

Chartered Institution of Highways & Transportation response to the Transport Labour Market & Skills consultation

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The Chartered Institution of Highways & Transportation (CIHT) provides strategic leadership and support to help our members develop, deliver and maintain sustainable solutions for highways, transport infrastructure and services.

CIHT is a chartered professional body for those working in highways and transportation.

We support our members throughout their careers by providing:

- industry-recognised training and qualifications
- professional standards
- research and business information
- leadership on key transportation related issues

We have members across the world, working in the public, private, academic, research and not-for-profit sectors.

CIHT is the only body to offer the full range of professional transportation qualifications including Chartered Engineer, Incorporated Engineer, Engineering Technician, Certificate of Competency in Road Safety and, uniquely, Chartered Transport Planning Professional.

These qualifications ensure that our members work to high professional standards on behalf of the societies we serve.

We ensure our members retain and develop their skills and knowledge to address the changing needs of the profession through our CPD requirements. We require our members to plan, undertake and record CPD and provide Members with a range of CPD opportunities through our digital learning platform, CIHT Learn, and our events programme.

We have a network of valued partner organisations – representing the private, public, research and education sectors – that support and collaborate with us in our work and align to our values.

Our work is governed by our Royal Charter. Our object states that we exist:

“To advance for the public benefit the science and art associated with highways and transportation in all their aspects: and to promote education, training and research and development of the said science and art.”

Question 1 - In your view, what skills does the transport sector need in the future?

Many of the current skills in the sector will remain core to delivering a safe and efficient transport sector. There are, however, four skills that CIHT think will be needed in the future: systems architects (reflecting how the transport sector should be considered a complex system), data thinking, sustainability, and professional ethics.

The CIHT Strategy 2022+ identifies professionalism as a key overarching theme, alongside climate action, and equality, diversity and inclusion (EDI). Being professional means being held to account for our advice and actions. We expect our members to operate within the CIHT Code of Professional Conduct, maintain and develop professional ethical expertise, and deliver a safe and effective service.

The skills needed within the transport sector span across embracing technology and innovation to addressing the need to decarbonise the transport sector. However, a key point is that the sector does not lose sight of the need to ensure existing technical skills are given focus: there will be a need for competent highway engineers, transport planners, bridge engineers, lighting practitioners and so on to maintain our current transport sector. We cannot assume that there will be a sufficient number of engineers, designers, material specialists in the future unless the sector focuses on that; this strategy is one means by which this can be undertaken.

CIHT Futures¹ highlighted that the sector needs to embrace uncertainty, and this requires a need for flexible thinking in response to the challenges we face. This work also highlighted the need to address unconscious bias. Through our EDI work, CIHT has focussed on and raised awareness of the importance of equality in providing an operational advantage and a moral imperative for the highways, transport, and infrastructure sector. Below are further aspects of skills that CIHT believes the transport sector needs in the future.

Systems architects

Our lives depend significantly on systems; interconnected webs of activity that link many organisations, technologies and people. During the Covid-19 pandemic the transport sector was part of a crucial system for the distribution of vaccines and enabling key workers to get to hospitals. What do the complex systems and interdependencies that underpin our lives tell us about the future of professions²? The paper 'Thinking systems: how the systems we depend on can be helped to think and to serve us better' offers one idea, making the case for the need for systems architects³.

To make systems function and serve us better, there is a need for new structures and roles; in particular, the need for 'the growth of a practice of systems architects with skills straddling engineering, management, data and social science'. Such

¹ [Futures \(ciht.org.uk\)](https://ciht.org.uk/futures)

² The Government office for Science Future of Mobility proposed a systems approach

³ [Thinking systems: how the systems we depend on can be helped to think and to serve us better \(ucl.ac.uk\)](https://www.ucl.ac.uk/transport/insights/thinking-systems)

people need to be adept at understanding, designing and improving intelligent systems that are transparent and accountable.

Arguably the transport profession has, for some time, been further advanced than other sectors in having professionals demonstrate system architect skill sets.

Certainly, systems engineering, and urban design adopt system thinking perspectives. Road safety has the 'safe systems approach'; the built environment has digital twins to represent physical systems in a digital environment⁴.

The airline industry⁵ has been successful in creating a system thinking approach to safety through embedding a culture of accountability and learning. The CROSS reporting system⁶ (for confidential reporting in the construction industry) is another example of creating a culture of learning and safety improvement whereby the system seeks to learn from mistakes. Resilience approaches advocate systems thinking⁷. There will be gaps in the transport profession, with some arguing for instance, for the need for a bridge collapse investigation unit, or a road safety accident investigation unit.

Transport planning and highway engineering interface with architecture and urban planning; and, as such, operate in a way that draws on materials and behavioural science, psychology, and neuroscience. But perhaps we need the equivalent of such professions as architecture or urban design when it comes to knowledge and data. To create professionals who are able to understand, design and improve the intelligent systems in a way that is transparent and ultimately self-aware.

The transport system is 'visible, comprehensible, and, through tools like Waze, increasingly self-aware'. The transport professional who manages that road should also be equipped to maintain and manage the asset in such a way that the system becomes self-aware. Perhaps this is well underway. By harnessing the power of sensors, drones, and satellites, the transport profession is progressing with creating a new generation of professionals that operate like system architects. There is now an opportunity to ensure this is more fully realised, but this will require a new way of thinking about data.

Data thinking

In 2021 CIHT published 'Growing up quickly - Why the transport sector must rapidly improve the use of data to deliver Net Zero Carbon highways'⁸. This paper highlighted how the sector's engineers and planners have trouble asking the right questions of data specialists, whilst, at the same time data specialists struggle to talk the language of transport.

⁴ [How is digital engineering transforming the industry? | CIHT](#)

⁵ [The Airline Safety Revolution - WSJ](#)

⁶ Collaborative Reporting for Safer Structures UK (CROSS-UK) helps professionals to make structures safer by publishing safety information based on the reports we receive and information in the public domain.

⁷ Resilience Shift - <https://www.resilienceshift.org/podcast-interview-shines-the-light-on-infrastructure-resilience/>

⁸ [Growing up quickly | CIHT](#)

Digital technologies have a wide range of implications for the transportation industry, including information provision and communication, supply chains and logistics, agent-based transportation models, and new vehicle and service models. Efficiency and flexibility in operations have risen, fuel consumption has decreased, and customer experiences have significantly improved as a consequence of the advent of big data and smart technology. Additionally, big data contributes to transportation safety improvement. However, there is still a clear need to overcome challenges such as optimising operations, decreasing costs, and increasing revenues (Shaheen and Chan, 2015)⁹.

While it is sometimes assumed that technology will evolve in lockstep with regulation, this is seldom the case in industries experiencing fast technological development. To bridge the gap between regulation and innovation, sector technologists will need to collaborate closely with government and industry authorities to guarantee that systems and applications are designed for agility in order to comply with new regulatory requirements (Wong et al., 2017)¹⁰.

Numerous organisations are presently developing in the fields of intelligent transportation systems and autonomous cars. These organisations develop their own solutions in isolation, using a variety of datasets, methods, and technology. Those with the data science and digital skills necessary to maximise the value of data will be critical in overcoming these obstacles.

Additionally, developing a workforce with more specialised digital skills will be vital to guaranteeing the continued design and implementation of digital transportation systems (Speranza, 2018)¹¹. Along with conventional engineering and modelling abilities, app development, user interface design, data analytics, digital security, and data integration design will be critical components of assuring the transportation market's continued growth.

The only path ahead is via collaboration and mutual learning. CIHT believes that the transportation industry should establish an open forum to further its digital and data maturity. This can be achieved: 1) by identifying what data is truly needed, as transportation professionals do not always know what data is of value to it; 2) Collaborating to work out how to collect and use data to tackle some common problems, as many people know that they need to act but do not know where to start; and, 3) To work out how we can get data-literate transport professionals and transport-literate data specialists to work together and collaborate.

Sustainability

The term sustainability, or being 'sustainable', is a term in common usage and of increasing importance to the transport sector. It is therefore important that sustainable

⁹ [Evolution of E-Mobility in Carsharing Business Models | springerprofessional.de](https://www.springerprofessional.de/evolution-of-e-mobility-in-carsharing-business-models)

¹⁰ Wong, Y.Z., Hensher, D.A. and Mulley, C. (2017). Emerging transport technologies and the modal efficiency framework: A case for mobility as a service (MaaS). Available at: https://ses.library.usyd.edu.au/bitstream/.../1/Thredbo_15_Thredbo_15_Paper_44.pdf

¹¹ Speranza, M.G. (2018). Trends in transportation and logistics. *European Journal of Operational Research* 264(3), 830–836.

thinking is part of the future transport professional's skillset. Taking different forms, sustainability is something that can be looked at in three dimensions:

- Social: *The relationship with other people, communities, and society.*
- Economic: *Meeting the economic needs of today without jeopardising the needs of the future.*
- Environmental: *Reasonable interaction with the environment to avoid depletion of natural resources to safeguard environmental quality.*

It is important for the future transport professional to be aware of how these types of sustainability relate to their work. This is a key skill, especially in enabling the achievement of climate targets. A good reference point for keeping sustainable action embedded in everything we do is the UN's Sustainable Development Goals (SDG). These 17 goals are interlinked and provide a blueprint for the skills and knowledge needed to create a sustainable future for everyone; the aim of the UN is to have achieved these goals by the year 2030.

The movement to create streets to support more active travel – walking and cycling - is more significant than ever before. Furthermore, the implementation of green and blue infrastructure within the highways and transportation profession is also likely to become more important due to the need to improve flood resilience, adapt to temperature fluctuation, enhance biodiversity, and improve wider amenity benefits¹². Consideration of these aspects will, CIHT expects, become more important for the future of the transport professional.

Carbon literacy is a component that will be important, not just in its own right but in providing a focus for better collaboration and understanding with other specialised professions. There is a need to have a baseline of understanding and what is necessary for achieving Net Zero. This will require a reflection on individual roles and how they can support net zero and CIHT is developing a CPD framework for Climate Literacy setting out the skills and knowledge that highways and transportation professionals need to address the climate emergency. Our digital learning platform, CIHT Learn has courses to develop members' skills and knowledge in this area.

Transport projects must be socially sustainable, and the social value concept of schemes must not be an afterthought, but actively embedded in the approach throughout the project.

Professional Ethics

Why do professional ethics matter? At their core, ethics are about the consideration of how we treat each other, and how we treat the environment and other species. Professional ethics matter for highways and transportation professionals because transport has such major and far-reaching implications for people (including the individual themselves) and the environment.

¹² [What is Green Infrastructure? | CIHT](#)

So professional ethics involve thinking about the basis for our decision-making, the needs of those affected by those decisions and the impact of the outcome on society, individuals and the environment.

Keeping this in mind is key to ensuring that we balance economic, social and environmental considerations when delivering transport policy and projects.

Ethical practice also brings significant benefits for practitioners and organisations. Perhaps most obviously around reputation and trust.

In practice ethical conduct leads to better decision-making and the avoidance of potentially costly and damaging problems down the line.

The CIHT Code of Conduct¹³ for members, based on the Engineering Council's Statement of Ethical Principles sets out four principles which frame our ethical professional practice. Members of the Institution have a duty to:

- Accuracy and Rigour

uphold the highest standards of professional conduct, including openness, fairness, honesty and integrity.

- Honesty and Integrity

uphold the highest standards of professional conduct, including openness, fairness, honesty and integrity.

- Respect for Life, Law, the Environment and the Public Good

obey all applicable laws and regulations and give due weight to facts, published standards and guidance and the wider public interest.

- Leadership: Listening and Communication

abide by and promote high standards of leadership and communication.

These principles establish the core behaviours required by professionals to fully consider the impact of our actions on people and the environment.

As the principles indicate, professional ethics are not about ticking boxes, but rather, acting with integrity, ongoing reflection, and lifelong learning.

The Government Office for Science highlighted the need to prepare for growing demand for workers with multidisciplinary technical skills¹⁴. The Department for Transport notes decarbonisation requires a rethink of how we invest in transport, technology, and skills¹⁵. In both 'skills' are key and will need to be a focus for individuals and organisations when they prepare themselves for the challenges ahead.

¹³ https://www.ciht.org.uk/media/13855/code-of-professional-conduct_october-2020-section1.pdf

¹⁴ [Future of Mobility - GOV.UK \(www.gov.uk\)](https://www.gov.uk/government/consultations/future-of-mobility) page 113

¹⁵ [Transport decarbonisation plan - GOV.UK \(www.gov.uk\)](https://www.gov.uk/government/consultations/transport-decarbonisation-plan) – page 26

The implications of the pace of change and scale of challenges ahead – from technology changes, to achieving decarbonisation – require a rethink of the education of our undergraduates and apprentices to prepare them for a different world of work. We need to build on the work already underway through the Joint Board of Moderators to ensure graduates have the skills needed to address the climate emergency and ensure that people entering the sector through other routes also have the underpinning knowledge required to address these challenges.

It is also critical that the existing transportation professionals develop the skills needed and CIHT see the role of Professional Institutions being vital in equipping the current workforce with knowledge and skills on sustainability and the climate emergency for their ongoing professional development.

Question 2 - How, in your view, can current qualification and training routes be made more accessible for those who want to pursue a career in the transport sector?

There is a need to support people to achieve qualifications in highways and transportation who might not traditionally have come into the sector. CIHT offers a broad range of qualifications to enable highways and transportation professionals to access qualifications whether they are working in engineering or transport planning.

There are a small number of sector-specific apprenticeships which broaden access to a career in highways and transportation and remove some of the financial barriers to gaining professional recognition. CIHT is an End Point Assessment Organisation for the Transport Planning Technician apprenticeship which enables an apprentice to gain their Transport Planning Technician apprenticeship and become registered with the Engineering Council as Engineering Technician. Continuing support for these apprenticeships including raising awareness of these opportunities is required as well as support for more apprenticeships and other technical qualifications in highways and transportation.

Feedback from a CIHT survey of potential candidates for Engineering qualifications showed that one of the main barriers to achieving professional qualifications is lack of time with 65% of respondents saying that was the main reason they hadn't pursued professional registration¹⁶. To support more people to gain professional recognition employers should be encouraged to give employees time to focus on their professional development.

Consideration should also be given to shifting the perspective of the transport sector in order to make it more accessible to pursue a career in highways and transportation for people who have not taken traditional qualifications or who are looking to career change into the sector. Now more than ever, the sector requires those with environmental skills to help decarbonise our transport and digital skills to achieve our commitments by exploring innovative and technological advances, this needs to apply across existing and future roles (see Question 1 answer) Support for developing sector-specific knowledge and competence could be used to bring

¹⁶ Unpublished CIHT survey of potential candidates for Engineering qualifications undertaken in Q1 2022

specialists into the highways and transportation sector alongside upskilling existing transportation professionals.

Question 3 - What, in your view, are effective ways to attract young people and career changers into a career in the transport sector?

As part of its Young Professional Festival of Learning, CIHT partnered with Atkins¹⁷ to ask the young professionals and aspiring leaders of the sector their view of the future of transport. From the research, it is clear that young highways and transportation professionals want a flexible approach to working with 93% wanting to flex their time between home and the office. They also want investment in their professional development with 63% saying that learning and development was the most important company policy.

The majority of young professionals do not feel that the current infrastructure meets the needs of younger people and 68% of young professionals responding to the survey¹⁸ thought that the UK is not doing enough to accelerate the decarbonisation of the transport network. Only 14% felt positive about the future state of the environment. To attract young people to the sector, we need to demonstrate that there are roles where they can make a difference in delivering a more inclusive transport network and addressing the climate emergency.

Young professionals told us¹⁹ that although diversity and inclusion was being recognised and communicated at an organisational level that actual gender and ethnic diversity lagged behind with little transparency of diversity at senior levels. CIHT launched 'Shifting the Dial'²⁰ equality, diversity and inclusion strategy in 2022. The strategy focuses on the need to work together across the sector to lead to greater inclusion and change the public perception of careers in transport to attract a more diverse workforce into the sector which better reflects the needs of different transport users. The sector needs more diverse role models to showcase the opportunities in the sector and increase representation in the workforce.

There is limited awareness of careers in transport and this can be addressed through improved careers advice in schools and colleges, and through use of existing schemes such as CIHT's STEM ambassadors who can inspire young people to continue studying core related subjects, while expanding opportunities to broaden career horizons, raise aspirations, and build understanding of the vital role that transportation plays in everyone's lives. Shared resources and case studies of diverse role models could support existing work to raise the profile of careers in transportation.

Question 4 - What, in your view, are the barriers to further increasing diversity, inclusion and social mobility in the transport sector?

Creating the right environment for equality, diversity and inclusion to thrive matters not just because it is the 'right' thing to do. It is also important because opening the

¹⁷ [Views of the future from the future | CIHT](#)

¹⁸ [Views of the future from the future | CIHT](#)

¹⁹ [Views of the future from the future | CIHT](#)

²⁰ [Shifting the dial](#)

sector up to a more diverse workforce and taking action to engage, retain and develop the people that work with us is vital to the capacity, capability and future sustainability of the sector. CIHT's 'Shifting the Dial'²¹ outlines how the barriers to further increasing diversity, inclusion and social mobility in the transport sector are broad and range from governance to a lack of role models: collective action is required.

As the Chief Scientific Advisor to the Department for Transport, Professor Sarah Sharples wrote in the foreword: "To bring about real change, we need to work together. This will require collaboration, education and a re-positioning of the sector so that we become an attractive career choice for people from all backgrounds."

Part of the challenge is that, where there is good practice and barriers being broken down, this is not shared systematically. It is about sharing the progress as well as highlighting the lack of progress. The sector needs to be transparent about challenges related to EDI and accountable on reporting progress internally and externally. This will require a shift in the public perception to support a greater diversity of entrants into the sector – as a barrier could be the perceived working environment of construction²².

Another barrier is the need for data, and the sector must comprehensively collect and analyse qualitative and quantitative EDI data to monitor progress and redefine priorities over time – this will be a barrier to overcome.

There is also limited understanding of what equality, diversity and inclusion means for those working in the sector. Responses to a CIHT survey²³ suggested that a number of respondents involved in the decision-making process for recruitment, or who manage a team or influence staff development, are not aware of an EDI policy within their organisation. Notably, training to help staff understand how to contribute positively to inclusion and diversity in the workplace was reported as inconsistent, with nearly 50% of respondents (65% of respondents in organisations with less than 499 staff) receiving no training²⁴.

Question 5 - How, in your view, can barriers to diversity, inclusion and social mobility in the transport sector be reduced?

CIHT launched a new EDI strategy and 5-year action plan in 2022²⁵ to drive and support change in the sector. In the Strategy, there are five strategic priorities, and these focus on the action required to reduce barriers to the sector and the role that Professional Institutions such as CIHT can play in making the sector more inclusive. The priorities are:

²¹ [Shifting the dial](#)

²² [Challenging construction | CIHT](#)

²³ [Survey | CIHT](#)

²⁴ [Survey | CIHT](#)

²⁵ [Shifting the dial](#)

1. Embed EDI as integral to the vision and mission of CIHT through encouraging wider member participation in all aspects of governance and ensuring there are no barriers to membership and professional education.
2. Become recognised as the EDI leader in the sector, influencing culture, behaviour and EDI best practice with regard to inclusive design and placemaking.
3. Use diverse role models and best practice examples to change the perception of the sector and support an increase in representation across all areas of diversity.
4. Improve and increase inclusive EDI education opportunities through CIHT, in addition to ensuring inclusivity of skillsets for the future.
5. Drive impact across the industry through facilitating collaboration with key partners, peers and SMEs to support sector-wide EDI progress.

The impact of these changes can be magnified by working collaboratively across the sector and CIHT would welcome Government support to achieve these strategic priorities.

In 2015, CIHT developed the Routes to Diversity & Inclusion Toolkit²⁶ which was the first toolkit designed specifically for and with employers in the highways and transportation sector. This was recognised in the Transport Infrastructure Skills Strategy²⁷ and CIHT would recommend that the Government builds on the work in this strategy.

CIHT expects its members, Trustees and staff to work together to create a professional environment that values equality, diversity and inclusion. We provide training on Equality, Diversity and Inclusion through CIHT Learn. We aspire to a more inclusive sector with inclusion embedded in the values and aspirations of our members and partners, while underpinning the work they do. Training can help to create a common language and understanding of key issues that may cause barriers to the sector and can be used to support future growth and the strength of the sector. Concentrating on inclusion and diversity programmes, and completely integrating them into an organisation's fundamental principles not only advances the business, but also improves the lives and creativity of workers, customers, and the community by establishing a cycle of positive benefits for everyone involved²⁸.

Final comments

CIHT has been at the forefront of skills development in the highways and transportation sector and would welcome the opportunity to work with the Government on supporting the agenda in the work.

²⁶ [Routes to Diversity and Inclusion](#)

²⁷ [Transport infrastructure skills strategy: building sustainable skills \(publishing.service.gov.uk\)](#)

²⁸ [Diversity & Inclusion | CIHT](#)