NFB's Technology, Digital and Data series

National Federation of Builders

ARTIFICIAL INTELLIGENCE (AI)

A handbook for contractors

OPEN

An advice guide from the National Federation of Builders (NFB)
in collaboration with the Southern Counties Builders Association (SCBA)

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About the National Federation of Builders

The National Federation of Builders (NFB) is the leading trade association in England and Wales representing real construction and building contractors.

The NFB boasts over 600 members representing 1300 construction companies with a combined annual turnover of £6.6bn and 21,000 employees.

The NFB provides expert advice, training, representation and business services for members so that they can comply with industry standards, excel in delivery, and grow successful businesses.

Members must observe the NFB's Code of Conduct which commits them to business integrity, good practice and high standards of service.

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Foreword – The era of AI

The construction industry stands on the brink of a transformative era, driven by advancements in artificial intelligence (AI). As one of the oldest and most foundational sectors of human civilisation, construction has long relied on manual labour, traditional techniques, and incremental improvements. However, the dawn of AI marks the beginning of a profound evolution, where technology and innovation are poised to revolutionise every aspect of the building process.

This guide delves into the rapidly expanding role of AI in construction, exploring how it is reshaping the industry's landscape. From design and planning to project management and on-site execution, AI is becoming an indispensable tool for increasing efficiency, reducing costs, and enhancing safety. The integration of AI technologies is not merely a trend; it represents a fundamental shift in how we conceive, construct, and maintain the built environment.

The potential of AI in construction is vast. It enables the optimisation of design through generative algorithms, the improvement of site safety via predictive analytics, and the enhancement of project timelines and budgets through smart scheduling systems. Moreover, AI-driven robotics and autonomous machinery are beginning to handle tasks that were once labour-intensive, reducing human error and the risks associated with dangerous work environments.

But as with any technological revolution, the integration of AI in construction brings challenges as well. Issues of data security, workforce adaptation, and ethical considerations must be addressed to ensure that the benefits of AI are realised responsibly. This forward-looking exploration offers insights into these challenges and provides a roadmap for industry leaders, engineers, and policymakers as they navigate this new frontier.

The following chapters will guide you through the various applications of AI in construction, highlighting case studies, emerging trends, and the future possibilities of this technology. As you embark on this journey, consider the profound impact that AI will have—not just on the structures we build, but on the very fabric of our societies.

As Chair of the Southern Counties Builders Association (SCBA) and former National Chair of the Federation of Builders (NFB), I am pleased to introduce this guide to the effect of Artificial Intelligence on our Industry. I am also proud that the SCBA committee were given the opportunity to sponsor the following for the benefit of SCBA members and those of the NFB.

Welcome to the future of construction, where AI is not just a tool, but a partner in creating the world of tomorrow.

Kevin J H Hogwood
Chairman
Southern Counties Builders Association

Southern Counties Builders Association

About the SCBA

The SCBA is an integral part of the development and organisation of the building industry in the South of England, dating back to at least 1901 where current lineage of the SCBA began.

It is believed that the SCBA was formed to support the southern region of the umbrella organisation the National Federation of Building Trade Employers (NFBTE), a forerunner incarnation of the now NFB. At that time, the NFBTE was a federation of regional organisations, of which the SCBA was the leading organisation in the south. Records indicate that the NFBTE dates back to 1878, so it is possible that SCBA does too.

The SCBA and the NFB (and the old NFBTE) have a long and shared history, with SCBA previously holding property that the NFB leased and used as regional offices. While the SCBA no longer holds any properties, the proceeds of the sale of these have been carefully invested, to give the SCBA the ability to fund diligently selected initiatives in support of the construction industry in the south of England.

The SCBA is governed by a committee of dedicated and hardworking Trustees, overseen by the SCBA Chairman. There have been over 80 Presidents and Chairmen of the SCBA since its inception, a tradition that continues to this day.

Southern Counties Builders Association

Working together

The SCBA and the NFB are committed to working together in close partnership for the good of the construction industry in the south of England. Together, the two organisations have committed to hold joint meetings and launch joint initiatives for the benefit of their members, so keep an eye out for NFB communications on the latest NFB x SCBA announcements.

Why this handbook is for you (and how to use it)

Artificial Intelligence: A handbook for contractors presents a comprehensive overview of Artificial Intelligence (AI), its transformative impact on businesses in general, and recommendations of tools for use within the construction industry. From enhancing efficiency and improving decision-making, to streamlining tender processes and strategic planning, AI offers a multitude of opportunities for organisational processes, growth, and innovation.

Aligned with our mission to enhance members' strategic focus on digital transformation, the NFB, with our AI consultants Datacove, are proud to present this handbook. It offers valuable insights into AI tools and strategies tailored to support businesses.

Drawing on insights from CITB Research, that reveal a mere 3% adoption rate of AI among employers in the construction sector, despite its potential to unlock significant efficiencies and value, this document underscores the need for embracing AI to gain a competitive edge in a volatile market.

How to use it – the three levels

As some companies may be unfamiliar with AI in a professional setting and others may be very advanced, this document caters to diverse user needs by providing differentiated guidance across three proficiency levels. These levels range from using AI to streamline business operations and boost efficiency (level 1), to driving performance (level 2) and finally for business transformation and excellence (level 3). Those who may be new to AI are encouraged to work through the levels in a linear fashion. Those who have more experience are free to dip in and out of each section as they see fit, commensurate with their business' AI experience.

Here's what to expect in this guide...

- **An Introduction to AI:** Delving into the broad impact and practical applications of AI, from everyday conveniences like voice assistants to advanced predictive analytics in business operations. Emphasis is placed on understanding AI's capabilities, limitations, and the importance of accurate and ethical data usage.
- **Preparation for AI Adoption:** Practical steps to ready organisations for AI integration, including defining objectives, assessing data readiness, ensuring data quality and security, and establishing robust governance frameworks.
- **Differentiated Levels of AI Guidance:** Tailored advice and recommended tools categorised into three proficiency levels to cater to varying levels of AI familiarity and expertise.
- **Getting Started with ChatGPT:** A user-friendly introduction to ChatGPT, currently the most widely known and accessible AI tool, complete with practical tips and prompt examples for maximizing its use.

An introduction to AI

You may have noticed the term AI, or Artificial Intelligence, cropping up more frequently these days. While it might sound like something out of science fiction, AI simply refers to intelligent technology that can learn and make decisions like humans, but at a much faster pace.

At its core, AI uses clever computer programs and data analysis to recognise patterns, make decisions, and even complete tasks without constant human guidance. This advanced technology brings with it a range of benefits, not only for tech-savvy individuals, but for everyone, in both a personal and business setting.

In everyday life, you've likely encountered AI without even realising it. Think of voice assistants like Siri or Alexa, which can help you with tasks using just your voice. Or consider how online services, such as streaming platforms or shopping websites, suggest movies or products you might like based on what you've enjoyed before. These handy features aim to make life simpler and more convenient for everyone.

In the business world, AI is also making waves, and it's not just for big tech companies. By using AI-powered tools, businesses of all sizes and across a diverse range of industries, can reap the benefits from the technologies that are out there to help make communication easier, predict future trends, and automate repetitive tasks.

In the construction industry, for example, AI can help optimise project scheduling, improve site safety by predicting potential site hazards, and enrich procurement documentation. This means companies can be more efficient, make smarter decisions, and ultimately save precious time and resources.

In this guide, we'll explore the world of AI together, showcasing its potential to benefit you and empower your business to thrive in today's digital age. While each section includes tool suggestions, many of these technologies have multifunctional capabilities and can support with more than one area of your business.

It's important to note that AI technologies are advancing rapidly, and the tools will continue to evolve and emerge. These suggestions should serve as starting points; we advise conducting your own research to pinpoint the tools that align best with your needs and would offer the greatest benefits to your business.

An AI health warning

Acknowledging AI as a tool, not the silver bullet:
While AI undeniably offers numerous advantages to both businesses and society, it's important to acknowledge its limitations and potential biases. AI should be viewed as a powerful tool rather than a complete solution for decision-making.

Firstly, AI serves to enhance human decision-making capabilities. It's essential to exercise caution and judgement when relying on AI recommendations, combining them with industry expertise and common sense for well-informed decisions.

Secondly, the quality of AI's output relies heavily on the accuracy of its input. Therefore, attention should be paid to ensuring precise, unbiased, and reliable data to maximise its effectiveness.

Additional considerations
When deploying AI in business operations, it is important to remember that AI will not operate in a vacuum. The use of AI will need to work in the context of your legal obligations and other business policies. Therefore, several important considerations arise that should be considered:

- **Legal and ethical compliance:** Ensure compliance with relevant laws and regulations, including obtaining necessary licenses for data usage and addressing jurisdictional challenges.
- **Algorithm transparency and accountability:** Understanding AI algorithms and their potential biases is crucial. Transparency in algorithmic decision-making fosters trust and allows for scrutiny.
- **Data quality and source limitations:** The reliability of AI predictions depends on the quality of data it accesses. Apply strict data validation processes to mitigate the risk of errors. For example, make sure the data has no gaps, major outliers, or obscure information that could influence the results.
- User consent and data privacy: Respect user privacy by obtaining explicit consent for data collection and usage, implementing robust security measures, and prioritising transparency in data handling practices.

Getting ready for AI

Before diving into using AI, it's essential to ensure your organisation is adequately prepared. As with any project, planning your implementation is going to lead to much better results. To that end, here are some simple things to consider as you prepare to use AI:

- **Define your objectives:** Identify the specific goals you want to achieve with AI implementation. Whether it's improving efficiency, enhancing bids and tenures, or saving costs, having clear objectives will guide your AI strategy.
- **Assess data availability:** Take stock of the data you have available within your organisation. Determine the types of data (e.g., stock data, transactional data, sensor data) and assess their quality, completeness, and relevance to your AI objectives.
- **Data cleaning and preprocessing:** Clean and preprocess your data to ensure its quality and readiness for AI analysis. This may involve removing duplicates, handling missing values, standardising formats, and addressing any inconsistencies or errors.
- **Data integration:** Combine data from various sources within your organisation to create a comprehensive dataset. Ensure compatibility and consistency between different datasets to help with AI model training and analysis and spot-check the resulting data to ensure process accuracy.
- **Data security and privacy:** Apply robust data security measures to protect sensitive information from unauthorised access or breaches. Ensure compliance with relevant data privacy regulations (e.g., GDPR) and establish protocols for data anonymisation or encryption where necessary.
- **Data governance framework:** Develop ethical guidelines and frameworks to govern the collection, storage, and usage of data within your organisation. Define roles and responsibilities, data ownership, access controls, and policies for data lifecycle management.
- **Data labelling, annotation, and documentation:** Label and add notes on your data to provide context and meaning for AI algorithms. This may involve categorising data into predefined classes or adding metadata to help AI model training and interpretation. Document the characteristics, origins, and usage of your data to maintain transparency and accountability.
- **Data accessibility and availability:** Ensure that data required for AI analysis is accessible to relevant stakeholders within your organisation. Establish data pipelines and repositories to help data access and availability for AI model development and deployment.
- **Continuous monitoring and improvement:** Apply mechanisms for continuous monitoring of your data quality, security, and compliance with AI usage. Regularly review and update your data readiness practices, adapting to evolving requirements and emerging technologies.

Level 1: Getting started with AI tools to streamline businesses for efficiency

Level 1 introduces the basics of AI tools and their role in enhancing business operations. Learn about simple yet effective AI solutions that can streamline tasks, improve communication with clients, and provide valuable insights into your business. Perfect for businesses new to AI adoption, offering a practical starting point for harnessing the power of AI to work smarter, not harder.

Supporting you to run your business: Do you find yourself swamped with admin tasks that you can't just get on with your job? AI can help with all those routine chores on your to do list, like organising schedules, coordinating with subcontractors, managing emails, and processing data, allowing you to focus on your core responsibilities.

- **ChatGPT:** A conversational AI model that can understand and generate human-like responses across a wide range of topics and contexts (Free / £16 /month)
- **ClickUp:** A tool providing automated project management, writing assistance, and a knowledge manager in one with AI ($12+ /month)
- **Nyfty.ai:** Automates field processes in Procure or Autodesk, and managed site attendance ($84 - $2,100 /month)

Helping you understand your clients better: Ever wanted to know what your potential clients really think? AI tools can take notes during live or virtual meetings, summarise content, offer actionable next step insights, and can even give you an idea of the overall sentiment of the meeting! AI can also analyse online reviews and social media to give you insights into what people like (or don't like) about your company or services.

- **Otter.ai:** AI meeting assistant with real time automated notes, summaries, and creates action items (Free - $20 /month)
- **Fireflies.ai:** AI meeting assistant that helps your team transcribe, summarise, search, and analyse voice conversations (Free - $40 /month)
- **Lexalytics:** Transforms complex text documents into data, insights, and value (Price on request)
- **Other tools:** Zoom AI Companion, Microsoft Copilot

Making communication easier: Do you struggle to keep pace with client queries? AI-powered chatbots can help. These friendly digital assistants can update clients on projects, answer enquiries, and guide potential clients through your website highlighting your expertise and past endeavours. This can create smoother user journeys, keeping your clients engaged and happy, as well as saving you time and effort.

- **Hubspot Chatbot Builder:** Create messenger bots that help you qualify leads, book meetings, provide answers to common customer support questions, and more (Free - $3,000 /month)
- **Salesforce Einstein Copilot:** Personalise experiences, boost productivity, and maximise growth with conversational AI for your CRM (Price on request)
- **Tidio AI:** Increase sales and boost customer satisfaction with AI (Free - €499 /month)

Optimising building solutions: AI-powered planning and real time analysis systems enable accurate measurements and dimensions straight from digital floor layouts, facilitating a smooth digital take off procedure. This reduces project costs and optimises resource allocation, by doing away with manual errors and speeding up the estimation process.

- **OpenSpace:** Reality capture and AI-powered analytics for builders – from preconstruction to operations (Price on request)
- **PlanSwift:** Fast, easy and accurate takeoff quantities software ($1,749 /year)
- **Autodesk AI:** Predict and prevent risk, improve decision-making, save time with assistive workflows and access project information faster and earlier (Price on request)

Helping with recruitment: AI's expertise in data analysis, pattern recognition, and predictive analytics can enhance how you can identify, attract, and retain candidates. By sifting through vast amounts of data, AI can uncover insights into candidate qualifications beyond traditional metrics, tapping into a broader and more diverse talent pool. This frees up human resources to focus on more complex, creative, and strategic aspects of recruiting and retain talent.

- **Indeed Smart Sourcing:** Streamline the hiring process by using AI to match quality candidates to your open roles (£960 - £3,120 /year)
- **Fetcher.ai:** Sources high-quality candidate profiles that match your hiring requirements (Free - $149 /month)
- **Oracle talent management:** Source, recruit, onboard, manage performance, develop careers, and plan succession – all in one place (Price on request)
- **Other tools:** HireVue, Textio

Level 2: Advanced AI integration for performance

Building upon the foundations of the previous level, level 2 delves deeper into advanced AI solutions. Exploring sophisticated techniques like natural language processing and machine learning algorithms. Discover how these techniques can elevate business performance by automating complex tasks, assisting with procurement documentation, improving site safety, and driving data-driven decision-making. Ideal for businesses seeking to enhance efficiency, competitiveness, and strategic agility.

Automation for streamlining operations: AI can handle more than just the day-to-day tasks. Think about all those intricate processes that are so time consuming, like construction or procurement documentation. With advanced AI tools, you can automate tasks that help with these, as well as project management, resource allocation, and workflow optimisation. It's like having a digital assistant that can handle the finer details and save you time, allowing you to focus on the bigger picture.

- **Fieldwire:** Jobsite management for construction teams (Free - £67 /month)
- **Procore:** Streamline every process from pre-construction to closeout. Build with less risk and bigger profits (Price on request)
- **UiPath:** Uses AI to streamline processes, eliminate errors, and deliver better experiences to customers and employees (Price on request)
- **Other tools:** Oracle construction project management, Togal.ai, SWAPP, Blueprints

Strategic decision support with advanced analytics: Dive deep into your data with analytics tools empowered by AI to gain invaluable insights guiding your strategic direction. Through predictive modelling and prescriptive analytics, organisations can project market trends, identify opportunities, and proactively mitigate risks. Use these insights to optimise resource allocation, refine budget planning processes, and make informed strategic investments. Ultimately, these endeavours drive business growth and foster resilience, positioning organisations to thrive in dynamic and competitive environments.

- **Procore's construction management software:** Take control of outcomes, minimise risk and protect profits (Price on request)
- **DataRobot /NVIDIA:** Unified platform for generative and predictive AI (Price on request)
- **Datacove:** Bespoke predictive modelling and prescriptive data analytics for your business (Price on request)

Natural Language Processing (NLP) to interpret and analyse: AI extends beyond numbers to understand language, thanks to Natural Language Processing (NLP) technology. It enables computers to process, summarise and draft text, analyse data using Large Language Models (LLMs) and even change text styles or sentiment. Businesses can leverage NLP for tasks like sifting through job applications or enhancing bid processes. AI can analyse requests for bids, help formulate responses for tenders, and review previous successful bids to spot patterns which lead to successful bids, offering valuable suggestions to optimise future bids, contributing to business success.

- **AutogenAI:** Harness the power or AI for high-quality bid writing, proposals, and tenders (Price on request)
- **BidWork:** Easy AI tendering tool custom made for UK main contractors (Price on request)
- **Brainial:** AI-based tender assistant to create better proposals (Price on request)

Predictive analysis for project management: By harnessing techniques such as machine learning and deep learning algorithms (teaching a computer to recognise patterns by showing it many examples), predictive analytics enables accurate forecasting of project timelines and productivity enhancements. By identifying patterns, it aids in strategic decision-making, optimising project initiation and resource planning. Streamlining project planning, it ensures efficient task allocation and smooth execution, prompting cost-effectiveness, and improved outcomes.

- **BuildStream:** Increase equipment utilisation and save money for larger-scale construction projects (£1,500 /month)
- **Aveva Insight:** Self-service dashboards and customisable alerts for optimising operations and OEE using process analytics (Price on request)
- **Datacove:** Bespoke predictive modelling and prescriptive data analytics for your business (Price on request)
- **Other tools:** Procurify, Versatil

Enhancing Health & Safety and site security with computer vision: By deploying cameras and sensors equipped with computer vision algorithms, businesses can monitor construction sites in real-time to identify potential hazards and safety violations. From detecting unsafe working conditions to ensuring compliance with safety protocols, computer vision enhances site security and minimizes risks of accidents and injuries. Additionally, computer vision can aid in identifying unauthorised access, improving overall site security and asset protection.

- **Kwant.ai:** Workforce management & safety platform using safety wearables and plug-n-play sensors for real-time insights (Price on request)
- **Oracle construction intelligence cloud service:** Leverage predictive intelligence to reduce schedule, workflow, and safety risk (Price on request)
- **AI Clearing:** Full digital field construction progress tracking. To decrease rework cost. To mitigate litigation risk (Price on request)

Level 3: Strategic AI integration for industry excellence

In Level 3, we explore the transformative potential of AI for strategic business growth. This level is tailored for businesses ready to fully embrace AI as a strategic asset and explores cutting-edge technologies that leverage AI to revolutionise building design, construction processes, and safety protocols. It is perfect for businesses seeking to unlock new opportunities for efficiency, sustainability, and quality within construction.

Building Information Modelling (BIM) and digital twins: Harness the power of BIM and digital twins to revolutionise building design, construction, and operations. Use AI-driven BIM platforms to create digital representations of buildings, enabling stakeholders to visualise, simulate, and optimize building performance. By integrating BIM and digital twins into construction workflows, businesses can improve collaboration, mitigate risks, and deliver projects on time and within budget.

- **Autodesk Revit:** BIM software to design buildings and infrastructure in 3D (£366 /month - £8,820 /3 years)
- **SketchUp:** Reduce rework and coordinate with teams during construction more effectively (£103 - £645 /year)
- **Siemens Digital Twin:** Enables builders to respond faster and more flexibly to dynamic challenges and gain competitive advantages (Price on request)
- **Other tools:** Bentley MicroStation, Dassault Systèmes DELMIA, IBM Maximo

Autonomous construction equipment and robotics: Embrace automation with autonomous construction equipment and robotics powered by AI. From autonomous drones for site surveying to robotic bricklayers for masonry work, AI-driven technologies enhance construction productivity and safety. By deploying autonomous systems on construction sites, businesses can increase efficiency, reduce labour costs, and improve overall project outcomes.

- **DroneDeploy:** Reality capture which reduces the need for time-consuming manual inspections, helping to mitigate risk and keep field teams safe (Price on request)
- **ViAct:** Digitising construction jobsites to improve safety, enhance workflow and prevent environmental non-compliances (Price on request)
- **Dusty Robotics:** Automating construction layout, delivering unrivalled accuracy, communication, and efficiency (Price on request)
- **Other tools:** Construction Robotics, Boston Dynamics, Canvas.build

Smart building technologies for sustainability: Leverage smart building technologies driven by AI to optimise energy usage and enhance sustainability. Use AI-powered building management systems to monitor energy consumption, analyse occupancy patterns, and optimise HVAC and lighting systems in real-time. By implementing smart building solutions, businesses can reduce energy costs, minimise environmental impact, and achieve green building certifications.

- **Infogrid:** Understand building energy consumption and identify, manage, and measure impactful optimisations and efficiency projects (Price on request)
- **Green Badger:** SaaS platform for automating sustainability in the built environment ($250 – $600 /month)
- **Optimum Energy:** Decrease Energy Consumption. Increase Building Resilience. Decarbonise at Scale (Price on request)
- **Other tools:** LineMetrics, Schneider Electric EcoStruxure, Caidio, Honeywell Forge, or Siemens Desigo, GridPoint

Advanced AI-driven quality control and safety monitoring: Enhance quality control and safety monitoring with AI-driven solutions tailored for the construction industry. Use drones, computer vision and machine learning algorithms to detect defects, identify safety hazards, and ensure compliance with regulatory standards. By integrating AI-driven quality control and safety monitoring into construction processes, businesses can improve construction quality, minimise rework, and enhance workplace safety.

- **Intenseye:** Reduce workplace incidents, increase operational efficiency, eliminate lost work time (Price on request)
- **Arvist:** Increase productivity, improve quality, enhance compliance (Price on request)
- **Buddywise:** Real-time risk detection to help companies proactively build a safer workplace (Price on request)
- **Other tools:** Invigilo.ai, Everguard

ChatGPT: a user's guide

ChatGPT was one of the first artificial intelligence tools to gain wide-spread recognition and adoption, offering a glimpse into the potential of advanced language models. It's designed to simulate human-like conversations, providing intelligent and insightful responses to a wide range of queries. ChatGPT uses vast datasets to understand context, generate coherent text, and engage users in meaningful interactions. As an AI language model, it continually learns and adapts based on its interactions, evolving to better serve its users over time.

What is ChatGPT used for?

ChatGPT can be applied across numerous domains and industries, serving various purposes to enhance productivity, streamline communication, and provide valuable insights. Here are just a few examples of how ChatGPT can be used:

- **Research and information retrieval:** Researchers and professionals use ChatGPT to access information, gather insights, and explore complex topics across diverse fields, ranging from science and technology to humanities and arts.
- **Content generation:** Content creators leverage ChatGPT to brainstorm ideas, generate writing prompts, and draft articles, stories, or scripts, enhancing their creative process.
- **Innovation and development:** Developers integrate ChatGPT into applications, websites, and platforms to enhance user experiences, automate tasks, and deliver personalised services.
- **Customer service:** ChatGPT assists businesses in providing timely and helpful customer support, answering queries, resolving issues, and guiding users through product or service inquiries.
- **Entertainment:** ChatGPT entertains users with engaging conversations, storytelling, jokes, and interactive experiences, offering a delightful and immersive entertainment option.
- Other areas include assistive technology, education, healthcare, finance, and more.

If you are just getting started with AI tools, then ChatGPT might be the best one to start with so you can explore and experiment with AI and discover the potential for yourself.

Getting ChatGPT-ready

Before you get started here are a few things to bear in mind:

1. Effective communication

- Understand ChatGPT's capabilities: ChatGPT is just an AI language model designed to mimic human-like responses based on the input it receives.
- Use clear and concise prompts to enhance ChatGPT's understanding and accuracy.
  o Provide specific and context-rich prompts to yield better results tailored to your needs.
- Respectful interaction fosters better performance from ChatGPT, so maintain courteous communication.

2. Optimised interaction

- Stay on topic: Keep prompts focused on a single subject to reduce irrelevant responses.
- Experiment with different prompts and approaches to discover the most effective methods.
- Use the feedback loop: If responses are unhelpful, provide feedback through the thumbs down or regenerate response buttons to enhance future interactions.

3. Privacy and security

- Avoid sharing sensitive or personal information to maintain privacy and security, seek further guidance from compliance teams where necessary.
- While ChatGPT prioritises user privacy, exercise caution when sharing information online.
- Understand that ChatGPT learns from interactions, including those with you, to improve its performance for ALL users.

4. Continuous improvement through practice:

- Just like everything, the more you use it, the better you will become at it, discovering new ways to use it to your advantage!

Prompt examples – how to improve your outputs

When providing a query to ChatGPT, the level of detail you include greatly influences the quality and relevance of the response you receive. For instance, consider a (made up and somewhat exaggerated) scenario to showcase the varying outcomes based on input detail:

Input 1:
"What is typically used when building a medical facility?"

Output summary 1:
"The first output outlines the multifaceted approach necessary for constructing a medical facility tailored to the needs of patients, staff, and the community. It covers essential aspects such as strategic location selection for accessibility, meticulous building design ensuring efficient patient flow and comfort, adherence to regulatory standards, prioritisation of safety and security, integration of advanced technology for diagnostics and treatment, implementation of infection control measures, emphasis on accessibility for people with disabilities, incorporation of sustainable practices, creation of collaborative spaces, and consideration for patient comfort. Flexibility for future expansion and cost control are also highlighted as critical factors in the construction process, with the recognition that each facility's requirements may vary based on specialisation, demographics, and local healthcare regulations."

Input 2: "
What materials should I use to build a medical facility that would have room for 10 appointment rooms, a nurse's area, waiting rooms and space for admin and a breakroom? Please recommend the material that is the most durable, cost-effective, and has the lowest environmental impact."

Output summary 2:
"The second output provides a comprehensive list of materials suitable for constructing a medical facility with specific features such as appointment rooms, nurses' areas, waiting rooms, administrative spaces, and a breakroom. It emphasizes durability, cost-effectiveness, and environmental impact, recommending materials like steel or engineered wood for the structural framework, insulated concrete forms (ICFs) or insulated metal panels (IMPs) for exterior walls, linoleum, or luxury vinyl tile (LVT) for flooring, and acoustical ceiling tiles for sound absorption. The output also suggests energy-efficient windows, sustainable cabinetry, and fixtures, as well as HVAC and plumbing systems designed for efficiency and water conservation."

Both the above responses are helpful, but they offer different levels of detail. The first gives a broad overview on all the factors to take into consideration when constructing a new building, touching on various aspects without delving into specifics like structure or materials. The second response may be more valuable as it aligns closely with the user's likely intent, offering a detailed breakdown of factors relevant to the actual construction process.

Again, this is just an example of give you an idea of the different outputs you can receive using ChatGPT, but if you are not getting the results you want, then experiment with the amount of detail you are providing to see if that helps.

And if in doubt, ask it to help!
If you are struggling to get the results you are looking for, you can use ChatGPT to help you talk to it better:

- ***"I'm looking for information on [topic], but the responses aren't quite what I need. Can you help me refine my question?"***
- ***"Can you provide some guidance on how to frame my query more effectively?"***
- ***"Can you suggest a different approach or guide me towards more specific keyword or phrases to refine my search?"***
- ***"Act as a prompt engineer, review the following prompt for me, optimise to make it better and ask any questions you need to make it better."***
- And, even though it doesn't make any sense, if you feel the tool is just going round in circles and getting confused, you can 'restart it' by saying: ***"Right let's take a deep breath and try this again."***

The National Federation of Builders recognises that the way we interact with the world is forever changing. While we pride ourselves on our personal touch and connection with members, we also know that we too must embrace new technology and customer behaviour. That's why, in 2024, we launched Ask NFB.

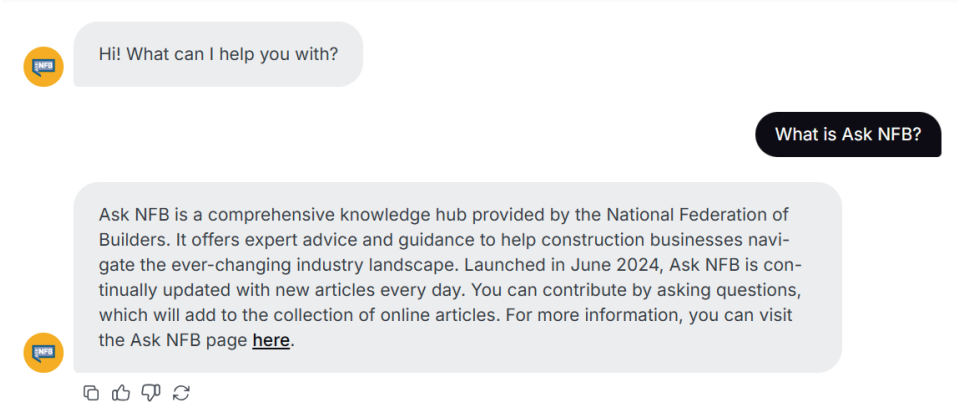
Ask NFB is both an ethos and a platform. It's an ethos because, if you're a member of the NFB, we invite you to ask us anything and we will do everything we can to help.

But Ask NFB is also a platform. Specifically, it is a digital, AI-assisted platform with a database of knowledge, resources, guidance, policies, templates, explainers, Q&As and much more. It is all verified and backed by the NFB's experts, both in-house and consultants, so you can trust and rely on it.

The system is intuitive, so you just need to start searching and it will start looking for the answer. It will tell you what has recently been uploaded or updated, what the most popular articles are, you can save to your own favourites, you can request an update or ask an original question and yes, if you want to, you can just chat to the AI-assistant, who will source your answer from our verified database.

NFB members are entitled to access Ask NFB as part of their membership and can book a demo by speaking to Membership Services. If you're not a member but would like to consider joining, we'd be happy to show you Ask NFB's capabilities, just call 03450 578 160 to get started.

Visit **ask-nfb.builders.org.uk** to find out more.



Meet the experts

The National Federation of Builders would like to thank and acknowledge industry experts, Datacove, who were commissioned to produce this guidance and deliver bespoke AI training for NFB members. Find out more about our lead author, Laura Mawer and Datacove below.

Laura is a data science consultant at Datacove with a diverse background in mathematics, and self-taught Python programming and AI skills. With over 15 years of experience in the education industry, Laura brings a wealth of knowledge in creating engaging and effective learning experiences. She is not only a seasoned data professional but also actively contributes to the tech community as the co-organizer and host of BrightonPy, Brighton's Python user community group, and the annual cross-sector tech conference EARL.

Datacove are a data and analytics consultancy specialising in customer analytics, marketing analytics and process automation. With over 20 years of combined experience in the industry we answer the questions that sit at the heart of every business, from who your customers are, to where and how you find more of them and how much you need to spend to do so. We also automate your most painful business processes, removing the 20+ hours you spend on them per week, forever!

Afterword – The future is here, embrace it

Artificial Intelligence is touted as the new business panacea; here to revolutionise our companies and return us to reasonable profit margins. Modern snake oil, or innovation that all must apply to survive? This is the guide to answer this question and demonstrate its valuable applications within construction.

I am very pleased to conclude this NFB guide to AI. It is written to help all understand what Artificial Intelligence is and how it can be effectively deployed in your business. AI is a tool that can broaden your services, helping contractors provide more value in a highly competitive market. It can also focus your customer services as well as making your existing systems more efficient, removing some steps and speeding up others. The challenge is not to be phased by the variety of opportunity or the speed of change. Concentrate on the processes and customer needs of your business and then use this guide to identify one or two areas where AI might be deployed to support you and your business. Like any project, determine the information, resources and partners that you need to execute effectively and achieve the specified outcomes. Most importantly though - get started! Your competitors have likely investigated and started their own implementation!

This guide demonstrates the breath of influence that Artificial Intelligence will have on our sector over the next decade and beyond. We are all exposed to the increasing number of priorities that contractors must address and tools that assimilate large amounts of information to help manage these issues will make a significant impact on our businesses. As constructors, we must not be distracted by the speed of technological change. Our challenge is changing our business culture to successfully adopt new technologies. This is easier implemented as evolution, not as a revolution. So, starting and continuing to invest in change is important.

This guide has been developed to inform and support your investments into Artificial Intelligence. Informing and supporting members is why the NFB exists and as the industry's use of technology and AI increases, we see our role in ensuring that our members can invest in the areas that will make them and their businesses resilient and more profitable. Artificial Intelligence has the potential to change the structure of our industry. The NFB is on hand to support transitions that you believe you need to make to stay at the forefront of your customers' demands.

A special thanks must go to Southern Counties Building Association for enabling this publication. It is a great introduction and advisory piece of work that helps explain the magic and opportunities of Artificial Intelligence to contractors. I am confident that it will help many of our members to understand their opportunity and improve the low levels of adoption within our industry.

Good luck to all our members. I hope that you can share your successes and lessons learnt with other members to help support the wider NFB family.

Mark Wakeford
Chairman of the Board
National Federation of Builders

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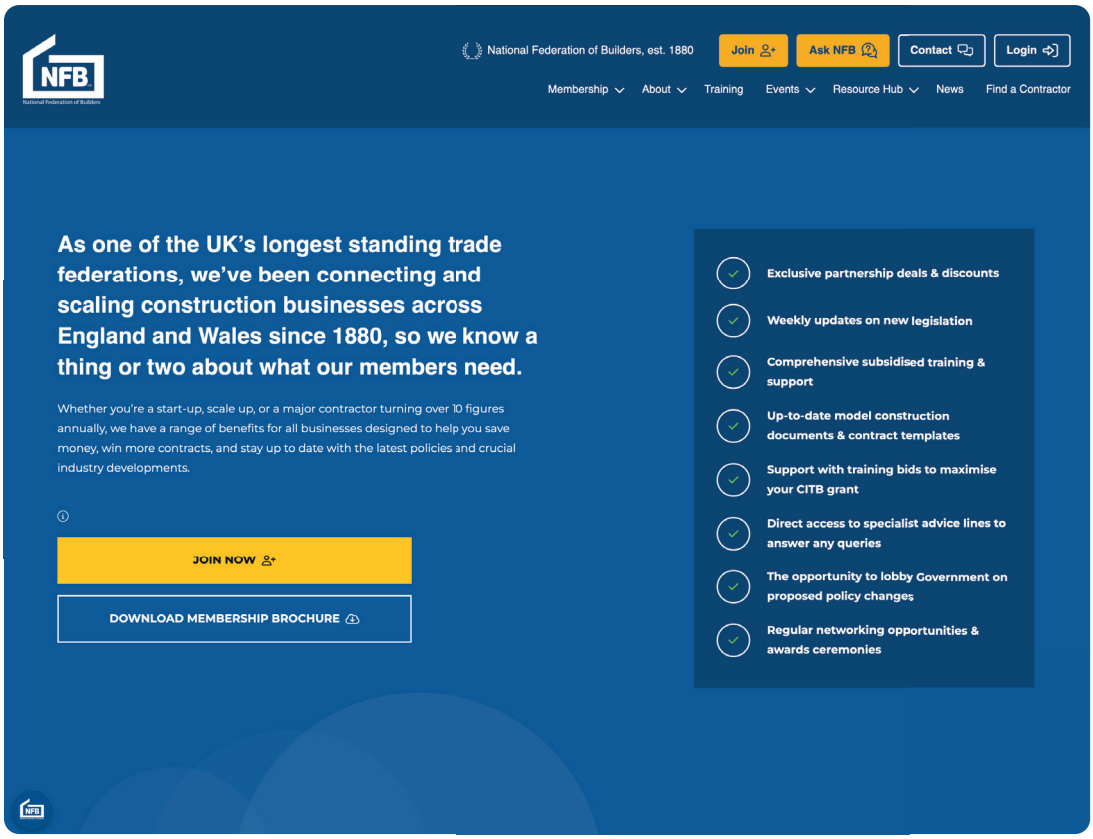
The National Federation of Builders is the foremost professional association of builders, contractors and house builders, offering unrivalled standards, services and advocacy to members across England and Wales.

We help our members build prosperous businesses and work to create optimal conditions for the construction industry to thrive.



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