The Human Case for Change

"I personally have experienced very substantial evidence of homophobic… culture in the laddish environment of civil engineering offices, and would certainly not have dared come out before retirement"

The human impact of an embedded culture of discrimination is the most obvious effect that should be considered in tackling homophobia in Engineering. The psychological effect that bullying in the workplace has on LGBT employees is crippling for many who are trying to progress their careers in the field.

Many employees reported feeling forced to hide their sexuality for fear of the reception from their colleagues and management, along with the impact it would have on their job prospects, if they were to come out. Lord Browne describes this effect as 'The Glass Closet' [13].

Surveyed LGBT engineers reported that they felt their colleagues would "lose respect for them". Others felt their diversity measures would not protect them at work, they did not want to expose themselves as "the gay engineer" or be seen to be "high maintenance".

In 2009, nearly a fifth of all LGBT employees across all fields in the US said they are not out because of a lack of policies to support them [13]. A similar percentage also stated a fear that they would be dismissed because of their sexuality/gender identity.

The perceived risk of coming is twofold on a personal and professional level and can have an impact on the mental health as hiding becomes a progressive habit. The fear of coming out and not being accepted by your peers can be paralysing for people in the closet. Many believe that in this instance conformity is the key to coping in the workplace with 83% of surveyed LGBT employees reporting that they had changed an aspect of their appearance/lifestyle in order to fit in at work [1].

The impact of remaining in the closet appears to increase psychological stress. In a cross-sector survey, 44% closeted employees reported feeling depressed compared to just 25% who were out [13]. Professionally, of closeted gay men, 34% said they were happy with their rate of job promotion compared to 61% who were out of the closet and happy with their level of progression [13].

The energy wasted in trying to hide themselves has a serious consequence as personal stress takes its toll. Higher rates of heart disease, violence and suicide have been found among LGBT people who live and work in anti-gay communities. Their life expectancy can be reduced by up to 12 years [1].

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Having a strategy for implementing global D&I policy is doubly important today because companies are expanding rapidly in faster-growing emerging and frontier markets, where LGBT equality and inclusion are not well-institutionalized and the concepts often are seen as downright foreign and unacceptable [19].

Encouraging diversity and equality for LGBT people in a manner that will allow them to come out in the workplace will reduce the risk of psychological stress having an adverse effect on personal health. Some aspects of the 'Glass Closet' can also be removed as employees expend less energy on hiding themselves from their colleagues and focus more closely on their own career progression.

5.2   The Business Case for Change

''A lot of employers take the stance: 'why should we care what you get up to in the bedroom?'. But the real question is; if you're not comfortable at work, can you perform at your best?'' [9].

Studies have found evidence that firms have reaped business benefits from equality & diversity. While it is hard to find an exact measure for productivity, companies can pay a heavy price when their employees do not feel comfortable in the workplace. One productivity index has indicated that closeted employees who are trying to hide their sexuality from their co-workers suffer up to 30% loss in productivity and engagement [2].

Coming out does not just help individual productivity, but also has a significant effect on people working around them. Being closeted can create barriers between people and their co-workers as not knowing the identity of someone harms productivity more than knowing, even if stigmatised.

Studies on the tolerance of homosexuality and a nation's productivity as a whole has shown a correlation between positive attitudes towards gay men and women and the ability to attract financial investment.

Encouraging inclusion in addition to diversity is important as having a number of people from different backgrounds is meaningless unless they are made welcome, to feel valued and are able to integrate as a team.

The number of role models would be increased by encouraging workers that it is ok to be out while working in Engineering thereby making Engineering more attractive to LGBT professionals.

Increasing numbers of Fortune 500 companies have recognised the need to attract LGBT talent for the skills they can bring to the workplace. At the end of 2014, 91% prohibit sexual orientation discrimination and 61% protect Trans people and gender identity [13]. Engineering companies and institutes can learn from this and implement policies that will see widespread LGBT diversity and inclusion implemented across the sector.

Additionally, the 2013 Perkins Review outlined a need for a significant flow of engineers by 2050 to remain competitive in the market [5]. If young students can see Engineering as inclusive, then this will increase take-up at university level.

The Government's 2015 Productivity Plan [10] has outlined significant benefits for companies who can improve their productivity levels. For example, matching the productivity of the US would raise GDP by 31%, equating to around £21,000 per annum for every household in the UK [10].

Many firms also now focus on creating high performing organisations. Such organisations place behavioural training at the core of their values, and recognise that creating better performance from the company means deploying all measures possible for creating high performing teams. Diverse teams play a central role to this, and this is something which Rolls-Royce have been addressing over the past three years. They officially launched PRISM, their LGBT network in October 2015 and should be considered as a good case study on their early stages of their journey.

BP have BP Pride which hosts graduate outreach insight days specifically for LGBT students. The network also collaborates with other BP employee resource groups such as the BP Positive Ethnicity Network where they hosted a joint event on Ramadan in the Workplace considering intersection between LGBT and being Muslim. This is a good example of cross-collaboration between networks which in turn helps facilitate improving communication channels in a firm. The Transport for London (TfL) LGBT network OUTbound is over ten years old. Whilst continuing to promote inclusion within the company, the network has also been used to show positive support for the LGBT community externally with Rainbow buses around London in their "RidewithPride" campaign. This is a good example of using a network for external marketing purposes.

Staff networks are found to be an effective first step towards improving inclusivity. Employee network groups play a vital role in delivering workplace equality for LGBT people. Increasingly, network groups are finding more sophisticated and innovative ways to support gay staff in the workplace and support their employer across all business functions. From increasing understanding of sexual orientation equality amongst employees to improving the external reputation of an organisation, network groups are an important tool to support business objectives [20].

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6 Actions

To achieve the desired change in Engineering that will eradicate a culture of discrimination and homophobia, a plan of action, with clear goals is required that will be subscribed to by Engineering companies and institutes. Some companies and institutes are making diversity for LGBT people a priority, but the pace remains slow and approach varies widely. Below we present actions for Engineering companies and institutes. Furthermore, we present action points for the UK Government to consider to accelerate change.

6.1 What Should Engineering Companies Do?

Measure	Description
1. Establish a diversity and inclusion policy	"The private sector needs to begin to get its domestic house in order before it can begin looking to initiate change in other countries. Companies that do not currently integrate LGBT-inclusive policies into areas such as supply chain management, promotion criteria and two-way mentoring should look to revise policies or fall behind in the marketplace" [4]. The first goal that should be targeted is a universal uptake of LGBT diversity policies within Engineering companies and institutes where sexual orientation discrimination is prohibited and gender identity is protected. By having clear, established policies a base is provided to prevent open homophobia throughout the industry and diversity can be built upon further. Note: some Engineering firms do not have diversity and inclusion policies. Secondly, promoting LGBT diversity in scheduled diversity days will ensure that workforces are educated in what is and is not acceptable when it comes to comments made throughout the workplace. The Royal Academy of Engineering have an implementation policy that centres on communication between its employees and members that will allow for further education about LGBT issues.
2. Get the Board on-board	Senior leadership must be included in any programmes that are implemented. In the same sense that managers are able to set the tone for a workplace in a negative manner with homophobic attitudes, they too can create a positive atmosphere where inclusivity becomes the norm. IBM are an example of a company that widely use engineers and are aware of the importance of senior leadership commitment to LGBT inclusion.
3. Employee resource groups	Establish LGBT employee resource groups, elect an executive sponsor to endorse the group and support them in attracting members. Employee resource groups are very useful sources of information for companies and help with diversity and inclusion aims and positive outreach internally and externally.

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4.	Role model programs	Encourage the visibility of LGBT role models, particularly transgender role models, throughout the workplace to ensure there are stories that can be repeatedly told to inspire other people in the industry to come out. By taking responsibility themselves, LGBT engineers can help with the transition in the industry that sees a transformation from homophobia to acceptance.
5.	Reverse mentoring	Implement reverse mentoring schemes. IBM have successfully introduced reverse mentoring as an inclusion tool, and the company is now trying to engage all managers as LGBT leaders or supporters. This has greatly helped educate managers and the executive team.
6.	Unconscious bias training	Implement unconscious bias training, firstly for managers and eventually full workforce. This makes people aware of their unconscious biases which occur naturally as a human being. Training helps inform their decision making, and this can help embed the message of the barriers minorities face and stop process of perpetual homogeneity in teams.
7.	Introduce ally-programs	Set up an "allies" program where heterosexual colleagues show a commitment to challenging homophobic language and behaviour. The most effective manner of encouraging social change and changing people's perspectives is by encouraging straight people to point out where colleagues are using derisory, homophobic language and report it. By doing this the problem of underlying and subtle homophobia can be steadily challenged.
8.	Supply chain requirements	Introduce a requirement for suppliers to show what they are doing to change diversity and inclusion in the Engineering industry when receiving invitation to tender.
9.	Share best practice	Share best practice with other firms and institutes. Contribute to industry forums and encourage collaboration between companies co-located. This would especially help small-medium enterprises.
10.	Flexible policies for working overseas	Create and apply a universal diversity and inclusion policy. Communicate to employees working in conservative countries that still retain homophobic laws that the firms holds values on respect for all at the core, and this is expected of employees. Within work there must be no bending on their non-discrimination policies that hold legally enforceable in the UK to ensure a continued fight for equality. This policy is currently employed by IBM who are definitive that their diversity policy is universal.
11.	Profile workforce and collect data	Collect data from a graduate level on diversity and inclusion asking questions relating to invisible protected characteristics (e.g. sexuality) through surveying workforce. Effective monitoring is crucial for understanding impact diversity and inclusion initiatives are having on the workforce over the long term.

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6.2 What Should Engineering Institutes Do?

Measure	Description
1. Introduce D&I requirements for approved corporate partner programs	Some Engineering institutes have companies which they have given gold, silver or bronze status to based on the quality of their graduate program. A commitment to diversity and inclusion should be introduced as a requirement here and this would help cascade change through member firms. It should also be a full commitment to diversity and inclusion, and not selective.
2. Introduce D&I award at annual awards ceremonies	Engineering institutes often run annual awards ceremonies and it is prestigious for Engineering firms to win them. An award for diversity and inclusion should be introduced to encourage competition between firms.
3. Uphold D&I values globally as they expand across geographies	Adopt an equal approach to diversity and inclusion globally. Some, for example, will not proactively address LGBT inclusion in countries repressive to LGBT. Institutes should apply an equal measure globally. Institutes should also have support mechanisms for member engineers working in overseas countries repressive to LGBT, to support those who work for firms which do not have active inclusion policies or employee resource groups.
4. Survey global membership to track issue	Global membership should be surveyed by Engineering institutes on a series of questions related to diversity and inclusion. The Institute of Chemical Engineers have a template questionnaire which can be adopted as best practice, with questions developed based on the Equality Act.

6.3 What Should the Government Do?

Measure	Description
1. Publish best practice guidance specifically for Engineering	Issue a guidance document on best practice based on suggestions in sections 6.1 and 6.2 above, and be specific to Engineering and aligned with productivity. Government should be specific in their expectations from firms and Engineering institutes for effective implementation. Pledge-based guidance has historically not proven effective in this area; mandatory implementation is required.
2. Encourage Engineering firms to be more active in implementing diversity & inclusion initiatives	List the expectations of diversity and inclusion initiatives Government expects to take up. Engineering needs to be better aligned with law and banking in having employee resource groups. Government should specify this as a requirement. In particular, the model of Lloyds of London could be followed which has committed ensuring diversity and inclusion throughout the entire banking sector.

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3.	Supply chain requirements	Firms should have to demonstrate their commitment to diversity and inclusion when bidding to become a recommended supplier. Engineering firms should make this a compulsory item in their invitation to tender for firms bidding for projects.
4.	Workforce data collection for capturing invisible minorities	Firms are hesitant on data collection due to Data Protection Act. Government should explicitly clarify data firms can collect, and that there are no barriers to firms collecting data from employees. Transparency from firms will erode away suspicion of employees. Firms could be mandated to do it by Government.
5.	Engineering firms be more vocal in supporting LGBT engineers	Where diversity is being tackled, gender imbalance is a core primary focus of most firms. Government can specify the wider diversity spectrum of protected characteristics from the Equality Act 2010 need to be addressed.

6.4 Roadmap

The goals above set out what needs to be achieved and what Engineering firms, institutes and the government should be doing respectively. The above goals are a stepping-stone for achieving the much needed change in the culture of Engineering companies. We propose the following roadmap:

Date	Event	Purpose
January 2016	Reception inviting CEOs & Presidents of all 39 Engineering Institutes	Communicate message of desired goals for Engineering institutes.
March 2016	Parliamentary reception inviting CEOs of major Engineering companies pledging commitment to the above metrics.	Communicate message of desired goals for Engineering firms.
June 2016	Statement in Queens' Speech for industry to tackle diversity and inclusion more strongly.	Lay down benchmark for Parliament from 2016 to mandate firms and institutes should take effective action.

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