

# PROCURING IMPROVED CONSTRUCTION PRODUCTIVITY

## GUIDANCE NOTE

### Introduction

Productivity can be defined as the ability to get more economic output from any given level of inputs. Or, more straightforwardly, the ability to make more with the same number of workers. Improving productivity means addressing efficiency, effectiveness and economic factors, which deliver a wide range of benefits including contributing towards zero-carbon targets. Improved productivity can flow from wide-ranging sources such as having clarity of requirements to avoid change, wastage, re-work and over-specification, as well as the way projects are planned, procured and delivered.

The National Infrastructure Strategy (NIS), published in November 2020, sets out how national productivity and economic growth can be supported by better infrastructure. Alongside the UK Government's plans to help economic recovery, the strategy seeks to address the long-term issues that have held back UK infrastructure. These issues include 'stop-start' public investment, insufficient funding for regions outside of London, slow adoption of new technology, and project delivery being plagued by delays and cost overruns.

The NIS sets out how the Government will address these issues and do things differently; how it will build back fairer, faster and greener. It also describes how the Government will boost growth and productivity across the UK.

The NIS identifies that the construction sector has a longstanding reputation for low productivity. The Government recognises the need to transform the sector to enable it to become more productive, more sustainable, more focused on zero carbon and more internationally competitive, with better use of data and modern methods of construction.

In December 2020, the Cabinet Office published the Construction Playbook, which provides guidance on how to strengthen the health of the construction sector, including by addressing low levels of productivity and future skill shortages. Clearly, the achievement of greater productivity from workers will help to reduce future pressures on skilled resources. The Construction Playbook is aligned with the Institution of Civil Engineers' Project 13 initiative, which, among other things, focuses on modern methods of construction, digital technology and production line programming.

### Using this Guidance Note

Key aspects of construction project delivery, such as health and safety and sustainability, have been improved over time by providing a strong focus on them in the procurement of works and services. There is a clear opportunity for productivity to be improved by adopting similar approaches.

This Guidance Note has been developed by ICE to assist professionals involved in the development and implementation of construction procurement strategies and plans. It identifies typical causes of low productivity and sets out opportunities to support increased productivity in the procurement of projects. The guidance is presented in two tables. Table 1 identifies typical factors that contribute to low productivity in the design and construction stages. Table 1 also cross-references Table 2, which sets out the procurement actions that can help to address each cause and boost productivity.

A list of further guidance can be found at the end of this paper. It provides further reading for procurement practitioners who are interested in helping to maximise productivity through improved procurement strategies and processes.

## Causes of low construction productivity

Table 1 includes a range of factors that contribute to the current low levels of productivity in the construction industry.

<b>Table 1: Factors that contribute to low productivity that can be influenced by procurement</b>		
<b>Ref</b>	<b>Description</b>	<b>Procurement actions (see Table 2)</b>
<b>1</b>	<b>Design development</b>	
1.1	Failure to obtain contractor and supply-chain input into design and planning at an early stage. Without an integrated approach between the designer and supply chain at the right time, the design development can miss opportunities for innovation, meaning redesign may be needed to incorporate ideas that could have been included earlier.	C3, E1, E2, E3, J6
1.2	Clients not clearly identifying the business case and defining its requirements at the outset to minimise the risk of change.	A1, A2
1.3	Failure to consider opportunities for standard designs, or design to support repeatable construction processes based on production line methods.	C3, C6, I2, I3, L2
1.4	Designs not maximising opportunities for modern methods of construction, including offsite production opportunities.	I2, I3, I5
1.5	Ineffective use of digital technology such as building information modelling (BIM) to ensure error-free design and efficient right-first-time buildability.	C5
1.6	Failure to use assurance reviews, value engineering and buildability reviews to review design solutions, reduce design errors and minimise over-design to make construction more efficient.	C6, H1
1.7	Failure to incorporate lessons learnt from works construction reviews.	K4, L4
<b>2</b>	<b>Design responsibility</b>	
2.1	Inappropriate design maturity strategies that do not consider potential issues arising from design liability and the transfer of responsibility at design handover stages. Issues include: <ul style="list-style-type: none"> <li>▪ Designers being overcautious in relation to design liability, resulting in over-design</li> <li>▪ Design handovers resulting in inefficiency owing to the need to undertake due diligence and redesign to reflect the preferences of the new designer</li> <li>▪ Clients being unwilling to take ownership of designs to minimise the need for due diligence and unnecessary redesign at handover stages</li> </ul>	C1, C2, C7
<b>3</b>	<b>Specifications</b>	
3.1	Clients not providing sufficient flexibility in specifications to support innovation, improved buildability and the delivery of zero-carbon targets.	I4, I5
3.2	Failure to engage with the supply chain on the possible use of innovative products and materials.	C3, E3, J6
3.3	Clients not ensuring that specifications are optimised for the requirement, avoiding unnecessary 'gold-plating'.	C7

**Table 1: Factors that contribute to low productivity that can be influenced by procurement**

Ref	Description	Procurement actions (see Table 2)
<b>4</b>	<b>Inefficient procurement procedures</b>	
4.1	Requiring significant amounts of detailed design to be undertaken as part of tender submissions, which unnecessarily consumes scarce design resources.	B2
4.2	Clients expecting all innovation and good ideas to be developed and presented during tender procedures.	B2
4.3	Clients setting risk positions heavily in the client's favour at the outset of procurement in expectation of negotiating back towards a more equitable position. This leads to protracted qualifications processes during procurement and potentially inappropriate risk allocations, which can drive adversarial relationships.	J2, J5
4.4	Having too many tenderers, unnecessarily increasing resource requirements and risking deterring the best companies from bidding owing to the lower chance of winning.	B1
4.5	Not allowing adequate timescales for preparation/submission of high-quality bids.	B4
4.6	Failing to focus on the key objectives and priorities in the contract award criteria, with the consequence that optimal proposals are not identified.	B4
4.7	Inconsistent approaches across procurement exercises, which require suppliers to present information in different and inefficient ways.	B3
<b>5</b>	<b>Project leadership</b>	
5.1	Not recognising the importance of the role of leaders in establishing a culture that supports collaboration and increased productivity in the delivery of the project.	J8
5.2	Not ensuring that designers and contractors nominate and appoint senior representatives with accountability and responsibility for ensuring productivity is considered in the planning, design and delivery of the works.	C4
<b>6</b>	<b>Integrated and collaborative working</b>	
6.1	Clients failing to establish integrated project structures that support collaborative working and allow all parties to contribute knowledge, experience and ideas into project delivery.	J1
6.2	Use of contractual arrangements that result in a focus on commercial matters rather than efficient delivery of the project.	J1, J3, J4
<b>7</b>	<b>Resource and skills planning</b>	
7.1	Not recognising the importance of committing skilled resources in the early stages of projects to identify and minimise delivery risks.	D2, L1, L3
7.2	Failure to apply production line planning and programming techniques to optimise the use of available construction resources.	D2, J6, L2
7.3	Not ensuring the early appointment of the contractor and the supply chain to support investment in appropriate construction skills planning and training.	C3, E1, E2, E3, J6
7.4	Not involving the contractor and supply chain in the detailed resource planning to smooth out potential peaks and troughs.	E1, E3, J6

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Ref	Description	Procurement actions (see Table 2)
7.5	Not identifying potential shortages of skilled resources or establishing contingency plans for resource shortages.	D1, D2, E1, K1
7.6	Failure to coordinate resources with other projects that may be competing for the same skilled resources.	D2
<b>8</b>	<b>Logistics</b>	
8.1	Failure to identify at an early stage the materials and products requirements, supply-chain arrangements and contingency plans to ensure a smooth and reliable supply of materials in the delivery of the works.	D2, E1, L3
<b>9</b>	<b>Health, safety and welfare</b>	
9.1	Failure to establish a project culture that has a strong focus on safety and welfare to minimise the adverse impacts of accidents, injuries and fatalities on the works programme, worker morale and productivity.	C8, D1
9.2	Failure to provide site worker and welfare facilities that are designed and located to maximise productivity, e.g. convenient changing facilities that are located to minimise travel time and time lost at break times.	I6
9.3	Lack of consideration of potential health risks arising from the design and specifications.	C8
<b>10</b>	<b>Productivity data</b>	
10.1	Lack of reliable baseline productivity rates for use in establishing budgets and prices and as a basis for incentives and benchmarking.	K1, K2
10.2	Inappropriate performance measures that do not adequately cover the efficient utilisation of labour, plant and materials.	I1, J3, K1
<b>11</b>	<b>Commercial incentivisation</b>	
11.1	Failure to ensure commercial incentives and performance measures are built into the contract to motivate the contractor and its supply chain to deliver best value while minimising the outturn cost of the project.	J3, J4, J7, K1, K2, K3, K4, K5
11.2	Incentive arrangements that are developed with an over-reliance on financial penalties and create financial risks that cannot realistically be borne by construction companies.	J3, J4
11.3	When target price is used as an incentive, not making the gain share conditional on achieving suitable key performance indicators (KPIs), including on utilisation and productivity.	J1, J3, J4, J7, K1
11.4	Incentive mechanisms that are too complicated, resulting in the contractor not being motivated to deliver improvements.	J3
<b>12</b>	<b>Project and contract management</b>	
12.1	Insufficient skilled contract management resources that are trained to identify improved productivity opportunities.	L1, L3
12.2	Failure to focus on production line programming supported by resource planning and effective logistical arrangements.	L2

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Ref	Description	Procurement actions (see Table 2)
12.3	Failure to learn lessons from previous projects.	L4
12.4	Insufficient mobilisation period for the contractor to complete effective planning for the start of works.	D3

## How procurement actions can support productivity

Table 2 describes procurement actions that can be used to support improved productivity in construction.

**Table 2: Procurement actions that can support increased productivity**

Ref	Description
<b>A</b>	<b>Clarity and reliability of requirements</b> <i>From the outset it is vital that project aims and requirements are clear to avoid wasted time and cost on work that is not required.</i>
A1	Establishing from the outset clear client outcomes, requirements and priorities to minimise the risk of change. For public sector clients, these will need to cover government policy objectives as well as specific project objectives.
A2	Developing robust business cases and the identification of adequate funding and budgets to minimise the risk of project reviews and consequential delays.
<b>B</b>	<b>Efficient procurement procedures</b> <i>Significant resources can be wasted by clients and suppliers if procurement procedures are not proportionate or focused on the key issues that will determine best value.</i>
B1	Restricting the number of tenderers to avoid unnecessary expenditure of tendering resource, at the same time improving tenderer appetite.
B2	Avoiding undue tendering costs, such as expecting a number of tenderers to undertake significant design during the tender period.
B3	Using, as far as possible, common methods of determining tenderers' financial capacity that are based on a consistent approach.
B4	Focusing on key objectives for the assessment criteria and allowing adequate timescales for high-quality bids to be submitted.
<b>C</b>	<b>Procurement of design development</b> <i>Design development must involve the right expertise at the right time to produce optimal solutions that can be built safely and productively.</i>
C1	Ensuring that the client's design is advanced sufficiently to define its requirements, establish land-take and avoid the contractor making unacceptable or non-productive assumptions requiring redesign or rework.

**Table 2: Procurement actions that can support increased productivity**

Ref	Description
C2	Planning design responsibility through the development stages to ensure that redesign is minimised at any design handover stages. The client should ensure that design liability does not result in designers being overcautious in relation to standards or being reluctant to consider opportunities for innovation. It may be appropriate for the client to retain design responsibility for work previously undertaken by an earlier designer. Novation of the client's designer to the contractor may be an option, but there can be disadvantages in terms of forcing a relationship and reducing the opportunity for innovation provided by a new designer.
C3	Making provision for contractor and supply-chain input into the design at an early stage.
C4	Requiring designers to identify and appoint a senior representative with responsibility for ensuring that the design takes account of productivity in construction.
C5	Establishing BIM arrangements and procedures to support the design development.
C6	Setting out requirements for value engineering reviews at key stages.
C7	Ensuring specifications meet requirements without resulting in 'gold plating'.
C8	Considering the health, safety and welfare implications of the design as it is developed with the aim of minimising time lost to accidents or work injuries.
<b>D</b>	<b>Procurement strategy to address productivity improvements</b> <i>Productivity should be a 'golden thread' in the procurement lifecycle to ensure that there is a continuous focus on actions to promote productivity improvements.</i>
D1	Procurement strategies should specifically address how the procurement procedures and contract documents will support the objective of improved productivity.
D2	Strategies should address resource and material requirements to ensure that works can be delivered efficiently. This should also consider the impact of work programmes delivered by other clients who may be competing for the same resources.
D3	Ensuring that procurement activities are programmed to be complete in time to allow an adequate mobilisation period for the contractor to carry out the necessary resource and construction planning.
<b>E</b>	<b>Pre-procurement market engagement</b> <i>The market should be briefed and prepared for the client's requirements in relation to improving productivity, and should be given the opportunity to identify and resolve risks and barriers to productivity improvements.</i>
E1	Using early market engagement to set out client requirements and expectations in respect of productivity improvements, and also to obtain feedback from the market on potential barriers such as a shortage of skilled resources and works materials, risk allocations, and approach to design.
E2	Consulting with the market on proposed productivity strategies and working arrangements.
E3	Using early engagement and collaboration with suppliers and the supply chain to develop and refine products to allow efficiency in installation and building.

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Ref	Description
<b>F</b>	<b>Pre-qualification and tenderer selection procedures</b> <i>Clients should appoint suppliers with demonstrable strong capability, experience and potential for improving productivity in the delivery of projects.</i>
F1	Developing procedures that result in the selection of designers and contractors who have a strong understanding of construction productivity.
F2	Developing appropriate mandatory requirements and selection criteria to identify appropriately qualified and experienced tenderers.
<b>G</b>	<b>Contract award criteria</b> <i>Clients should ensure that tenderers are required to set out proposals for improving delivery methodologies to optimise productivity.</i>
G1	Requiring tenderers to include proposals for the development and implementation of plans for measuring and improving productivity.
G2	Setting out health, safety and welfare requirements linked to the impact that accidents and injuries have on productivity and worker morale.
<b>H</b>	<b>Procurement governance and assurance procedures</b> <i>Clients should ensure their governance arrangements cover the consideration of improving productivity as part of the project development and delivery processes.</i>
H1	Adapting the existing three line of defence assurance procedures to identify risks to maximum productivity and considering productivity as part of the remit of procurement independent assurance panels.
<b>I</b>	<b>Contract scope and specifications</b> <i>Clients should ensure that the contract scope includes obligations on the contractor to demonstrate that it has fully considered productivity risks and opportunities in the development of its approach to construction.</i>
I1	Including in the contract scope a requirement for the designer/contractor to support and demonstrate efficient construction and high productivity.
I2	Client's requirements to cover the use of digital technology and to support modern methods of construction and production line methods.
I3	Creating opportunities for standard designs and offsite production to be identified and assessed.
I4	Ensuring efficient approval procedures to support innovation in standards, products and procedures and avoid approval delays.
I5	Ensuring that the client's requirements and specifications allow flexibility and support the development of innovative ways of improving productivity.
I6	Specifying efficient and effective welfare facilities onsite.
<b>J</b>	<b>Form of contract</b> <i>It is important that forms of contract support improved productivity through integration, collaboration, incentivisation and leadership.</i>
J1	Using collaborative forms of contract that support the required culture and behaviours and incentivise the client's key objectives.

**Table 2: Procurement actions that can support increased productivity**

Ref	Description
J2	Developing a fair allocation of risk that is acceptable to both the client and the contractor. This can include risk sharing and the joint management of risks where appropriate.
J3	Developing commercial incentives that focus on rewarding good productivity and efficient performance in terms of time, cost and KPIs.
J4	Ensuring KPIs are clear and simple – too many overcomplicated KPIs can lead to unforeseen consequences and unexpected contractor behaviours.
J5	Using industry-standard forms of contract, such as the NEC4 Engineering and Construction Contract, avoiding unnecessary changes that may distract from the efficient delivery of the works.
J6	Using contracting methods that incorporate the principle of early contractor/supply-chain involvement to achieve improved buildability, better planning of the works and resource requirement, and more effective risk management.
J7	Incorporating the contractor’s proposed approach to improve productivity, as set out at tender stage, in the contract and supported by appropriate incentives and sanctions.
J8	Ensuring that contract key persons include a senior manager who is responsible for productivity improvements, including the development of an appropriate culture.
<b>K</b>	<b>Contract productivity performance management</b> <i>Performance measurement and management should be used to understand and demonstrate productivity improvements and to identify best practice.</i>
K1	Developing productivity baselines and improvement targets for use in resource planning and inclusion in contracts.
K2	Considering publishing productivity performance tables for client supply chains.
K3	Including in contracts a requirement for improvement plans when performance falls below required levels.
K4	Sharing productivity data and lessons learnt across contracts/contractors to support continuous improvement.
K5	Developing processes for future awards based on past performance.
<b>L</b>	<b>Project/contract management and skills planning</b> <i>The effort put into procuring best value will be wasted if appropriate skilled resources are not available and employed to ensure that the procured value is delivered in practice.</i>
L1	Selecting project managers who can demonstrate the required culture and behaviours. Ongoing development of the skills of project and contract managers in relation to improving productivity.
L2	Adopting a systems approach to infrastructure delivery, including production line planning.
L3	Recognising the importance of committing resources to the front end of projects to minimise delivery risks and ensuring the availability of works materials when required.
L4	Using cross-party working groups to review lessons learnt and identify productivity opportunities for improvement through working methods, procedures, culture, etc.



## Further advice on productivity

Construction Leadership Council (2020) [Roadmap to Recovery: An Industry Recovery Plan for the UK Construction Sector](#)

Department for Business, Innovation and Skills (2009) [Changing to Compete: Review of Productivity and Skills in UK Engineering Construction](#)

Department for Transport (2019) [Transport Infrastructure Efficiency Strategy: One Year On Report](#)

Department for Transport (2019) [Transport Infrastructure Efficiency Strategy: One Year On Report Annex](#)

Department for Transport (2019) [Lessons from Transport for the Sponsorship of Major Projects](#)

Dromey, J (2016) [Involvement and Productivity: The Missing Piece of the Puzzle?](#) IPA (Involvement and Participation Association)

Farmer, M (2016) [Modernise or Die: The Farmer Review of the UK Construction Labour Model](#) (independent report), Construction Leadership Council

Farmer, M (2021) [Five Years On from Modernise or Die, Where Are We Now?](#) Construction Management

HM Government (2017) [Construction Labour Market in the UK: Farmer Review – Government Response](#) (policy paper)

HM Government (2018) [Industrial Strategy: Construction Sector Deal](#)

HM Government (2020) [The Construction Playbook: Government Guidance on Sourcing and Contracting Public Works Projects and Programmes](#)

Infrastructure and Projects Authority (2016) [Government Construction Strategy: 2016-2020](#) (policy paper)

Infrastructure and Projects Authority (2019) [Best Practice in Benchmarking: Government Project Delivery Framework](#)

Infrastructure and Projects Authority (2021) [Cost Estimating Guidance: A Best Practice Approach for Infrastructure Projects and Programmes](#)

Infrastructure and Projects Authority (2021) [Project Routemap: Setting up Projects for Success – Handbook](#)

Infrastructure and Projects Authority (2021) [Transforming Infrastructure Performance: Roadmap to 2030](#)

Institution of Civil Engineers (2018) [Guidance Note: Procurement, Commercial and Contracting Key Principles](#)

Institution of Civil Engineers (2020) [Doing a Better Job: A Systems Approach to Infrastructure Delivery](#)

Institution of Civil Engineers (2022) [A Systems Approach to Infrastructure Delivery – Part 2: Putting the Principles into Practice](#)

National Audit Office (2020) [Lessons Learned from Major Programmes](#)

Project 13: [www.project13.info](http://www.project13.info)

## Contributing ICE Procurement Advisory Group members

**Gary Wright MICE (chair)**, director, Rowsell Wright

**Steve Hudson FICE**, group commercial director, Sir Robert McAlpine

**Professor Gordon Masterton FICE**, chair of Future Infrastructure, University of Edinburgh

**David Orr FICE**, strategic adviser on major infrastructure

**Martin Rowark FICE**, partner, Gardiner and Theobald

**Steve Rowsell FICE**, director, Rowsell Wright

**Nicola Sumner**, partner and head of infrastructure, Sharpe Pritchard