Ethics in the engineering profession

A GoodCorporation report for the
Royal Academy of Engineering

Introduction

**Engineering plays an integral role in the world in which we live.**

The profession is known and generally respected for its high professional standards. In the 2021 IpsosVeracity Index, which explores trust in professions, 84% of British adults surveyed said they trust engineers to tell the truth, placing engineering as the sixth most trusted profession in the UK.[1]

However, a series of ethical challenges in recent years – from the Boeing 737 Max fraud conspiracy to the Grenfell Tower tragedy and ongoing inquiry – has heightened awareness of the important role engineering plays in both the safety and well-being of society, and the need to ensure ethical decision-making and practices are front and centre.

In 2017, the Royal Academy of Engineering and the Engineering Council updated the *Statement of Ethical Principles* for engineering professionals, outlining the decision making and behavioural expectations for all engineering professionals, not just those registered with professional engineering institutions (PEIs)[2]. In 2020, the Engineering Council published the fourth edition of *The UK Standard for Professional Engineering Competence and Commitment* (UK-SPEC) which enhanced the requirements for professionally-registered engineers and technicians with regard to demonstrating an understanding of the ethical issues that may arise in their work and carrying out their responsibilities in an ethical manner.[3]

It is notable that in the Ipsos survey mentioned above, trust in engineers, while high, had in fact dropped five percentage points from the previous year's survey – a drop second only to the police which fell eight percentage points year on year. **While the actions taken to date are important steps in the right direction, there is no room for complacency.**
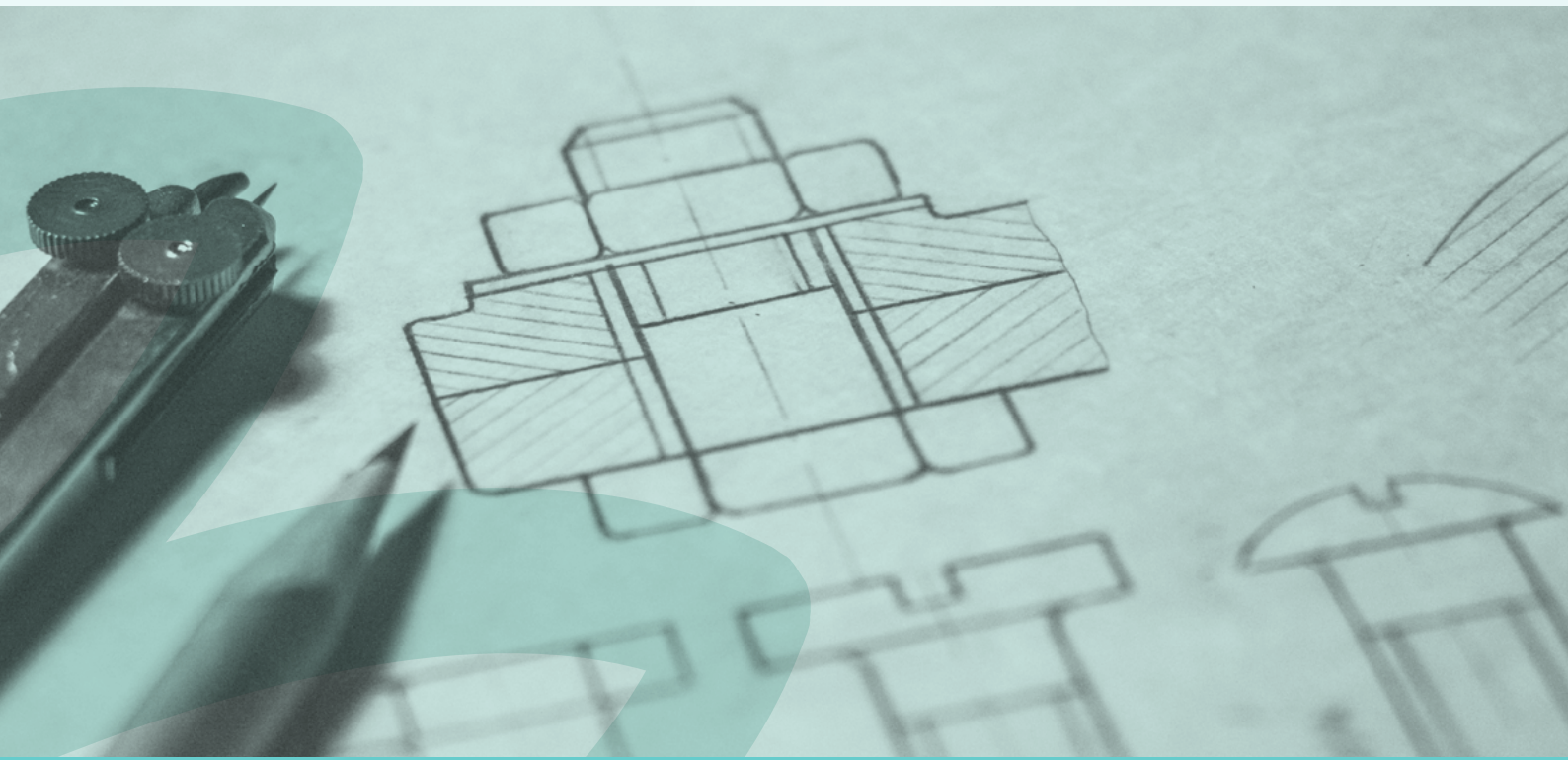
[1]Ipsos Veracity Index, 2021
[2]Statement of Ethical Principles, Engineering Council
[3]UK Standard for Professional Engineering Competence and Commitment, Fourth Edition

Background to the review

In January 2022, GoodCorporation was tasked with undertaking a Review of Ethical Culture and Practices in UK engineering.

The need for the review was one of several actions identified in a report by the Engineering Ethics Reference Group (EERG), whose remit is to provide leadership and advice to help develop an enhanced culture of ethical behaviour in UK engineering[4]. The overall objective was to develop a benchmark from which the UK engineering profession can periodically audit and report on ethical performance in UK engineering and identify areas for improvement in ethical culture and practice. The exercise would also allow benchmarking against other professions and identify relevant learnings from them.

The findings of the review paint a mixed picture of ethics in the profession. There is much to be pleased with in terms of the way in which engineers, technicians, and many engineering firms view the important role of ethics in engineering decision-making. However, there are signs of concern – both in how engineers and technicians view ethics in practice in their workplace as well as the level of engagement of engineers and technicians with professional engineering and trade bodies more broadly.

Given challenges with engaging stakeholders in the survey process, which we discuss in this report, the project did not establish the benchmark we initially set out to achieve. However, the insight obtained into the fundamental beliefs and behaviours related to ethics among UK engineers and technicians is useful for the wider engineering community's understanding of how to improve ethics in the profession going forward. The evidence we have gathered through this project points to several clear strengths in ethical practice and culture in UK engineering, as well as gaps and structural challenges in the profession which must be resolved. It also provides valuable learning on how to better engage the profession and establish a benchmark in the future.

We review the findings in detail in this report and provide suggestions for how the UK engineering profession could take this information forward.

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[4] Engineering Ethics: Maintaining society's trust in the engineering profession, Feb 2022

Key findings

Key Finding 1

Engineers and technicians report good ethical practice and ethical culture in engineering compared to the general UK workforce, but there are worrying signs of poor ethical standards in some parts of the profession.

Eight out of ten engineers and technicians believe that their organisations have a strong ethical culture and that operating responsibly is a priority, compared to 66% of the general UK workforce who believe this about their own organisation.

Health and safety and the environment stand out particularly positively. Eighty-six percent of engineers and technicians believe their safety is taken seriously at work (vs. 70% of the general UK workforce) and 94% agree that serious adverse impacts on safety should be reported regardless of any possible effect on their career. Engineers and technicians are more mindful of how their work affects the environment than the UK working population (84% vs. 65%) and more likely to say their organisations care about the impact they have on community and the environment (80% vs. 63% of the general UK workforce).

The picture is nuanced, however, as one-third of engineers and technicians report that the work they undertake makes them feel ethically compromised. Forty-four percent say profitability is sometimes prioritised over fitness for purpose, and 35% say they are asked to take shortcuts they feel are unacceptable.

Key Finding 2

There is evidence many engineers and technicians feel dissuaded from raising concerns in the workplace.

More than one-third of engineers and technicians report that the culture in their organisations discourages raising bad news – fewer than half disagree (48%). **This points to a discouraging environment for many UK engineers and technicians when deciding whether to report concerns or misconduct in their organisations.** Similarly, 36% of engineers and technicians agree that being a team player means refraining from raising concerns or objections, and only half (52%) disagree. Forty percent of engineers and technicians agree they sometimes must prioritise work relationships over raising concerns.

However, more than three-quarters of respondents (78%) would feel comfortable raising an issue of poor or unethical behaviour to a professional body if no action was taken by their employer. This denotes an opportunity for a profession-wide reporting mechanism for those who cannot, or will not, report concerns to their own organisations. There are prescribed bodies for submitting protected disclosures about wrongdoing in other UK sectors, including The Office of Communications (Ofcom), the Nursing and Midwifery Council, and the General Pharmaceutical Council, for example.[5]

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[5] Whistleblowing: List of prescribed people and bodies, Department for Business & Trade

Key Finding 3

Engineers and technicians in larger firms have more support when it comes to ethics than those working in smaller firms.

Larger firms have significantly more sophisticated systems and processes in place to address ethics in the workplace and mitigate ethical risks than do smaller firms. This puts engineers and technicians working independently or in smaller firms at risk of falling through the gaps, with little support for guidance on ethical practice or to report concerns about misconduct.

Small companies often report being keen to do more to address ethical business risks and negative impacts on society but are limited in their ability to fund an ethics programme, given the need to focus on short-term profitability.

While certain larger organisations are having a positive effect on the supply chain by supporting suppliers in developing ethical practices, there is a risk the ethical/ environment, social, governance (ESG) requirements

of larger organisations could result in smaller, resource-poor companies being excluded from supply chains and procurement processes if they cannot evidence compliance with ethical practices.

For a sector dominated by small and medium-sized enterprises (SMEs), this is particularly concerning.[6] This gap means engineering firms outside the large company environment – and the engineers and technicians they employ – are missing out on this drive to instil a more ethical approach to engineering, and as a result, could fall foul of the ethical standards being established within the profession. The consequence is that ethics programmes become a luxury largely confined to large multinationals and those in the engineering workforce whom they employ.

Key Finding 4

Engineering firms rank the safety, health & wellbeing of workers, business integrity, and cybersecurity as the most relevant ethical risks for their organisations.

Diversity and inclusion, and data privacy round out the top five ethical risk areas. Many of these issues have received increased attention since the COVID-19 pandemic, and cultural events such as the Black Lives Matter protests and #MeToo. Engineering firms generally believe they are well prepared to address risks related to these top five issues.

There is a greater gap between the relevance and preparedness scores engineering firms ascribe to risks in their supply chain. The growing importance of human rights was recognised by many companies in interviews but did not appear in the top 10 ethical risk areas in terms of relevance.

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6 Office of National Statistics (ONS) analysis of UK enterprises

Key Finding 5

Professional engineering institutions are beginning to explore ethical issues, but often in a piecemeal and unsystematic way.

Most professional engineering institutions (PEIs) acknowledge that the current approach to ethics in their organisations is one of ad hoc activities.

There is a sense by some in the profession that the revised UK-SPEC, with its enhanced requirements related to ethical considerations, is taking care of ethics. However, this only applies to engineers and technicians going through the registration process under the revised UK-SPEC, not the millions more working in engineering roles who are not associated with a PEI, or those whose registration is now maintained through continuing professional development (CPD).

Different PEIs are engaging with ethics at different levels, but with no common agreement on what topics should be within their domain. Whilst salient topics such as carbon emissions or equity, diversity and inclusivity may be well progressed in some, it is uncommon to see the coherent ethics programmes found in other professions such as finance or human resources.

Many PEIs find it difficult to identify unified positions on ethical issues, given the diversity of sectors they represent within their membership, and thus, conflicting perspectives. The challenge of navigating

ethics while representing what some PEI members and registrants perceive to be fundamentally 'unethical sectors' (e.g., gambling or weapons manufacturing), was raised repeatedly.

Some PEIs have accepted the need for an ethics programme to address ethics issues effectively; in others, the debate is active.

There is surprisingly little dialogue about ethics between PEIs and engineering companies – with companies being closest to the ever-changing societal demands and ethical challenges engineers and technicians face in practice. Many engineering firms are advancing comprehensive ethics and compliance strategies in their organisations, including codes and expectations for engineers. In some cases, they are also pushing ethics programmes down through their supply chains. Identifying opportunities for more proactive engagement with employers would allow PEIs greater visibility of these activities and real-time insight into the ethics issues facing the engineering profession. It would also be consistent with good practice found in other professions, such those in finance.

Key Finding 6

A lack of integration and coordination within UK engineering creates obstacles in communication and engagement on ethics.

The UK engineering profession is diverse and fragmented. This creates challenges in communicating and coordinating on topics like ethics across the broad range of stakeholders representing the profession: the PEIs, the Engineering Council, the Royal Academy of Engineering, Engineering UK as well as trade and business associations and engineering companies of diverse sectors and size. The difficulty we faced in engaging members of the profession in this research effort highlights the challenge of driving ethics initiatives more widely.

Moreover, the professional institutions are not currently an effective channel for communications on ethics to engineers and engineering technicians, or the broader UK engineering community. Only a minority of PEI members and registrants engage with their professional institutions in a meaningful way after registration. There are also an estimated three million individuals working in engineering roles in the UK who have no affiliation with any professional engineering body.[7]

Research approach

GoodCorporation designed this review around a series of surveys covering the following populations:

1) the UK working population

2) practising engineers & technicians in the UK,

3) UK engineering firms

4) UK professional bodies, including Professional Engineering Institutions.

The research questions we sought to answer included:

- How does the net ethical culture (NEC)[7] of UK engineering compare to the UK workforce generally, and to that of other sectors?

- To what extent do the beliefs and behaviours of UK engineers and technicians align to the principles for ethical behaviour and decision-making outlined in the *Statement of Engineering Principles?*

- How well are ethical policies, procedures and practices embedded within UK engineering?

- In what ways does ethical decision-making manifest in the activities of those who work in UK engineering?

Insights were obtained from both the quantitative surveys as well as interviews with firms and professional bodies, to provide deeper understanding of the culture, codes of conduct, ethics policies, procedures and behaviours within organisations, and to highlight challenges and good practice.

Below is an overview of the sample size by survey:

UK workforce

4,000 respondents, including 640 engineers

UK engineers & technicians

1,594 respondents

Engineering firms

49 respondents

35 firms interviewed

Professional institutions

23 Professional Engineering Institutions (PEI) respondents

3 non-engineering professional bodies respondents

10 professional institutions interviewed

Engineers' and technicians' views on ethics in engineering

Engineers' and technicians' views of ethics in engineering were collected in three ways:

1. An **anonymous online survey of 4,000 people from the UK workforce**, which included 640 engineers and technicians, conducted by a national market research firm

2. An **anonymous online survey of 844 engineers and technicians** solicited through PEI outreach and company outreach

3. An **anonymous online survey of 750 people who self-identify as engineers or engineering technicians** conducted by a national market research firm

Each of the survey questionnaires included statements that described ethical practice. Individuals were asked to select a response on a five-point scale, in which one was strongly disagree and five was strongly agree with the statement. The statements were designed to understand the state of ethical culture and attitudes in the workplace. The survey of the UK workforce was intended to be used as a benchmark by which to compare the responses of people who work as engineers and technicians to that of the general workforce.

The two engineer-specific surveys included an additional set of statements specifically related to engineering.

The sample included only engineers and technicians who are currently practicing (at least part-time) and those who are ordinarily based and working in the UK.

In presenting the findings below, we have combined responses of 1 and 2 on the scale as 'disagree' and 4 and 5 responses on the scale as 'agree'. The combined percentages do not equal 100% because response 3, 'neither agree nor disagree', is not included in the summary figures.
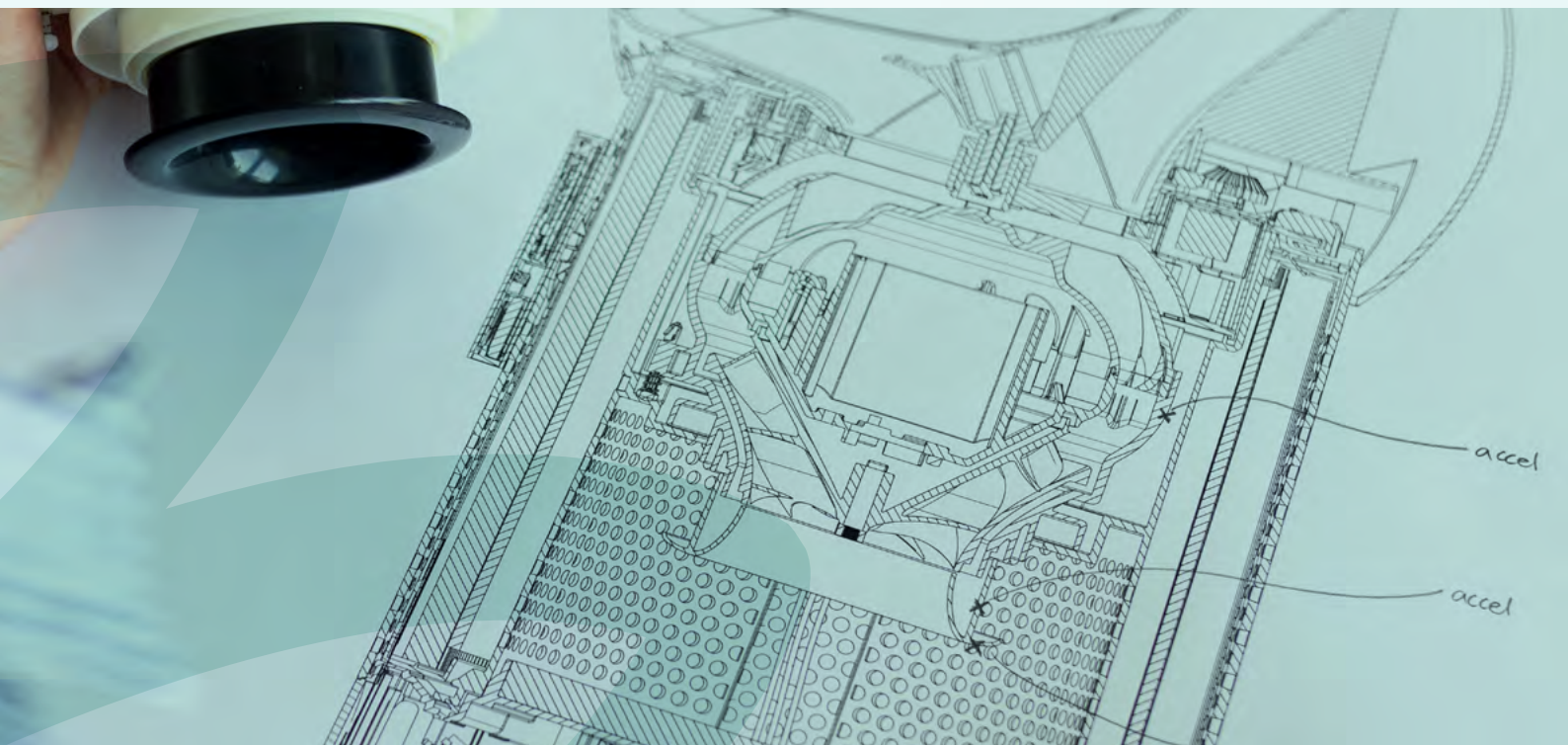
Findings

In general, engineers and technicians responded more positively to statements related to the overall ethical environment in which they work when compared to the general UK workforce. Eighty-two percent of engineers and technicians agreed that operating responsibly is seen as a priority in their organisation, compared to 66% of respondents from the general UK workforce. A similar number, 81% of engineers and technicians, agreed that their organisation has a strong ethical culture compared to 66% of the UK workforce.

Comparison of engineers and technicians with the UK workforce

I am expected and I feel supported to do the right thing at work
73%
84%

I am mindful of how my work affects others in society
73%
85%

In my organisation, operating responsibly is seen as a priority
66%
82%

Overall, I think my organisation has a strong ethical culture
66%
81%

■ **Workforce agrees**   ■ **Engineer/technician agrees**
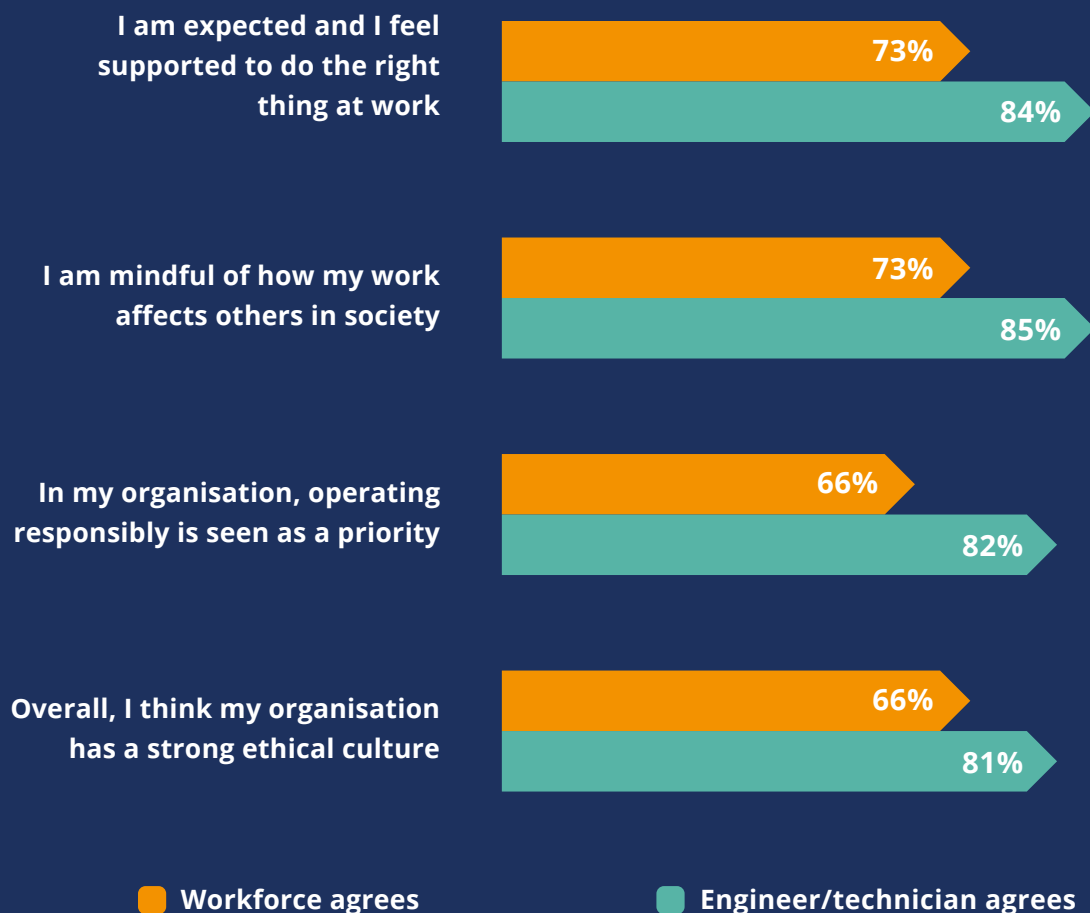
Source: UK Workforce Survey 2022 & UK Engineers & Technicians Survey 2022

At a more granular level, the responses showed a particular ethical focus on issues such as health and safety and the environment. Eighty-six percent of engineers and technicians said their safety is taken very seriously at work, compared to 70%

of the general workforce. Eighty-four percent of engineers and technicians said they are mindful of how their work affects the environment, compared to 65% of the UK workforce.

Comparison of engineers and technicians with the UK workforce

I feel the organisation cares about it's impact on the community and environment
63%
80%

I am mindful of how my work affects the environment
65%
84%

Our safety is taken very seriously at work
70%
86%

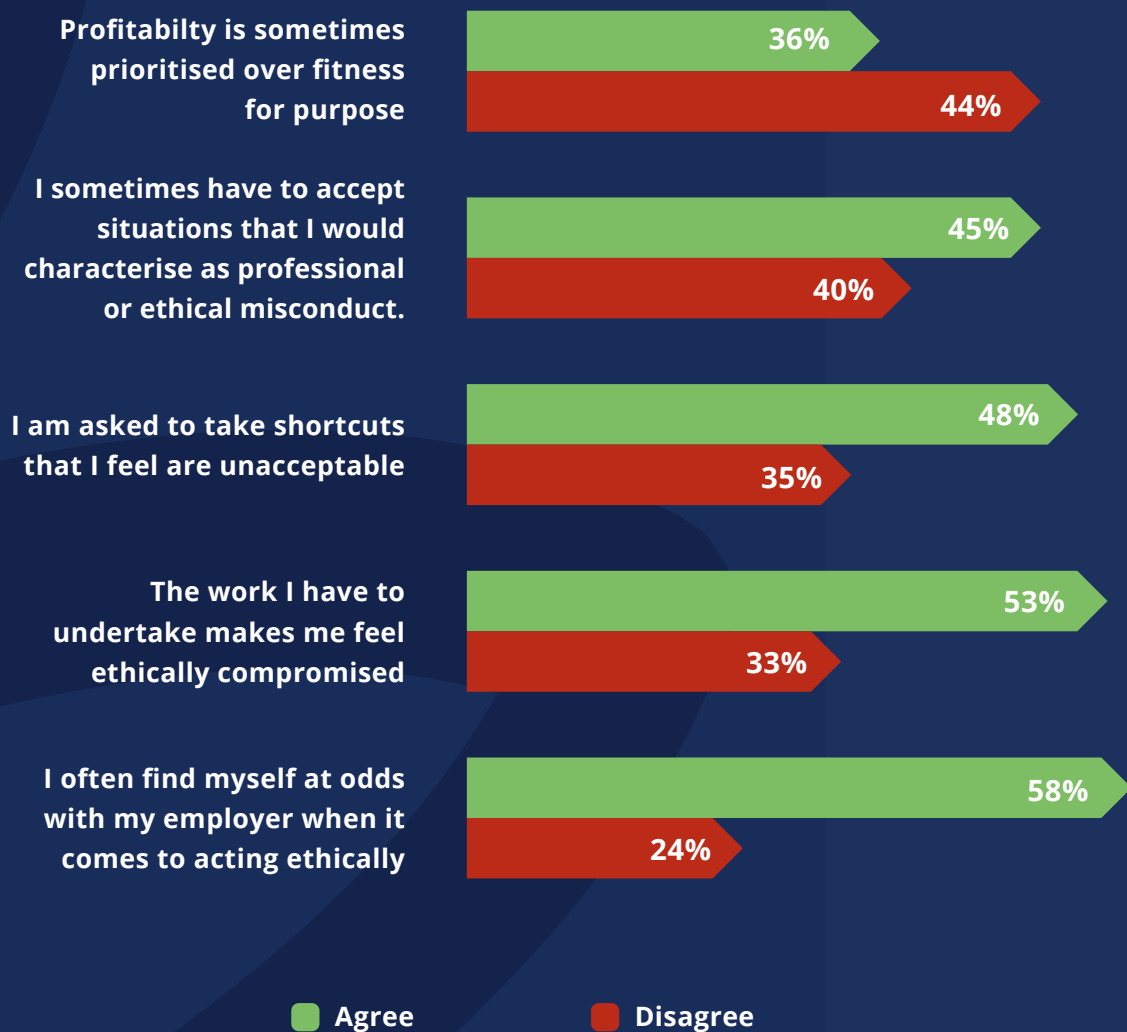■ **Workforce agrees**   ■ **Engineer/technician agrees**

Source: UK Workforce Survey 2022 & UK Engineers & Technicians Survey 2022

However, there are indications that, in practice, point to shortcomings in ethics in engineering. One-third of engineers and technicians (33%) said they undertake work that makes them feel ethically compromised. Forty-four percent of engineers and technicians agreed that profitability is sometimes prioritised over fitness for purpose. Sizeable numbers also report that they are asked to take unacceptable shortcuts (35%) and accept situations they would characterise as professional or ethical misconduct (40%).

Engineers and technicians opinion on ethical statements

Profitabilty is sometimes prioritised over fitness for purpose
- 36%
- 44%

I sometimes have to accept situations that I would characterise as professional or ethical misconduct.
- 45%
- 40%

I am asked to take shortcuts that I feel are unacceptable
- 48%
- 35%

The work I have to undertake makes me feel ethically compromised
- 53%
- 33%

I often find myself at odds with my employer when it comes to acting ethically
- 58%
- 24%

■ **Agree**   ■ **Disagree**

Source: UK Engineers & Technicians Survey 2022

There is also evidence that the speak up culture in many engineering firms leaves much to be desired. More than one-third of engineers and technicians agreed with the statement, "The culture in my organisation discourages raising bad news" and a similar number (36%) agreed that 'being a team player' means refraining from raising concerns.

Comparison of engineers and technicians with the UK workforce

I sometimes have to to prioritise work relationships over raising concerns that have not been addressed
- 43%
- 40%

In my organisation, 'being a team player' means refraining from raising concerns or objections
- 52%
- 36%
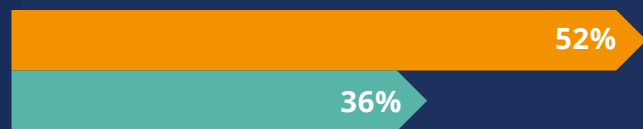
The culture in my organisation discourages bad news.
- 48%
- 36%

■ **Workforce agrees**　　　■ **Engineer/technician agrees**

Source: UK Engineers & Technicians Survey 2022

A method for raising concerns is essential for a properly functioning ethics programme. If ethics are integral to the profession, there needs to be a well-known means of speaking up if professional standards, including ethical standards, are suspected to have been breached by engineers or firms. This is especially important for those engineers and technicians working independently or in smaller firms without the supporting infrastructure that larger engineering firms more often provide.

For those driving the engineering profession's ethics agenda, it is worth noting that 78% of respondents agreed they would feel comfortable raising a concern to a professional body.

I would feel comfortable raising an issue of poor or unethical behaviour to a professional body if I had reported it to my employer and no action was taken.

78%
Agree

8%
Disagree
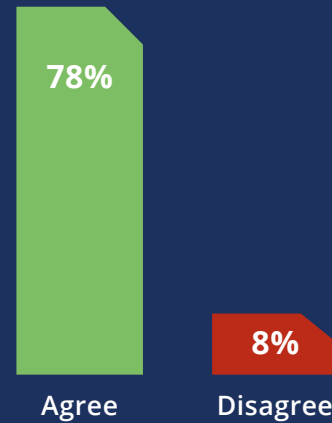
Source: UK Engineers & Technicians Survey 2022

Overall, I think engineering has a strong ethical culture.

75%
Engineers & technician agree

41%
Workforce agree
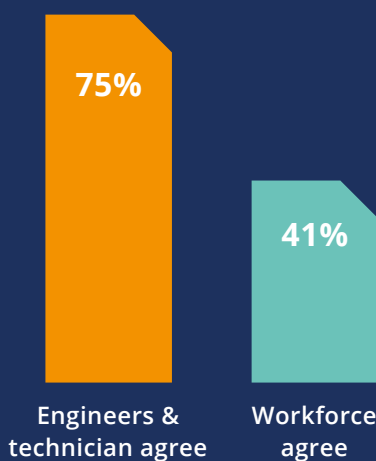
Source: UK Workforce Survey 2022 & UK Engineers & Technicians Survey 2022

Finally, the perception of an ethical culture in engineering is stronger amongst engineers and technicians than it is in the overall UK workforce. While 75% of engineers and technicians in our sample agreed with the statement, "Overall, I think engineering has a strong ethical culture," only 41% of UK workforce respondents agreed with the same statement.

Alignment with the Statement of Ethical Principles

In developing the set of survey statements, statements were included that map to the *Statement of Ethical Principles* to assess whether the beliefs and (reported) behaviours of engineers and engineering technicians align with the profession's *principles for ethical behaviour and decision-making.*

Net Ethical Culture

A key metric used in the analysis of the responses is the Net Ethical Culture (NEC) score. This approach is based on GoodCorporation's established Measuring Ethical Culture methodology, in which respondents are asked to score survey statements on a five-point scale, where five is strongly agree and one is strongly disagree[12]. 'Strongly agree' answers are added to 'agree' to give a positive score, and the sum of 'strongly disagree' and 'disagree' are taken away. This results in a Net Ethical Culture score.
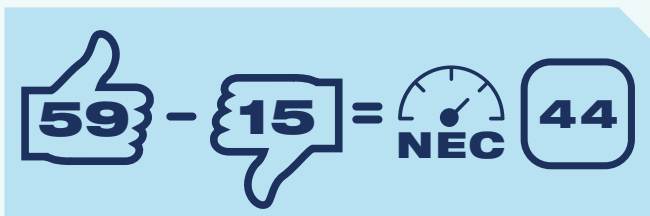
Higher positive or negative scores indicate a high level of consensus amongst responses (most respondents agreed or disagreed with the statement). The closer to zero the NEC, the more ambiguity in the response, meaning a similar number of respondents agreed and disagreed with the statement.

At the outset of this project, we intended to use the NEC approach as the key metric by which we would compare the responses of the engineering population to that of the UK workforce.

After further consideration, we decided that a percentage breakdown of agree vs. disagree responses to survey statements provides a more detailed and impactful picture of the state of ethics-related attitudes and culture amongst engineers and technicians for this initial review.

The NEC approach, however, delivers a score that allows comparison across a variety of ethics topics and can be more easily tracked over time. It works well when evaluating the overall picture of how engineers and technicians respond to the set of statements linked to the Statement of Ethical Principles.

Our analysis finds there is generally strong alignment between the beliefs and reported behaviours of UK engineers and engineering technicians and the profession's Statement of Ethical Principles.

In the following tables, the higher the positive or negative integer score (NEC score), the more consensus amongst respondents either agreeing or disagreeing with the statement. This is shown in dark green (agree) and dark red (disagree).

The closer to zero the positive or negative score, and the more muted the colours, the more ambiguity in the response – and in many cases, the more cause for concern.

Where available, the NEC scores for responses from the UK workforce are provided for comparison. Note that questions in italics are inverted questions in which the most ethical response would be 'disagree.'

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[10]Measuring Ethical Culture, GoodCorporation

Mapping survey results to the Statement of Ethical Principles

Engineering professionals work to enhance the wellbeing of society. In doing so they are required to maintain and promote high ethical standards and challenge unethical behaviour.

1. Honesty and integrity

Engineering professionals have a duty to uphold the highest standards of professional conduct including openness, fairness, honesty and integrity. They should:

- act in a reliable and trustworthy manner

- be alert to the ways in which their work and behaviour might affect others and respect the privacy, rights and reputations of other parties and individuals

- respect confidentiality

- declare conflicts of interest

- avoid deception and take steps to prevent or report corrupt practices or professional misconduct

- reject bribery and improper influence

NEC for surveyed statements		
Engineers & technicians	**General UK workforce**	
76	55	**Overall, I think my organisation has a strong ethical culture.**
68	33	**Overall, I think engineering has a strong ethical culture.**
71	52	**I would feel comfortable raising an issue of poor or unethical behaviour.**
-6	9	**I sometimes have to accept situations that I would characterise as professional or ethical misconduct.**

2. Respect for life, law, the environment and public good

Engineering professionals have a duty to obey all applicable laws and regulations and give due weight to facts, published standards and guidance and the wider public interest. They should:

- hold paramount the health and safety of others and draw attention to hazards

- ensure their work is lawful and justified

- recognise the importance of physical and cyber security and data protection

- respect and protect personal information and intellectual property

- protect, and where possible improve, the quality of built and natural environments

- maximise the public good and minimise both actual and potential adverse effects for their own and succeeding generations

- take due account of the limited availability of natural resources

- uphold the reputation and standing of the profession

NEC for surveyed statements

Engineers & technicians	General UK workforce	
83	60	**Our safety is taken very seriously at work.**
81	54	**I am mindful of how my work affects the environment.**
75	52	**I feel the organisation cares about its impact on the community and environment**
56	50	**For the organisation treating people fairly is at least as important as profit.**

3. Accuracy and rigour

Engineering professionals have a duty to acquire and use wisely the understanding, knowledge and skills needed to perform their role. They should:

- always act with care
- perform services only in areas in which they are currently comoetent or under competent supervisions
- keep their knowledge and skills up to date
- assist the development of engineering knowledge and skills in others
- present and review theory, evidence and interpretation honestly, accurately, objectively and without bias, while respecting reasoned alternative views

- identify, evaluate, quantify, mitigate and manage risks
- not knowingly mislead or allow others to be misled
- maximise the public good and minimise both actual and potential adverse effects for their own and succeeding generations
- take due account of the limited availability of natural resources
- uphold the reputation and standing of the profession

NEC for surveyed statements		
Engineers & technicians	**General UK workforce**	
67	48	**The organisation takes my training and development needs seriously.**
-13	-43	**I am asked to take shortcuts that I feel are unacceptable.**
47	-1	**My work is frequently negatively affected by time or budgetary constraints.**

4. Leadership and communication

Engineering professionals have a duty to abide by and promote high standards of leadership and communication. They should:

- be aware of the issues that engineering and technology raise for society, and listen to the aspirations and concerns of others
- promote equality, diversity and inclusion
- promote public awareness and understanding of the impact and benefits of engineering achievements

- be objective and truthful in any statement made in their professional capacity
- challenge statements or policies that cause them professional concern

NEC for surveyed statements		
Engineers & technicians	**General UK workforce**	
69	53	**I trust my manager to do the right thing at work.**
81	66	**My organisation is committed to creating a diverse workforce and an inclusive culture for everyone, regardless of race, background, sexuality, disability or gender.**
-12	-15	**The culture in my organisation discourages raising bad news.**

Firms' views on ethics in engineering

The views of engineering firms were collected in two ways:

- An **online survey of 49 engineering firms** in which they were asked to provide a relevance rating between 1 and 10 to a selection of ethical risk areas; then to rate on the same scale their preparedness level for addressing specific risks related to the most relevant topics. They were also asked to describe the maturity of specific ethics-related risk mitigation strategies in their organisation.

- **Interviews with 35 engineering firms**, including up to three respondents per firm in some cases, to identify good practices and understand the challenges

Findings

Engineering firms ranked the **safety, health & wellbeing of workers, business integrity,** and **cybersecurity** as the three most relevant ethical risk areas for their organisations. Diversity and inclusion and data privacy round out the top five ethical risk areas.

Ranking	Risk	Relevance Rating	Ranking	Risk	Relevance Rating
1	Safety, physical / mental health and wellbeing of workers	9.17	13	Using third-party intellectual property	6.77
2	Business integrity	9.14	14	Protecting workers from acts of aggression (e.g. terrorism, violent protests…)	6.69
3	Cybersecurity	8.94	15	Interactions with competitors	6.60
4	Equal opportunities, discrimination, diversity and inclusion	8.85	16	Abuses further down the supply chain (e.g. problematic raw materials, conflict minerals, child labour…)	6.55
5	Data privacy	8.60	17	Other negative impacts of direct operations on neighbouring communities (e.g. noise, traffic, security, pollution)	6.43
6	Environmental and climate protection	8.49	18	Receipt or processing of funds	6.38
7	Bullying and harassment	8.39	19	Unethical use or potential for mis-use of product or service	6.33
8	Potential for negative impacts of products or services on users or others (safety, wellbeing, privacy…)	7.77	20	Over-charging or mis-representation (e.g. unjustified variation orders, unnecessary work, product substitution, not building to spec, price fixing or collusion, falsifying rebate requests…)	6.14
9	Payment of applicable taxes	7.68	21	Bidding on projects that could be considered unethical	5.90
10	Compliance with economic sanctions	7.36	22	Diversity, equity and inclusion within design	5.90
11	Unethical first- or second-tier suppliers (e.g. poor working conditions, poor safety standards, poor living conditions, forced or bonded labour, passport retention…)	7.23	23	Influencing public policy	5.49
12	Risks or impacts for neighbouring communities' safety or health	7.00	24	Negative impacts of subcontractor workforce on neighbouring communities (e.g. sex work, drugs, rough sleeping, housing crises)	4.19

Firms generally reported high levels of preparedness to address specific ethical risks related to their most relevant risk areas. Again, health and safety and wellbeing of workers topped the list closely followed by other employee welfare issues, such as diversity and inclusion and bullying and harassment. Corruption and fraud ranked high for preparedness, as did the potential for negative impacts of products or services on users.

Ranking	Risk	Preparedness Rating	Ranking	Risk	Preparedness Rating
1	Safety, physical / mental health and wellbeing of workers	8.72	13	Insufficient protection against malicious attacks	7.52
2	Corruption or fraud	8.40	14	Over-charging or mis-representation (e.g. unjustified variation orders, unnecessary work, product substitution, not building to spec, price fixing or collusion, falsifying rebate requests…)	7.40
3	Equal opportunities, discrimination, diversity and inclusion	8.33	15	Bidding on projects that could be considered unethical	7.28
4	Bullying and harassment	8.12	16	Risks or impacts for neighbouring communities' safety or health	6.98
5	Potential for negative impacts of products or services on users or others (safety, wellbeing, privacy…)	8.10	17	Laundering proceeds of crime	6.90
6	Facilitating non-payment of tax due	8.05	18	Unethical first- or second-tier suppliers (e.g. poor working conditions, poor safety standards, poor living conditions, forced or bonded labour, passport retention…)	6.83
7	Inappropriate use or safeguarding of personal data	8.02	19	Other negative impacts of direct operations on neighbouring communities (e.g. noise, traffic, security, pollution)	6.69
8	Not respecting third party intellectual property rights	7.92	20	Unethical use or potential for mis-use of product or service	6.50
9	Environmental and climate harms (e.g. in design, production, transportation, use, disposal, site remediation / decommissioning…)	7.68	21	Inappropriate lobbying	6.12
10	Anti-competitive behaviour	7.88	22	Diversity, equity and inclusion within design	5.98
11	Trading with sanctioned parties	7.59	23	Abuses further down the supply chain (e.g. problematic raw materials, conflict minerals, child labour…)	5.85
12	Protecting workers from acts of aggression (e.g. terrorism, violent protests…)	7.56	24	Negative impacts of subcontractor workforce on neighbouring communities (e.g. sex work, drugs, rough sleeping, housing crises)	4.76

Observations by risk area

Safety, mental health & wellbeing

Atop the list of the most relevant, and most prepared-for risks, was the safety, mental health and wellbeing of workers.

Throughout our interview process, the importance of mental wellbeing was emphasised. Interviewees consistently described how wellbeing was a top company priority, particularly after COVID-19.

One IT company reported noticing low retention amongst recruits joining during the COVID-19 work restrictions. Further research indicated the cohort had reported not having any 'friends' at the company. This led to the encouragement of hybrid working and the introduction of social events after work to facilitate social bonding.

Companies reported offering wellbeing and mental health support, including access to specialist on-line support and the training of mental health first aiders.

In addition, health and safety processes are reportedly well-embedded throughout company culture and practice. This is an area that took time to become well established but where practice has matured to incorporate a pervasive safety culture and mature methodologies and processes for maintaining strong health and safety environments.

This was evidenced in our data from engineers and technicians as well where 86% agreed, and only four percent disagreed, that their safety is taken seriously at work.

Ninety-five percent of the 34 companies surveyed had conducted a safety risk assessment for relevant workplace tasks. For companies where it was relevant,

100% identified that their company provided and replaced personal protection equipment (PPE), and they had qualifications or training processes for employees undertaking particularly hazardous activities.

> Interviewees felt strongly about having a strong safety culture and feeling comfortable to discuss issues with senior management.

There were reports, however, that despite the undoubted seriousness with which health and safety is applied in UK engineering, at times of financial stress or even the promotion of other ethical issues (CO2 reduction or diversity and inclusion targets), compromises can be made leading to unintended negative consequences for health and safety. Transparency in decision-making is crucial when facing conflicting demands. The risk of negative impacts should be included in risk analyses and mitigated to the extent possible.

Diversity, equity & inclusion

Equal opportunities, discrimination, diversity, equity and inclusion (DEI) was the fourth most relevant ranked issue, and also featured high in the preparedness rankings. Ninety-seven percent of companies had a statement or policy on non-discrimination. Eighty-three percent of these companies, including all large companies that answered this question, measured or monitored their diversity rates.

Our survey of engineers and technicians reinforced that DEI is high on the list of priorities in the engineering workplace. Eighty-six percent of engineers and technicians agreed that diversity and inclusion is important in their organisation, and only five percent disagreed.

DEI was also a topic that resonated with interviewees, who were largely able to speak to their companies' commitments on these issues.

Interviewees recognised the need for greater DEI within the sector but observed that DEI initiatives could be hard to implement effectively.

> Small companies expressed their desire to boost diversity but thought that people of diverse backgrounds may be less willing to join small companies with a non-diverse workforce.

The most widespread DEI issue related to discrimination against women, for which we heard several case examples, including that top-down gender targets had meant the basis of merit for appointment had been compromised engendering a feeling of unfairness and, it was claimed, placing individuals with insufficient technical knowledge and experience in potentially compromising positions.

Non-engineer compliance officers in engineering organisations often found it challenging to engage certain of their engineer colleagues with ethics issues generally, with particular examples given of DEI topics. It was suggested this may be related to the nature of ethics issues compared to engineering issues, wherein ethical matters have more grey areas concerning what's right and wrong and a lack of well understood methodologies to help analyse challenging situations and the implications of proposed solutions than an engineer might be accustomed to when dealing with engineering dilemmas.

A number of interviewees commented on matters of neurodiversity and colleagues on the autistic spectrum. Those with autism were reported to have excelled in scientific and engineering roles particularly by developing expertise in technical specialisms. However, those with autism often find interpersonal skills challenging, which can put them at a disadvantage for promotion and create retention issues in organisations where promotion requires managerial responsibility. For those who do move into managerial roles, their technical expertise may be underutilised. As one interviewee put it, "it was assumed that the best person to do the job was the best person to manage the team". In organisations that promote on the basis of increased technical expertise and experience, retention was not reported as an issue.

Business integrity

Business integrity was rated as the second most relevant risk for engineering, and firms showed high levels of preparedness for risks in this area.

The most common mitigation measure was a formalised procurement process incorporating assessment of bribery and corruption risks which 90% of companies had in place. The analysis also showed that 87% had a 'well publicised policy statement countering corruption' and a 'process to identify and manage conflicts of interest'.

During our interviews process, companies described anti-bribery, corruption and fraud training as a regular feature of employee training.

Less common measures were having an analysis of whether separation of duties is required (66%) and a dedicated anti-corruption risk assessment (68%). Smaller companies described the difficulty of implementing procedures such as these due to their limited resources.

Cybersecurity & data privacy

Cyber security and *data privacy* were also areas of relevant risk.

Ninety-seven percent of respondents stated they had a policy document covering cybersecurity; however, only 54% had independent auditing of cybersecurity measures.

During interviews, we often found there was a tendency for individuals to conflate data privacy with confidentiality and secrecy.

Whilst individuals were often aware of the importance of cyber security and data privacy, they often did not have a clear understanding of all the protections in place unless they played a role in the IT or cyber department.

Bullying and harassment

Bullying and harassment was the seventh most relevant risk.

Ninety-four percent of the 34 companies who identified this as a relevant risk had a statement or policy on bullying and harassment and 77% had training and communications on the issue.

An example of good practice in addressing such behaviour is undertaking a root cause analysis for patterns of bullying and harassment which 47% of companies reportedly undertake.

Design risks

The most relevant design-related risk identified was *the potential for negative impacts on users or others (safety, wellbeing, privacy)* which ranked eighth with a mean score of 7.79 overall.

Companies in the digital, IT and computing sector ranked this lower than other sectors (6.70).

The importance of health and safety culture in design was evidenced by the 79% of companies that had an assessment of safety or health implications of products or services for issues such as toxicity, addictiveness, or major incident.

The least relevant design risk was *diversity, equity and inclusion within design*, and while companies were aware of this issue in a general context, many did not see the relevance to their particular product or service.

Illustrating how DEI can be embedded in design, one digital firm described its efforts to ensure its websites met accessibility criteria for neurodiverse users.

Outsourcing & procurement – human rights

The issue of *unethical first- or second-tier suppliers* was rated the 11th most relevant risk.

> During the interview process, the topic of human rights was often identified as the 'ethical challenge of the future' by large companies. For smaller companies, the issue was not on their radar.

Risk of *abuses further down the supply chain (e.g., problematic raw materials, conflict minerals, child labour…),* was rated less relevant and ranked 16th, while coming in 23rd for preparedness. The discrepancy between the relevance and preparedness rankings may indicate that while many companies recognise the increasing relevance of such risks in their supply chains, their mitigation measures are not yet fully developed.

Forty-two percent of companies had initiated the process of addressing these risks by undertaking a preliminary mapping of the supply chain, and 52% felt there was a buy-in and a pledge to improve from management.

Sales

The two sales-related risks included in the survey were *bidding on projects that could be considered unethical and over-charging or misrepresentation (e.g., unjustified variation orders, unnecessary work, product substitution, not building to spec, price fixing or collusion, falsifying rebate requests…).*

Companies who identified as project-based ranked these higher in priority than those who did not.

In our interview process, we heard from engineering consultancies who described the integrity due diligence they undertake when bidding on projects. Larger companies also recognised they were able to be more discerning about the projects they bid on, and some firms spoke about customers they refused to work with due to their lacking ethical practices.

Seventy-eight percent of all companies reported undertaking ethical evaluations of projects with 77% of these companies ensuring evaluations happened independent of business objectives.

Community

The issue of *risks or impacts for neighbouring communities safety or health ranked 12th among engineering firms and the risk of other negative impacts of direct operations on neighbouring communities (e.g., noise, traffic, security, pollution)* ranked 17th. Seventy-seven percent of companies reported undertaking a safety risk assessment of the community; 12% described this risk assessment as not applicable to their business.

In the interview process, several larger engineering consultancies discussed how they are often given responsibility to undertake these safety assessments by the client.

The least relevant ethical issue in our review was the *negative impacts of subcontractor workforce on neighbouring communities (e.g., sex work, drugs, rough sleeping, housing crisis)* ranked last, 24th. For the companies who ranked this risk as relevant, 46% have conducted a preliminary assessment of severity and causes.

For a number of sectors, such as oil and gas, nuclear, and defence, community impacts were well recognised with policies and procedures developed to mitigate the risks. Environmental, social and health impact assessments (ESHIAs) and community impact assessments are used to analyse and apply mitigating measures to prevent risks ranging from those associated with armaments production, to nuclear accidents or oil pollution.

Sustainability

Environment and climate protection was ranked the sixth most relevant risk area and ninth for preparedness.

Sustainability is being led by greenhouse gas (GHG) emission reduction initiatives. The reduction of CO2 and other GHG emissions is a science-based problem that engineers should understand and have skills essential to mitigate.

Some firms have used the determination of their material environment, social and governance (ESG) issues in workshops and focus groups as a means of building awareness among staff and soliciting buy-in to actions aimed at reducing GHG emissions.

Reporting standards such as the Task Force on Climate-Related Financial Disclosures and Carbon Disclosure Project were adopted by some firms even prior to the former becoming an obligation for larger UK companies. Mapping material issues and mitigation actions to the UN Sustainable Development Goals (SDGs) has also been undertaken, particularly by larger companies.

In one case, a firm decided not to undertake work in the coal industry as this is incompatible with its reduction of CO2 emissions objectives. Another engineering consulting practice described a centre of excellence with senior executive leadership and dedicated resources to support all sector and discipline areas with meeting sustainability objectives.

> Sustainability is not, however, just about the environment. There was variation by sector concerning awareness of sustainability-related social issues such as worker welfare, negative community impacts and modern slavery issues.

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[12] Task Force on Climate-related Financial Disclosures (TCFD)

[13] CDP

For many organisations the awareness of human rights risks was low, but for some it was coming up the agenda.

It is not unusual for countries such as the UK to assume human trafficking, bonded labour or child labour are low risk. There was growing awareness that even if such risks are lower in the UK, they still exist amongst vulnerable groups.

There is also a growing realisation that UK companies have a responsibility to ensure risks in its sub-contractors or other suppliers are assessed and mitigated. This was one of the areas where actions to identify and mitigate such risks was least well developed. A number of companies in the oil and gas sector had started to audit third parties on worker welfare standards (minimum wage, health and safety, freedom of association, working hours, forced labour, child labour, bonded labour etc). Some had joined industry associations that specify what constitutes acceptable standards of worker welfare practice, such as Building Responsibly.[16]

[14] Building Responsibly

Observations by sector

While the sample of firms surveyed in this review was too limited to draw any significant comparisons between sectors on ethical practices, there were some observations by sector worth noting.

Consulting firms

The ethical practices of engineering consulting firms were often driven by their client's preferences. One firm discussed how although they had the options and capabilities to provide more sustainable building materials, these were often bypassed depending on the needs of the clients.

Digital, IT & computing

The digital, IT and computing sector stood out as distinct, with many ethical issues needing separate consideration and there being unique ethical challenges for the sector. Ethics programmes need to acknowledge the unique nature of the digital sector. For instance, when we talk about community, this has a meaning that is not place-specific.

There is also a debate concerning ethics and artificial intelligence (AI). Very thoughtful contributions have been made on this topic by both Rolls-Royce and Arm[16].

Energy, oil and gas

The energy, oil and gas sector had progressive industry-standards and ethical practices. We conducted interviews with several oil and gas industry firms that included large corporations and medium–sized suppliers. These firms described the strong ethical requirements within the sector, even within emerging issues such as human rights in the value chain.

This behaviour may be driven by the consequences of previous failures and scandals such as the Deepwater Horizon oil spill, and high-profile corruption and human rights issues, as well as the increasing pressure facing the oil and gas sector related to climate change mitigation.

Aerospace

Like oil and gas, aerospace has a long tradition of certain ethical issues being essential to their corporate culture. The concepts of product safety and an objective, no-blame, continuous improvement culture are well embedded. Despite the fundamental failings at Boeing in relation to the 737 Max safety issues, the organisations participating in this review put great emphasis on their strong ethical practices.

There was evidence that the focus on issues such as health and safety, anti-bribery and corruption, and worker competence and welfare were being cascaded down aerospace supply chains. A commitment to high technical and ethical standards was espoused confidently, even by smaller businesses.

Construction

High health and safety standards are accepted across construction as a norm. Difficulties can arise when financial pressures prompt compromises in the essential safety of materials used, the quality of energy efficient solutions deployed and even the independence of professional advice provided.

There are also cases of very strong practice, such as one structural engineering firm and a public sector agency taking leading and innovative positions with regards to steel and cement produced using lower CO_2 emitting processes. Innovative techniques are being used to ensure worker welfare standards are maintained in supply chains, although such procedures are not yet as widespread as the climate-related initiatives in the sector.

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[15] The Aletheia Framework, Rolls-Royce   [16] ARM AI Trust Manifesto 2019

Observations by size

We interviewed a range of companies of varying sizes, from large multinational companies to research start-ups developing progressive ecological technology.

Regardless of size, many of the companies felt their company's identity was directly tied to ethical values and behaviours. This was particularly, but not exclusively, demonstrated by companies producing an ethically-driven project or service; for instance, those focusing on renewable energy or developing sustainability products.

This ethical identity extended to other areas of business ethics. For example, they were not just focused on their climate-related sustainability practices, but also how their employees were treated.

For some of the small companies, it was difficult to fund an ethics programme given their need to focus on profitability. While management displayed commitment, they were limited in the means they could use to demonstrate this commitment in practice. In exceptional cases, senior leadership displayed a core commitment to ethical practices that permeated the company's operational environment, using, for instance, regular pulse surveys to identify worker welfare issues that were addressed and communicated to the workforce.

Certain large organisations are having a positive effect on the supply chain by supporting suppliers to develop their ethical practices. Larger organisations have greater influence to affect the sectors they work in, and these companies are working to develop their ethical policies within their supply chain. Otherwise, their ethical requirements have the potential to exclude smaller resource-poor companies.

Our research clearly validates that larger firms have more established ethics programmes, with supporting systems and processes, than do smaller and mid-sized firms. Larger organisations showed the most interest in our project, and the increased level of resources within these companies allows them to focus on these issues and take action. As such, they are more advanced at identifying and mitigating ethical risks.

Compliance best practices

Engineering firms take different approaches to compliance – principles, culture and prevention, or rules and enforcement. The challenge they face is to be effective with finite resources. Interviewees shared their experience of what works best:

- Risk assessments are at the core of effective compliance as this allows available compliance resources to be directed at the most material risks; this often worked well in workshops with colleagues with relevant responsibilities

- Principles and culture are important – with leadership by example. Compliance officers we interviewed had good support from business leaders including the CEO but regarded middle management as still often the most difficult group to engage.

- Dilemmas that reflect potential real-life circumstances for engineers and technicians are an important component of increasing awareness of compliance issues and ethical risks and providing guidance about how to analyse and react appropriately to situations

- One organisation has a central repository of learning resources and encourages sharing of what they consider "high value" learnings.

- Effective communications and engaging, relevant training (eLearning and in-person) are also positively impacted by the use of relatable examples and case studies

- Speak-up channels act as the emergency safety valve. To be effective they should offer confidentiality to the person raising concerns, and a guarantee that retaliation will not be tolerated. These assurances build confidence in the ability to raise concerns. Feeding back on resulting action taken, or why no action was appropriate, is also important to provide the sense that something happens if concerns are raised. In doing so, care is required not to disclose specific details that should remain confidential.

One interviewee with Board level responsibility for ethics reflected on some of the ethical challenges faced in engineering:

Conflicts of interest and disregard for professional advice in engineering can have the effect of altering fundamentally the nature of the building or structure that comes into existence.

For example, design advice can take due consideration of sound professional standards and matters such as GHG emissions in construction and during the operation of buildings. But the design advice may be diluted by those bidding for the construction work and/or by the developer emphasising financial considerations over the design and professional standards.

To make a building energy efficient over its lifetime requires a design that anticipates the emissions requirements likely to evolve in the future. Such design typically has a higher current cost of construction but would generate lower financial and CO_2 related costs in the future. Yet the net present value, fully loaded for GHG emissions costs (carbon credits), is not often the driver of the decision making; instead current build costs conforming to regulatory standards will most likely be the basis on which construction decisions are made.

Good practice is increased awareness of ethics issues through mandatory training and, more powerfully, focus groups of colleagues to determine how to address topical ethical issues. There should be a repository of case studies that exemplify ethical issues that arise and guidance on how to address them. Such good practices should be wrapped in good ethical culture and good governance. "Poor culture can be an Achilles heel."

An executive view: "Poor culture can be an Achilles' heel"

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PEIs' views
on ethics in
the profession

The views of PEIs and non-engineering professional bodies were collected in two ways:

- An **online survey of 23 PEIs, plus three non-engineering institutions**, in which they were asked to provide an importance rating between 1 and 10 to a selection of ethical issues. They were also asked to rate from 1 to 10 the support they believe their members and the employers of their members would ascribe to each of those ethical issues. In addition, professional bodies were asked to describe the maturity of specific ethics-related activities they conduct on behalf of their members/registrants and within their own organisation.

- **Interviews with 10 institutions (seven PEIs, three non-engineering bodies),** including multiple representatives where possible, to discuss their responses and understand their challenges.

The survey and interview programme delivered insights on the approach to addressing ethical issues in engineering and non-engineering institutions. The survey also looked at how they perceive support from members and employers in addressing these issues proactively.

Key findings

The PEIs ranked *maintaining professional standards* and values at the top of the list of important issues for their institutions with an average importance rating of 8.96 out of 10.

The importance of diversity, equity and inclusion (DEI) mirrors the firms' survey where it was also ranked among the highest ethical topics.

The small number of non-engineering institutions that completed the survey, representing finance, science, and HR, also placed great importance on *maintaining professional standards and values* as it was rated as 9.33 in importance. However, data protection ranked even higher among the non-engineering cohort with a score of 9.67 compared to a 6.39 average importance rating for data protection by PEIs.

The PEIs perceive *mental health and wellbeing* as an issue that companies in their sector/discipline do not necessarily prioritise. This makes an interesting comparison with the firms' data where s*afety, physical, mental health and wellbeing* was ranked as the ethical risk with the highest relevance.

Preventing fraud, corruption and money laundering was also relatively low on the list of PEIs' ethics priorities. Modern slavery & human rights were not on the radar of most PEIs, with a particularly low perceived importance rating for members and employers. The average importance rating given for support from members on *reducing modern slavery in the economy* was 2.0 out of 10 and for employers it was 3.5 out of 10.

Ethical issue	Average PEI importance rating	PEI view of "support from members" rating	PEI view of "support from employers" rating
Maintaining our professional standards and values that are respected by employers	8.96	7.91	7.18
Realising greater diversity, equity and inclusivity at all levels of the profession	8.30	6.73	6.95
Reducing carbon and other greenhouse emissions	8.00	7.59	7.35
Ensuring no harm comes to the communities affected by our work	7.96	7.85	7.32
Maintaining mental health and wellbeing	6.96	5.92	5.50
Preventing fraud, corruption and money laundering	6.83	7.67	7.67
Building the protection of personal information into everything the profession does	6.39	8.50	7.25
Promoting biodiveristy	5.22	8.00	5.00
Reducing modern slavery in the economy	5.04	2.00	3.50

In general, PEIs are taking a piecemeal approach to ethics. The integration of ethics into their activities is challenging for them, and there is not a clear and generally accepted view of what should be the role of PEIs with regards to ethics. Some PEIs have accepted the need for an ethics programme so as to address ethics issues effectively; for others the debate is active.

While many PEIs have ad hoc ethics-related activities and initiatives in place (for example, a code of conduct and a position statement on carbon emissions), in interviews most noted that they had not considered putting those ad hoc activities together as part of an overall ethics programme.

While all PEIs must have a code of conduct as a condition of their licence, 61% report that their code of conduct is reviewed regularly and actively promoted to members. In interviews, most noted that this code includes or links to the profession's *Statement of Ethical Principles.* PEIs discussed how the code of conduct acts as the foundation for ethical initiatives. They are generally knowledgeable about their codes and felt they are an important part of their identity as an institution that promotes professional standards; however, few provided regular training on the code or ethical issues to members.

When asked about their policy coverage regarding ethical topics, 53% of PEIs had policy coverage on 'most key ethics and compliance issues' and these had received approval from a senior governance body within the institution. Some of the more progressive PEIs had begun assessing communication and training needs for members in relation to these policies (13%) and a further nine percent had begun to address these needs and review policies on a regular basis.

Forty-six percent of PEIs described their investigations process as effective, where disciplinary sanctions are applied consistently and fairly. In an interview, one noted that it had published redacted versions of investigations relating to ethics to help build members' understanding of ethical issues.

Observations from interviews

The interviews held with PEIs were particularly insightful, often including several representatives of the institution with different responsibilities and perspectives. Several themes came up repeatedly in these discussions:

- **Challenge of dealing with the fundamentally 'unethical' in engineering:** PEIs with wide cross-sector membership, and those with international activities, find it difficult to identify priorities or unified positions on ethics-related issues. They often have affiliate activities taking place in parts of the world where human rights practices are questionable, or they represent individuals operating in roles that others view to be fundamentally unethical (e.g., systems design for weapons manufacturing). While consultations are ongoing to explore the possibility of establishing a 'Hippocratic oath' for engineers, one PEI noted that such a pledge would never work in engineering given the diversity of roles and sectors.

- **Cross-profession platforms for engagement are valuable:** PEIs appreciate the platforms the Academy has created for collaboration on issues

(D&I, ethics, infection resilient environments). At a senior pan-institutional level, positions are agreed and then taken back to the operational level for implementation. There is a willingness within the profession to work together toward a wider engineering community response in recent years. A valuable lever to promote efficient action on ethical issues would be a mandate from the Engineering Council as the regulator.

- **Complacency that UK-SPEC 4 is taking care of ethics in engineering**: Several PEIs noted that within their governance structure (e.g., board) there is complacency that the revised UK-SPEC for registered engineers and technicians is "taking care of ethics". While UK-SPEC 4 serves an important role, it only applies to registered engineers and technicians (a minority of the total UK engineering workforce) and generally is only validated when an individual goes through the registration process. Thus, it falls far short as a mechanism for the kind of culture change needed.

- **PEIs lack engagement with engineering firms:** Unlike in other sectors, such as financial services which we discuss in more detail below, PEIs usually engage with firms only in the context of promoting membership and registration amongst their engineering workforce. There is little information exchange between PEIs and engineering firms on ethics or other matters. PEIs conduct periodic surveys of their members, but they have limited insight into employers'/firms' needs and priorities. As part of the overall engineering ecosystem, the gap between professional bodies and firms is concerning. Moreover, PEIs are missing out on useful learning that could be had from engineering firms which are pushing progressively on ethics, and what that means for their workers.

# How others do it: Continuing professional development in financial services

One professional institution in the financial services industry has an active ethics programme: Integrity Matters.

Continuing professional development (CPD) is core to its approach and considered an imperative for any professional body. The industry and issues are constantly changing – ESG, Bitcoin – and CPD allows members to stay apprised of those changes. Ten percent of its CPD requirement is dedicated to ethics and integrity and the organisation has a page on its website that highlights CPD events and training modules members can access in order to meet their ethics CPD requirement.

The financial crisis raised awareness of integrity within firms and the institution works closely with firms to shape its priorities. It has an integrity presentation which institution staff can deliver to workers within firms. More specifically, the institution engages with firms as customers, assigning a client relationship manager to each and working with firms to create bespoke services/training to help them with ethics issues.

This approach means everyone's accountable for integrity, from the members to the institution to the firms.

The professional institution also hosts an accredited bodies forum, to which other industry bodies are invited to participate. The Financial Conduct Authority joins to share and solve problems so they can tackle issues together.
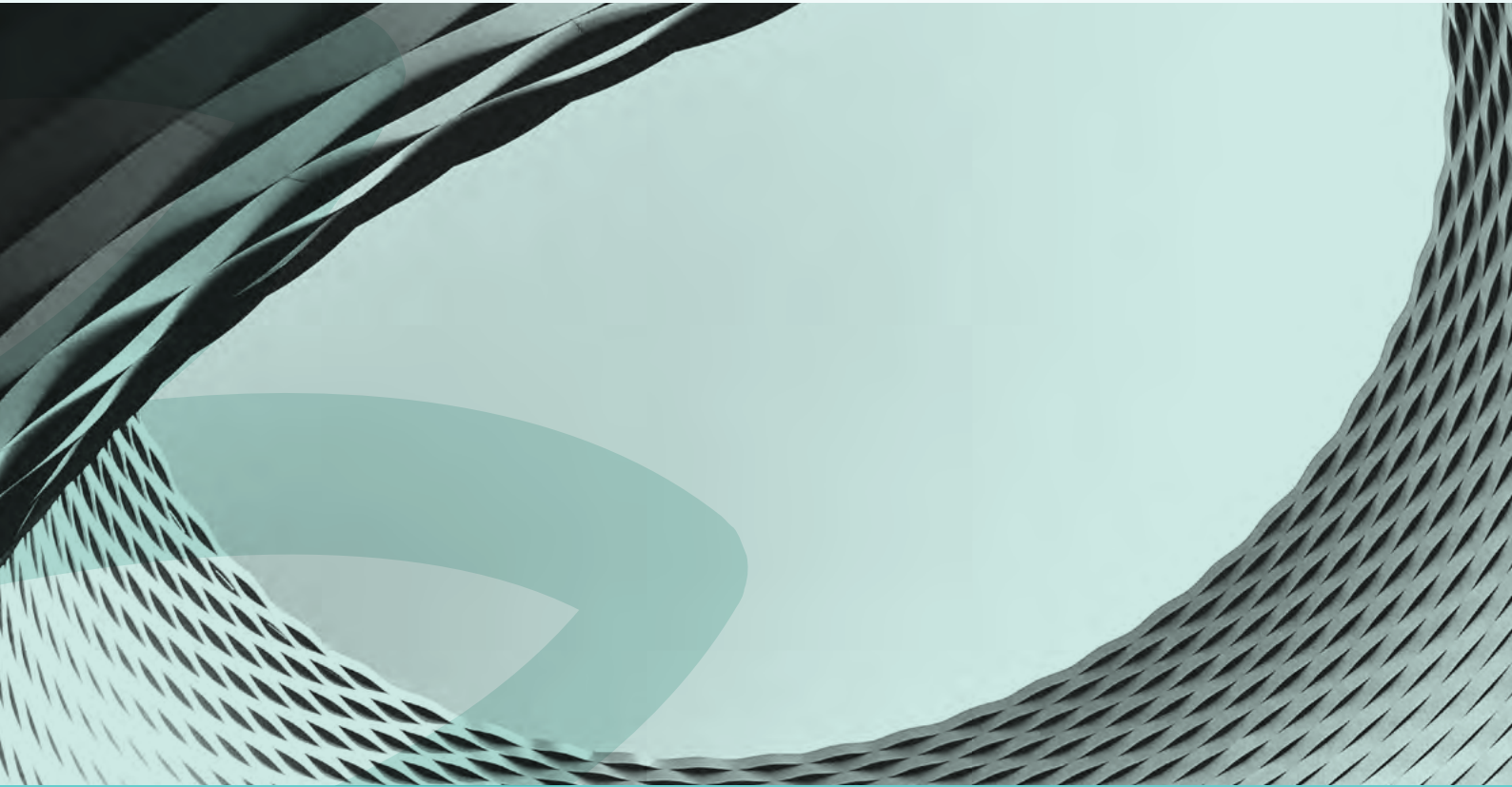
Discussion

This review of ethics in engineering has shown as much in the process of it being undertaken as it has in the findings from the survey work.

Given the small sample sizes of this review in a sector that represents 5.5 million people and more than two million engineering firms, the findings must be considered as indicative.

While there is a relatively strong professional and ethical ethos in engineering, there was a clear lack of engagement with the survey. We had intended to work through the PEIs and other engineering interest groups to access survey participants, but that process was slow and, ultimately, ineffective in delivering the numbers of respondents we aimed to achieve. It highlighted the limited channels in place for communication between the organisations driving efforts to embed ethics in engineering and the practising engineering workforce.

We tried reaching out to professional organisations, such as trade associations and business groups such as Make UK, but with little (or no) response.

This also brought to the fore the limited engagement between the PEIs and their registrants and members, as well as engineering firms. Senior managers in engineering firms often had limited knowledge of, or confidence in, the relevance of PEIs to their business. Moreover, only 23 of the 39 registered PEIs responded to the survey.

There is considerable fragmentation in the profession. There is a disconnect between the various stakeholders – the Engineering Council, the Royal Academy of Engineering, PEIs, business and trade associations, other engineering interest groups, engineers and engineering technicians who have or are in the process of gaining professional qualifications, engineers and technicians who are not members of PEIs, and employers of engineers. With regard to ethics, platforms and processes to facilitate collaboration on an engineering-wide basis are in their infancy, if at all existent.

These findings point to structural challenges in the profession which are complex and deep rooted. But, for there to be a robust ethical culture in UK engineering, establishing agreement on the role of these stakeholders, and more collaborative processes across the profession on ethics, is essential.

There are companies and other employers that are addressing ethical challenges in innovative and dynamic ways, but the beneficiaries are only their employees.

In carrying out this exercise, a gap in the provision of guidance on ethics issues has become apparent. The gap relates to engineers and technicians who are not employed by these beacons of good practice.

There is a danger that lip service will be paid to ethics in engineering in the absence of supporting processes to drive change throughout the profession in the broadest sense. Consequently, there would be an increased risk of unethical conduct undermining the value and values associated with engineering in the UK.

So, what should be the role of the professional bodies leading the charge on business ethics in the profession?

The Engineering Ethics Reference Group (EERG) has begun to consider actions needed to drive ethical collaboration and standards throughout the profession. Many of those actions – to establish accountability, improve education and training, enhance engagement and communications around ethics – are necessary and helpful. We build on those actions in the following recommendations.

Recommendations

Good practice suggests engendering ethical business culture is critically important. This takes time and requires common principles of good ethical practice to be defined and reinforced consistently and via a range of channels.

The action plan devised by the EERG and published in its *Engineering Ethics* report earlier this year, contains a broad and helpful set of activities that will, if implemented with a truly pan-profession approach, help to elevate the importance of ethics in UK engineering.

Based on the learnings from this review, and building on the actions in the EERG report, we suggest prioritising the following to improve ethics in engineering:

- **Recommendation 1: Develop a programme of communications, training and engagement to build awareness of and alignment with the Statement of Ethical Principles.**

This should happen within the constructs of the profession and throughout the engineering sector as a whole. Partner with firms to promote the principles amongst their engineering workforce in order to reach those who are not professionally registered. Consider developing training modules that can be delivered within firms or other membership organisations covering the principles of ethics for an engineer. *The Statement of Ethical Principles* does an excellent job of covering the fundamentals of good ethical behaviour and is a useful tool for defining what ethical behaviour and practice means for UK engineers and engineering technicians – but it needs greater exposure to its audience.

- **Recommendation 2: Promote and develop ethics-related continuing professional development (CPD).**

Consider how ethics-related CPD can be better used as a lever to drive understanding of the evolving nature of ethics issues amongst professionally-registered engineers and technicians. A minimum requirement for ethics-related CPD content, and signposting to available resources, would be helpful starting points.

- **Recommendation 3: Assess the accessibility of current whistleblowing channels and support the development of new alternatives.**

Assess the availability of whistleblowing channels for UK engineers and technicians and consider the need for a prescribed body to support whistleblowing in engineering, as seen in other sectors where the statutory regulatory body has that role, including the General Pharmaceutical Council and the Nursing and Midwifery Council. There is arguably a significant proportion of workers in UK engineering who either do not have direct access to a meaningful whistleblowing system or don't feel comfortable using the channel provided by their organisation. Clearer guidance on how to raise concerns, and/or a new mechanism to serve the diverse populations that comprise UK engineering, are needed. Moreover, a pan-engineering view of the types of concerns being raised would provide valuable input into the profession's ongoing ethics agenda.

[17] ibid

- **Recommendation 4: Create and support links between PEIs and employers across UK engineering.**

PEIs will learn an enormous amount about the evolving ethical risks engineers and technicians face by engaging with firms, which will help PEIs to deliver ethics messages and activities more relevant to their membership. In return, employers can benefit from having an authoritative third party support their ethics and integrity programmes. The Financial Services Culture Board (FSCB) is an example of an organisation that works closely with businesses in the financial services industry to understand, monitor and address issues that are central to good cultures and good outcomes in financial services.[19] The FSCB runs an annual employee survey that looks at issues around ethical culture, among other key factors, which could present an alternative model for collecting data on ethics from which the engineering profession could learn.[20]

- **Recommendation 5: Continue to survey the profession on ethical statements to provide benchmarking data.**

Select a condensed set of ethical statements from the broader set provided in this report which, using learnings from this review and mapped to the *Statement of Ethical Principles*, can be used as a baseline set of Net Ethical Culture (NEC) scores representing the views of practising engineers and engineering technicians on ethics. In the future, consider using a national survey firm to achieve representative numbers as this will access both registered and non-registered engineers and technicians. Where possible, explore particular issues with smaller groups of engineers and technicians in a focus-group style setting. Engineers and technicians could be accessed via an interest group of employers,

such as those participating in this survey, that are positively engaged with ethics in engineering, as is done in the FSCB survey.

- **Recommendation 6: Seek to establish consensus over the roles of the various stakeholders in UK engineering regarding ethics.**

The impact on good ethical and professional practices will be greater if there is better coordination of effort in order to optimise the use of resources. Clearer roles for the Academy, the Engineering Council, PEIs, engineering interest groups, trade associations, and employers will help ensure constructive collaboration across all parties and underpin the sharing of good practice.

- **Recommendation 7: Ensure all ethics programmes consider how to support SME engineering firms.**

Be ever mindful of how those driving the ethics agenda in UK engineering can support SMEs with building ethics programmes. The gaps this review has highlighted – of smaller, resource-poor engineering firms that are struggling to put in place ethics programmes, and of engineers and technicians working outside large firms – is where those leading the profession's activities on ethics have the most value to add. There is a growing risk that if smaller engineering firms do not put in place processes by which to demonstrate their compliance with ethical practices, they will be excluded from the supply chains of larger companies who are faced with increasing obligations, legal and investor-led, to manage and mitigate ethics risks throughout their business.

[19] Financial Services Culture Board
[20] FSCB Employee Survey 2021

About GoodCorporation

Recognised worldwide in the field of corporate responsibility and business ethics, GoodCorporation has 21 years of experience checking and measuring corporate behaviour. We have over 100 clients, including FTSE 100 and CAC 40 companies, and have conducted more than 600 assessments in 86 countries

Data gathered from our assessments is used to benchmark business behaviour. This enables

GoodCorporation to identify those management practices that are successfully embedded, and highlight weaknesses that might leave an organisation exposed to repetitional damage.

We support our clients through assessment, certification, training and advice. We also provide opportunities to share best practice and thought leadership through our Business Ethics debate series at the House of Lords.

Where we have worked

Countries in which GoodCorporation has worked
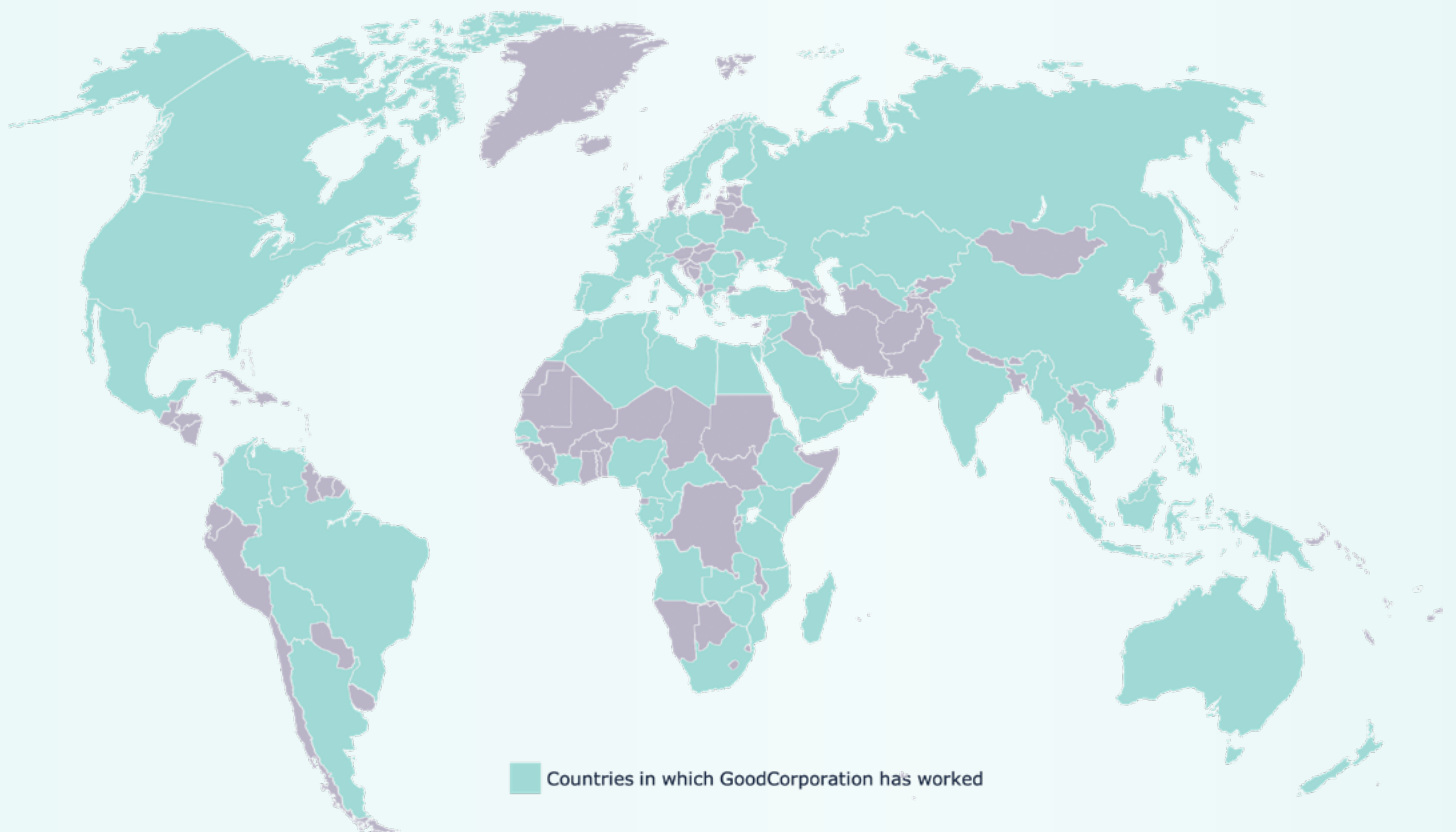
Ethics in the engineering profession has been compiled by GoodCorporation, one of the leading practitioners in assessing and measuring responsible business practices. This paper was jointly commissioned by the Royal Academy of Engineering and the Engineering Council to understand the state of ethical behaviour in UK engineering.

In this white paper, GoodCorporation examines how the engineering profession tackles a variety of ethical issues including human rights, whistleblowing, business integrity and sustainability.

For more information about GoodCorporation's work in the field of business ethics please contact us at info@goodcorporation.com.