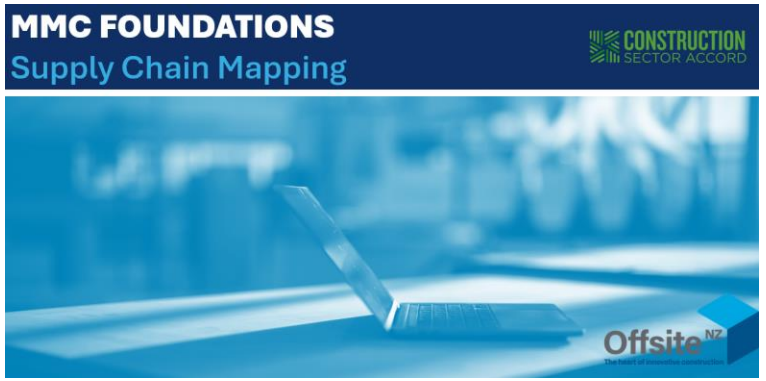
MMC FOUNDATIONS

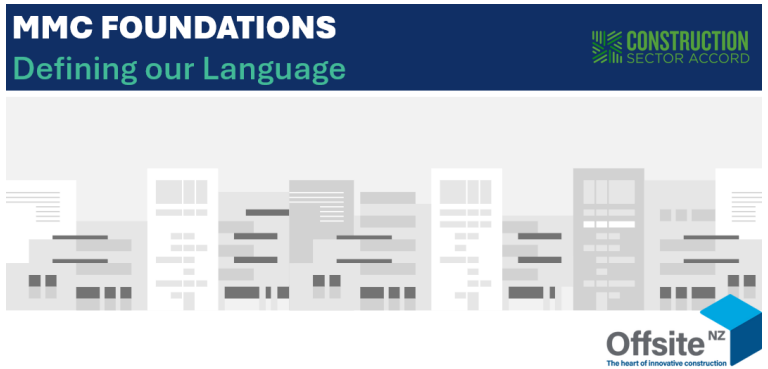
Supply Chain Mapping

Comprehensive MMC resources to power the industry.

To increase confidence and certainty across the supply chain



An analysis of the OSM Supply Chain in New Zealand, with a focus on Production & Operations.



A review of the readiness of the OSM Supply Chain to meet Carbon 2030 requirements, including modelling of exemplar products. Includes case studies.

A proposition for an industry-wide language & process for Clients & the MMC industry, including a product selection matrix.

SUPPLY CHAIN CAPABILITY MAPPING:

Why?

Over the past 10 years there has been significant interest in OSM from government & the private sector as a solution to meet rampant demand for housing, increasing construction productivity & meeting certainty & quality expectations.

However, in practice, the results have been mixed. There are examples but consistent, successful roll-outs where all parties are incentivised and consistently successful are rare – and this appears to be a global phenomenon.

To realise the potential of MMC to meet client needs, we need a deep understanding of the current state of the industry – beyond conventional assessment. So, we created a comprehensive self assessment tool to do this.

CONTEXT:
Boost OSM to meet Commerce Commission Recommendation*

The Construction Sector Accord is leading the OSM workstream, including delivering the Government's response to the Commerce Commission's market study into residential building supplies

(* Recommendation 7: Develop and implement an all of government strategy to coordinate and boost offsite manufacturing).

Image from Commerce Commission Report

WHAT WE PLANNED:

UNCOVERING CAPABILITY

Survey

Internally tested through iterations & collaboration. Drop down/Multiple Choice with additional comments.

Investigation:

- Production
- Facilities
- Business Model
- People
- Client & Market Response
- DfMA & Design
- Digital Thinking
- Product Development & Intellectual Property
- Project Management
- Facilities
- Logistics

Also include questions on future readiness - Carbon 2030 and standardisation.

Engage

Phase 1: October 2023
Engagement with ~10 suppliers to refine survey & process.

Self-assessment & follow-up interviews

Phase 2: November 2023
Engagement with remaining suppliers in cohort ~20-30. Self Assessment

Phase 3:
Wider Engagement with industry for self assessment

Scope Confirmation:
Following election, refining & recasting scope of works

Output

Anticipated Results:

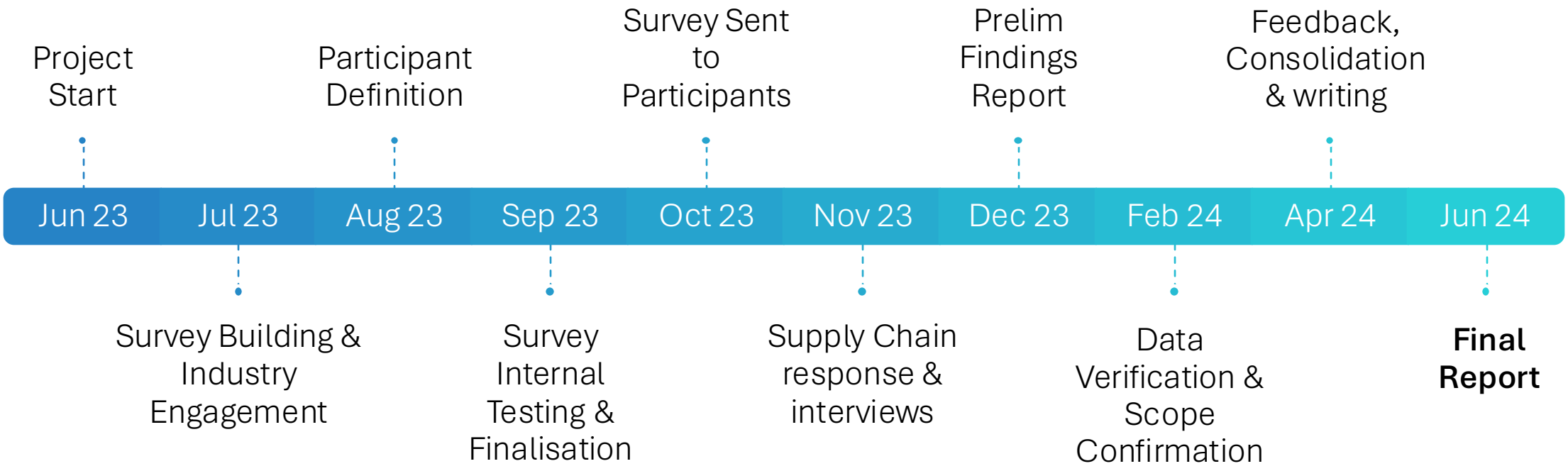
- Snapshot of current capability of supply chain through assessment & interview
- Case studies on supplier products & projects for education purposes
- Data on future impacts on built environment: carbon, circularity &
- Data to inform potential targeted support for businesses including training, resources etc.
- Potential for in-kind support & assessment of existing products i.e. energy modelling
- Create avenues for better understanding and accessibility between supply chain, the market and government

Information/data to be aggregated & protected.

Results Q2 2024

DELIVERABLE TIMELINE

DELIBERATIVE & COLLABORATIVE

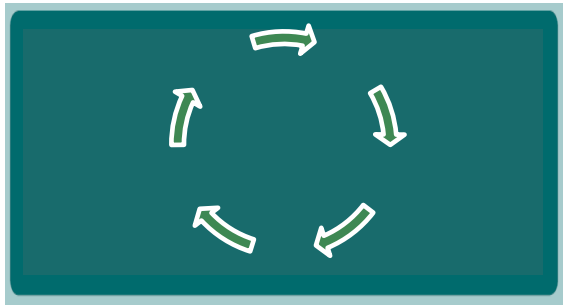


THE NEED:
The benefits of Offsite

The core benefits of Offsite Manufacturing are noted here. When compared to traditional construction methodologies there are clear and distinct advantages.

The social, environmental and economic benefits documented relate primarily to the construction process – the energy used in production of offsite components, systems, and volumetric units.

Category/Attribute	Potential Improvement over Conventional Construction	Societal Benefit	Financial Benefit to Builder/Developer
SOCIAL			
Health & Safety	Up to 80%	Large	N/A
Improved Working Conditions	Significant	Significant	N/A
ENVIRONMENTAL			
Reduced Road Traffic Movements	Up to 60%	Significant	Small
Reduced Energy Used on Site	Up to 80%	Small	Small
Reduced Waste	Up to 90%	Significant	Significant
Reduced Energy-in-Use	Up to 25%	Significant	Small
ECONOMIC			
Faster Construction	Up to 60%	Significant	Large
Improved cash-Flow	Significant	Small	Large
Reduced Snagging & Defects	Up to 80%	Small	Significant



Definition of Sustainability

(Based on the definition adopted by the World Business Council):

Sustainability involves the simultaneous pursuit of economic prosperity, environmental quality and social equity. Sustainable construction needs to perform not against a single, financial bottom line but against this triple bottom line.

WHAT WE RECEIVED:

A DEEP SNAPSHOT OF THE INDUSTRY

20

Topics

Focused on current and future capabilities - production, DfMA, IP, R&D, process, logistics and quality assurance

113

Questions

Mostly multiple choice responses based on industry knowledge, with comments

34+

Recipients

Original cohort from Offsite NZ & wider network

21

Responses

Representing the full MMC Spectrum.

Of these 15 suppliers currently making physical product were sampled for current & future production

11

Engagements

Five 1:1 interviews with key responders
&
6 Informal facility visits to responders manufacturing premises

13

Producers

Of all participants, 13 manufacturers were selected to generate production information

DATA POINTS COLLECTED:

PART ONE: PRODUCTION

- Service Offer
- Client
- Key Product & Services
- Production Capacity

Note: for Production Data, we used **data from 13 participants** currently producing physical products - this represents 62% of participants.

PART TWO: CAPABILITY

- Client & Market Response
- Design & DfMA (Design for Manufacture & Assembly)
- Digital Thinking
- Product Development & Intellectual Property
- Supply & Partner Management
- Production & Manufacturing
- Facilities & Investment
- Logistics
- Onsite Assembly
- Project Management
- Continuous Improvement
- Quality Assurance
- Environmental
- Future: Carbon, Energy & Circularity

DATA DASHBOARD 1/2

Do you have plans at this time for an additional production facility?
21 responses

Are you interested in additional pipeline at this time?
21 responses

Do you have the capacity to scale up production volume in your existing facility?
21 responses

Could you increase throughput with a standardised suite of products?
21 responses

Who is your main client?
21 responses

What service do you offer?
21 responses

Architectural Design
21 responses

DfMA (Design for Manufacturing and Assembly)
21 responses

Engineering
21 responses

Environmental / Sustainability
21 responses

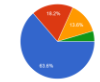
Manufacturing: Operator
21 responses

Labour: carpentry, trades
21 responses

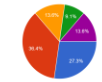
Transportation
21 responses

Installation
21 responses

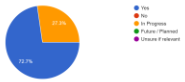
Do you have a defined client that is the target of your business?
22 responses



Do you engage in market research or benchmarking to better meet client needs?
22 responses



Do you have a system or procedure for capturing client requirements?
22 responses



Do you conduct regular or formal client satisfaction surveys?
22 responses

Do you have a standard cost schedule for your product or service?
21 responses

Do you have a standard services delivery schedule with estimated durations?
22 responses

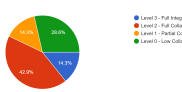
Is DfMA central to your product or service?
21 responses

Is there an internal design guide or process that outlines your standard designs and practices?
21 responses

Do you employ Digital/BIM models to capture project requirements?
21 responses

Have you developed standardised details, interfaces, processes, or methods?
21 responses

Which BIM maturity level best describes your way of working? - refer here https://tinyurl.com/4by3432f
21 responses



Do you have design accreditation such as membership to a licencing board?
21 responses

Do your products have a CodeMark, Multi-proof, or other independent compliance assurance?
21 responses

What level of design rework/modification is typical in translating design information received from third parties i.e., designers, engineers, etcetera into production-ready specifications?
21 responses

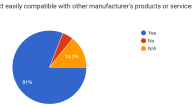
Do you have a standard design file interoperability process i.e., receiving architectural or structural models and translating to machine files?
21 responses

Do you have a future labour and automation strategy in place?
21 responses

Are any of your design, production, installation, or other services simulated or automated?
21 responses

Are your products readily adaptable or configurable to different project requirements?
21 responses

Is your product easily compatible with other manufacturer's products or services?
21 responses



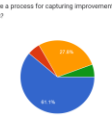
Do you monitor and track waste and account for the additional cost in your product or service?
18 responses

Is waste minimisation a critical factor in materials handling, protection, and fabrication?
18 responses

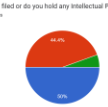
Do you have an R&D / product development strategy?
18 responses

Do you have in-house prototyping facilities or product testing?
18 responses

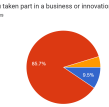
Do you have a process for capturing improvement ideas from the workforce and converting them into results?
18 responses



Have you filed or do you hold any Intellectual Property in product, process, or engineering?
18 responses



Have you taken part in a business or innovation incubator program?
21 responses



Are Product Development activities and investment supported by a business case?
21 responses

Do you have a systemitzed supplier evaluation and selection process?
21 responses

Are opportunities to drive value improvement with supply partners routinely reviewed?
21 responses

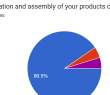
Are your critical suppliers secured through a partnership or other documented agreement?
21 responses

In your supplier assessment, how significant are environmental ethos to selection?
21 responses

Are your critical suppliers New Zealand based?
21 responses

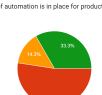
Do you have a systematic/compliance quality control process for the products or services you offer?
21 responses

Is fabrication and assembly of your products carried out in-house?
21 responses



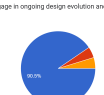
Is your pre-production planning process standardized?
21 responses

What level of automation is in place for production?
21 responses

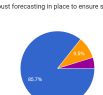


Do you have a digital production management system?
21 responses

Do you engage in ongoing design evolution and product development?
21 responses



Is there robust forecasting in place to ensure successful procurement and storage of materials?
21 responses



Is there a preventative maintenance regime/system in place for critical equipment?
21 responses

Is there adequate storage for stock and completed products, i.e., buffer storage?
21 responses

Do you have an investment strategy in place that addresses future significant automation, machinery, or other purchases?
21 responses

DATA DASHBOARD 2/2

Are strategic purchases, capital investments, or other activities supported by business case?
21 responses

Is there a training regime in place for your staff to increase skills and productivity?
21 responses

Is there a preventative maintenance regime/system in place for critical equipment?
21 responses

Is there adequate storage for stock and completed products, i.e., buffer storage?
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21 responses

Are strategic purchases, capital investments, or other activities supported by business case?
21 responses

Is there a training regime in place for your staff to increase skills and productivity?
21 responses

Are your logistics constraints understood and responded to across all processes?
21 responses

Are these constraints communicated to clients and third parties so that they are considered early in design?
21 responses

Is the inventory management system mature?
21 responses

Are your goods suitably protected during manufacture and for dispatch?
21 responses

Are your transport risks understood and mitigated?
21 responses

Are your parts/products clearly identified upon dispatch?
21 responses

Are your parts/products able to be packed in sequence to suit onsite assembly?
21 responses

Is waste minimisation a critical factor in materials handling, protection, and fabrication?
21 responses

Do you have standard site/traffic management plan templates?
21 responses

Do you create an installation plan that takes into account project, site, environment, and quality factors?
21 responses

Is there a kitting approach for tools, fixings, and other consumables? E.g., pre-packed fixings, quantity specifically for project install etcetera
21 responses

Do you have a standard and defined scope of services and warranties for installation?
21 responses

Are production compliance requirements and onsite compliance requirements understood and well managed?
21 responses

Are subcontracts between yourself and key suppliers and trades typically well understood by all parties and are executed as planned?
21 responses

Are your project management resources and processes sufficient to service Client requirements?
21 responses

Do you use an online, 'live' project management platform or software?
21 responses

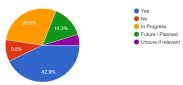
Are Client budgets actively managed through the contracted service?
21 responses

Are project reviews completed at specified and critical milestones?
21 responses

Do you have an active continuous improvement culture?
21 responses

Do you support the use of LEAN Construction including waste identification and management?
21 responses

Are KPIs clearly displayed and tracked throughout the workplace?
21 responses



Do you have a process in place to quantify and track the financial aspects linked to process improvements?
21 responses

Is there a management system certified under ISO Standards?
21 responses

Is there third-party quality monitoring of your operations?
21 responses

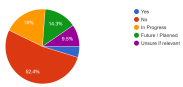
Is there an inspection regime or agreement by a consenting authority or agent? i.e., in premise inspections of key work.
21 responses

Are you a member of a Public/Government procurement panel?
21 responses

Do you have a good health and safety regime with subsequent low accident rates?
21 responses

Do you monitor and track waste and account for the additional cost in your product or service?
21 responses

Have you adopted an environmental management system and is it ISO 14001 certified?
21 responses



Do you actively incorporate the use of renewable or recycled materials?
21 responses

Is there a company policy limiting the use of certain kinds of materials i.e., referencing Red List, Declare, or banning materials that creates silica dust or other toxins?
21 responses

Do you have policies that support the reporting of relevant environmental issues?
21 responses

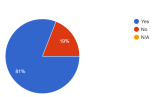
Do you have in-house experience with third-party accreditation requirements such as GreenStar and PassiveHouse?
21 responses

Is your organisation familiar with the concept of operational carbon and embodied carbon in the context of building design and construction?
21 responses

Are you familiar with any industry standards or certifications that focus on reducing operational and embodied carbon in buildings? If so, can you name one or two?
21 responses

There are a series of changes coming to the NZ Building Code starting in 2025 in order to restrict operational and embodied carbon in buildings. Do ...sustainable homes than the current code requires?
21 responses

Would you like to receive information and support to adopt strategies or technologies commonly employed in the construction industry to reduce both operational and embodied carbon emissions?
21 responses



If there was a clear set of design criteria for the procurement of high performance offsite product solutions would you be interested in being considered for this supply and product pipeline?
21 responses

Would you like to avail of a sponsored / free comprehensive energy model of one or your projects / designs in order to understand how close you are ...carbon targets proposed in the upcoming changes?
21 responses

Would you support an industry effort to provide standardized designs, details or systems that can be specified during design and align with supply chain capabilities?
21 responses

Are you willing to share a lessons learned example that highlights an issue, problem, or opportunity, and being a case study for the Accord?
21 responses

WHAT WE FOUND:
KEY TAKEAWAYS

KEY TAKEAWAY 1:
BREADTH & DEPTH

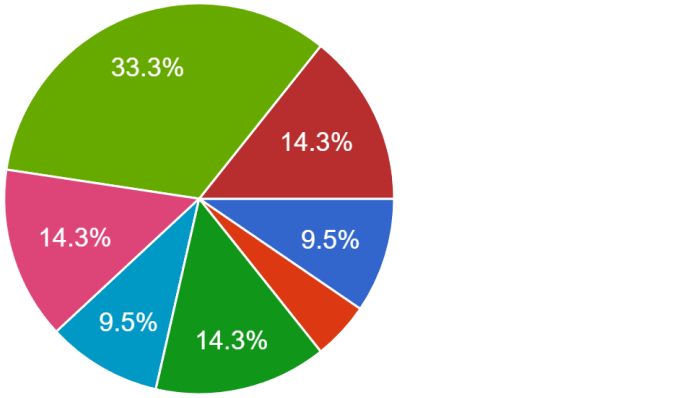
Breadth & Depth

Wider and deeper values-driven industry than optics suggest due to measured capability & knowledge “not just houses on trucks”.

There are a range of business models produced and growing innovation to meet pain points including in process, digital, Kit of Parts and more.

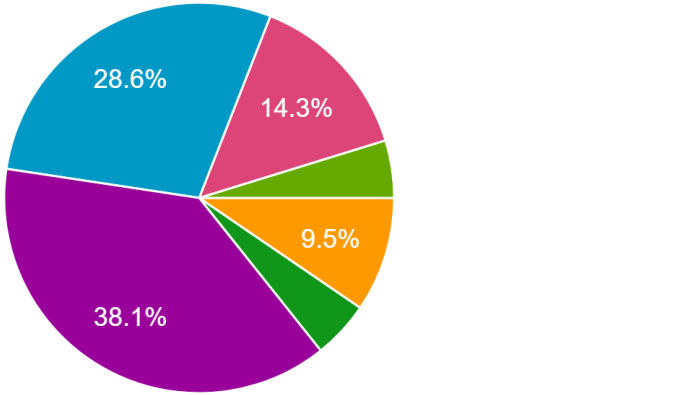
Who is your main client?

21 responses



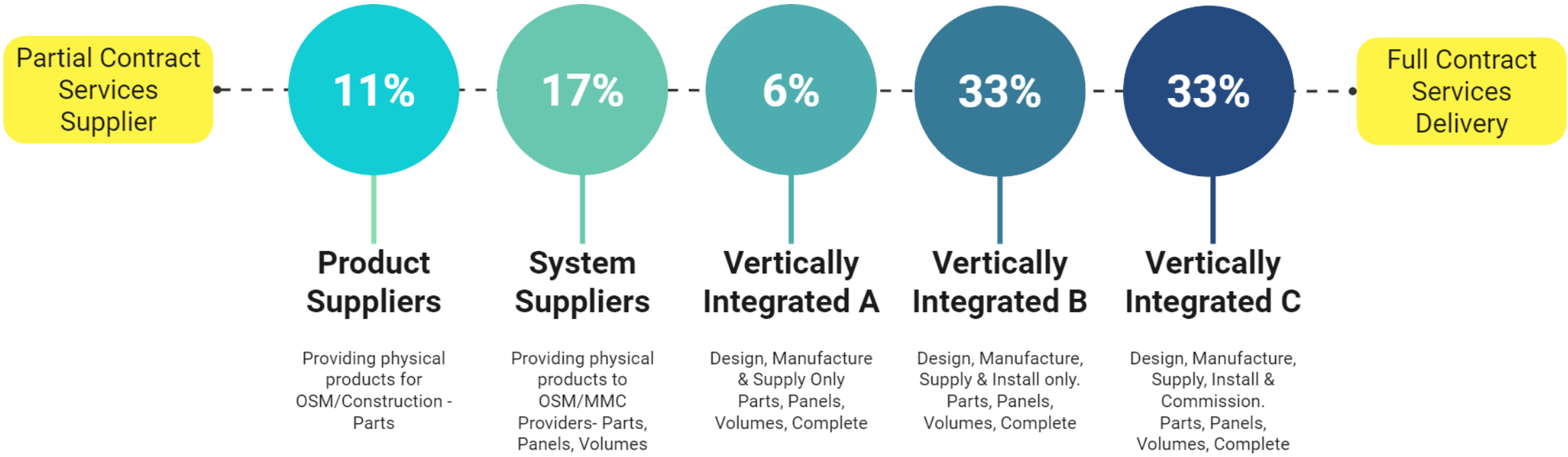
What service do you offer?

21 responses



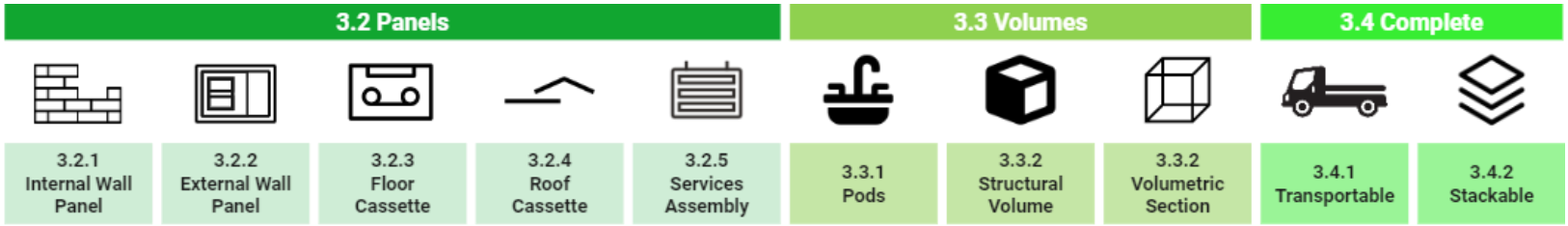
MMC CONTRACT SPECTRUM

SPECTRUM OF PHYSICAL PARTS ONLY, OR FULL CONTRACT MMC DELIVERY



PRODUCTION DATA

We asked all participants their production data – measured in their preference. We then used 13 of them to measure & standardise & map production data.



CURRENT ANNUAL PRODUCTION

MMC Providers
Current Production as reported

1492

674

MMC Providers - Panels
Translate m2 production into 80m2 equivalent Complete units

818

MMC Providers - Volumes & Transportable
Complete Units

PLANNED ANNUAL PRODUCTION

MMC Providers
Potential increase based on current facilities or planned increase in facility area

2399 +60%

1031 +53%

MMC Providers - Panels
Translate m2 production into 80m2 equivalent Complete units

1367 +67%

MMC Providers - Volumes & Transportable
Complete Units

AMPLIFIED ANNUAL PRODUCTION

MMC Providers
Potential Increase based on Industry-wide Standardisation, Pipeline contracts, collaboration etc.

2399+ +?%

1031+ +?%

1367+ +?%

LOCATION & PRODUCTION

A NATIONAL ENTERPRISE

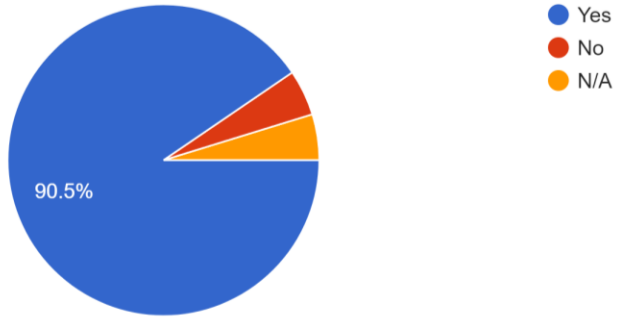
Auckland – 42%
Bay of Plenty – 9%
Waikato – 12%
Wellington – 15%
Other North Island – 4%
South Island 18%

KEY TAKEAWAY 2:
APPETITE FOR COLLABORATION

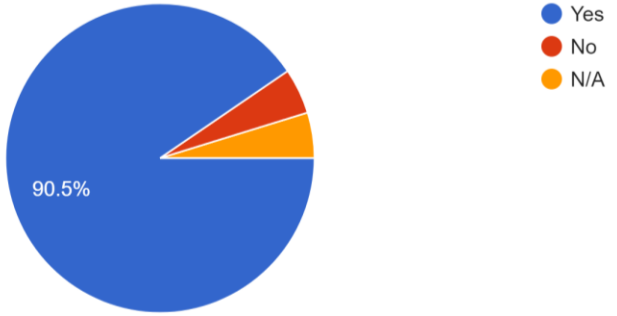
Appetite for Connection

More interest in collaboration with other suppliers & keen interest in standardization than might be evident from the outside “ask and we can deliver” – MMC participants need to do better at communicating this.

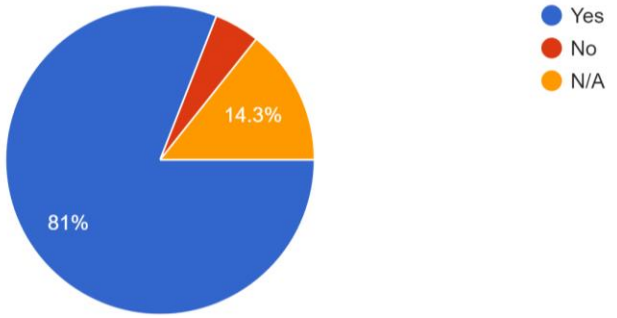
Would you support an industry effort to provide standardized designs, details or systems that can be specified during design and align with supply chain capabilities?



Are your products readily adaptable or configurable to different project requirements?



Is your product easily compatible with other manufacturers products or services?



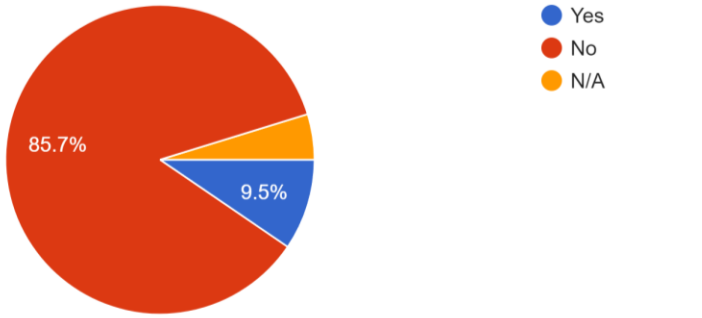
KEY TAKEAWAY 3:
IMPROVEMENT OPPORTUNITIES

Support Required: Engagement

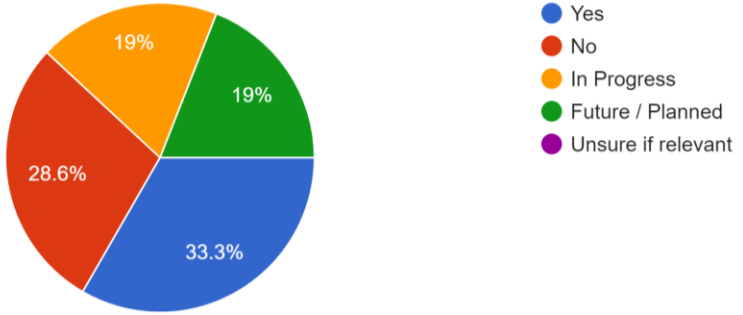
We can see that engagement with innovation & business support, like an incubator is rare.

And improvement in direct client and market research is needed.

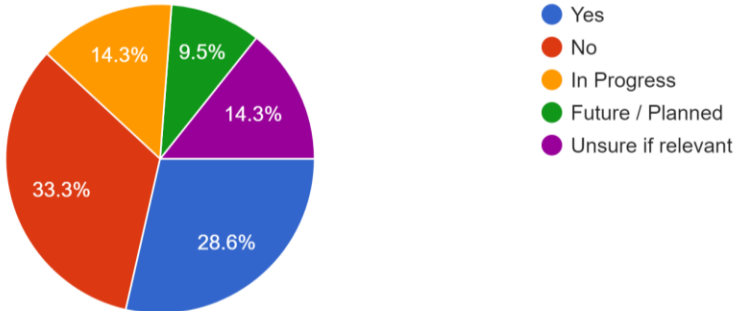
Have you taken part in a business or innovation incubator program?



Do you conduct regular or formal client satisfaction surveys?



Do you engage in market research or benchmarking to better meet client needs?

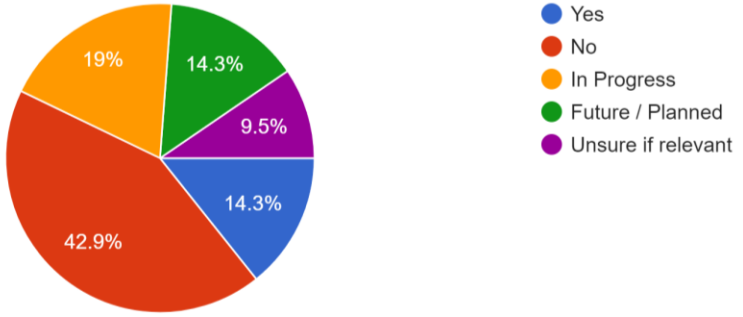


Support Required: Quality

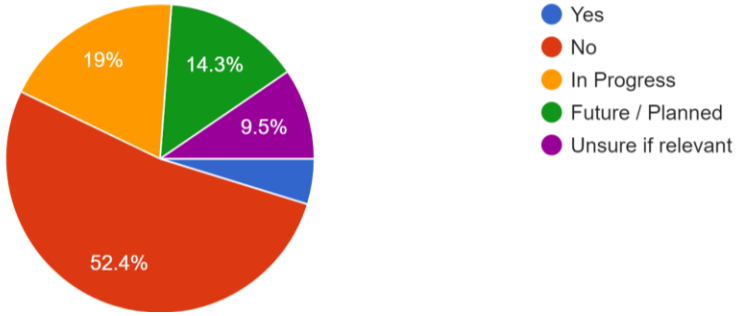
Participants are moving toward more accountability & accreditation for their systems, but very few have recognized systems in place right now.

This is an opportunity to build upon operational quality & find advantages.

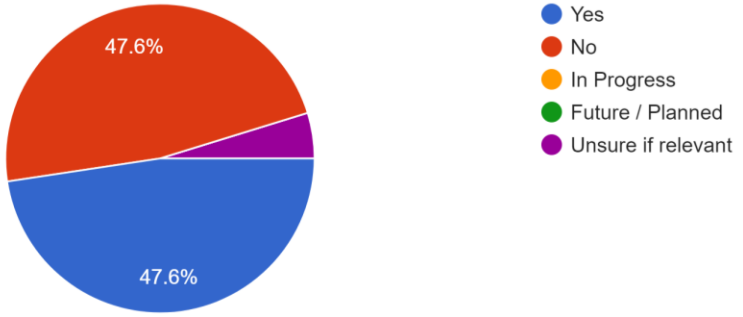
Is there a management system certified under ISO Standards?



Have you adopted an environmental management system and is it ISO 140 certified?



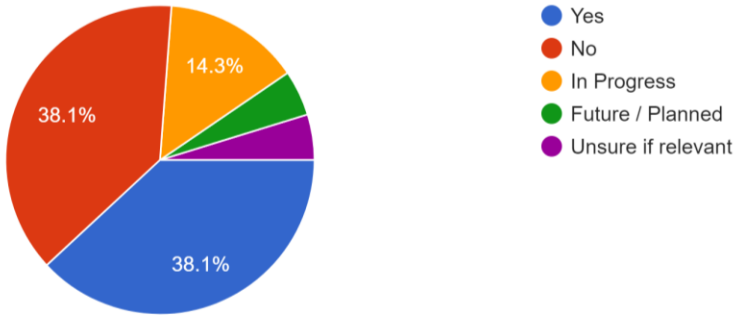
Is there third-party quality monitoring of your operations?



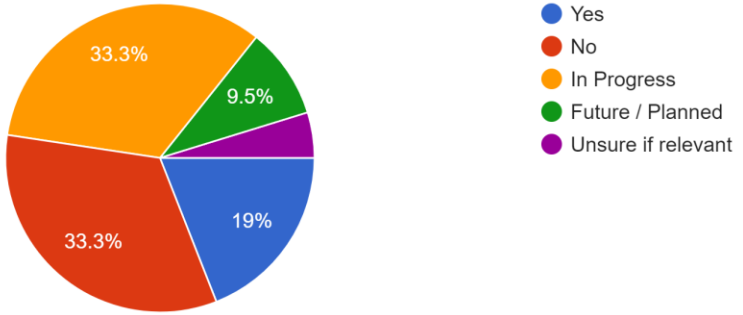
Support Required: Digital

Mixed engagement with digital tools and strategies point to an area of support and further investment.

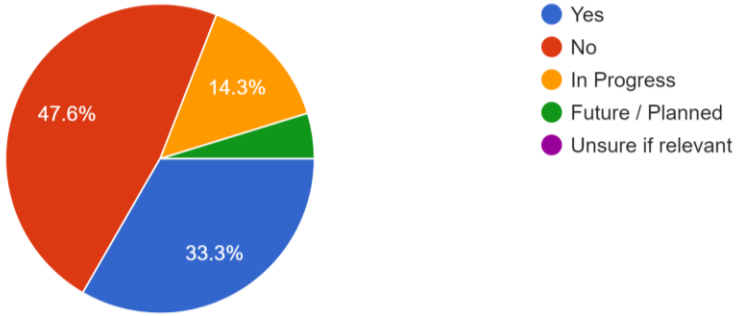
Do you have a published or accessible guide for external designers that aligns with production?



Do you have a Digital Strategy? (a strategy or plan addressing digital impact and opportunities for your business?



Are any of your design, production, installation or other services simulate(automated?



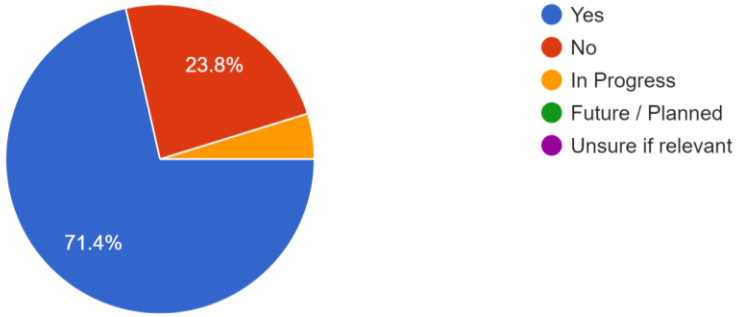
KEY TAKEAWAY 4:
PRODUCTIVITY POTENTIAL

Productivity Potential

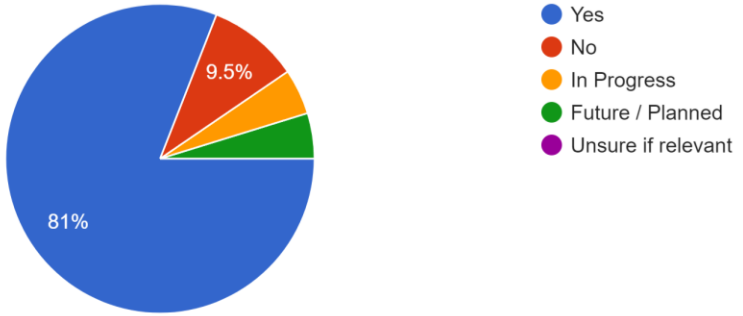
The Signs

There is strong capability around prototyping, internal design, process and standardisation.

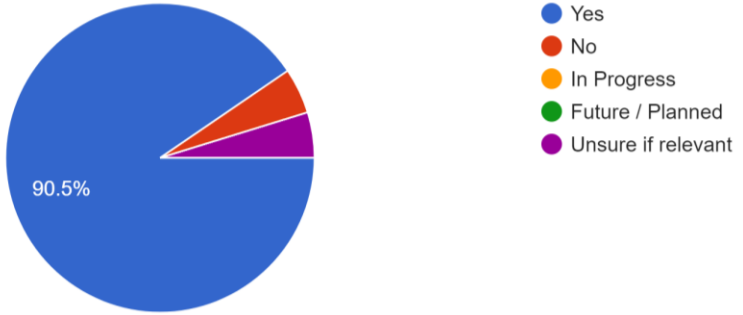
Do you have in-house prototyping facilities or product testing?



Is there an internal design guide or process that outlines your standard designs and practices?



Have you developed standardised details, interfaces, processes, or methods?

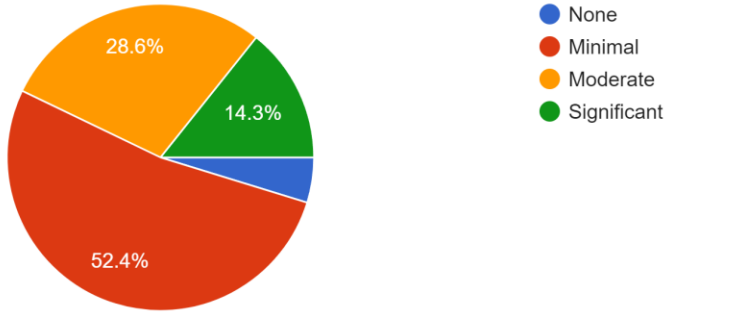


Productivity Potential

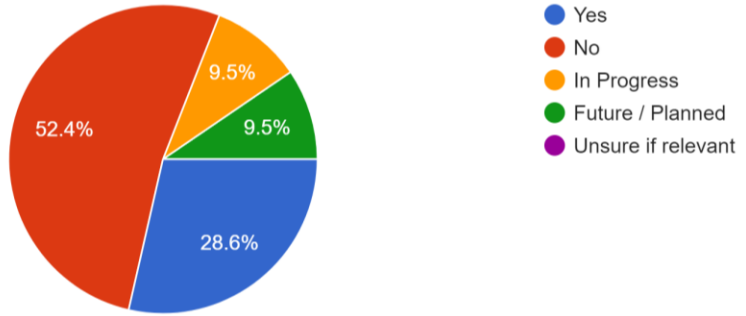
The Gaps

Rework, varying compliance pathways and approaches and variable automation strategies (not just robots but standardisation of processes, low-capital tooling etc.) can be improved upon.

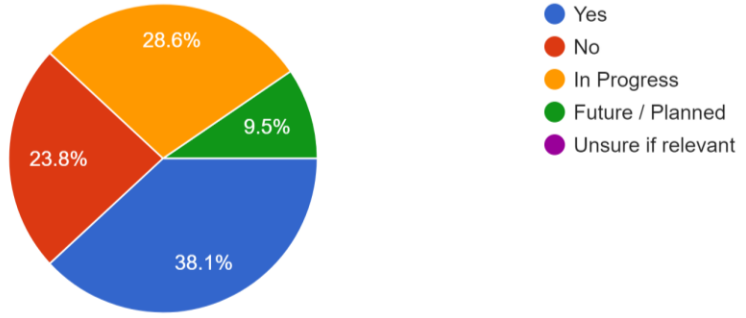
What level of design rework/modification is typical in translating design information received from third parties i.e., designers, engineers, etcetera into production-ready specifications?



Do your products have a CodeMark, Multi-proof, or other independent compliance assurance?



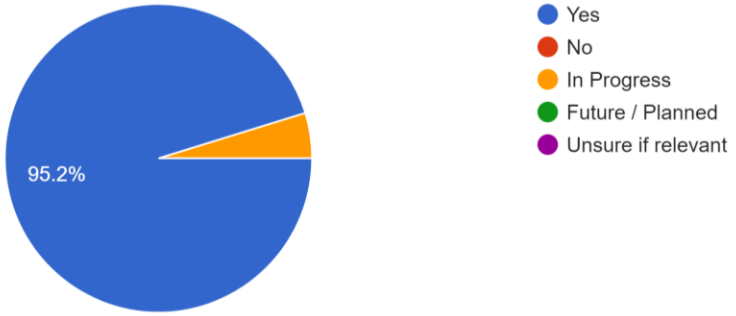
Do you have a future labour and automation strategy in place?



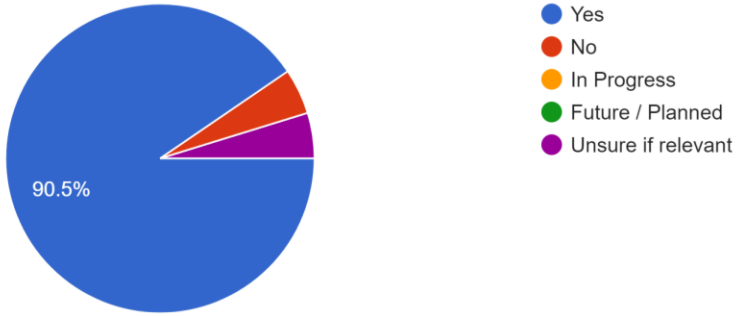
Productivity Potential Opportunities

An MMC provider that makes its own products, with its own people and QA processes is an excellent candidate for more responsibility for consenting and compliance.

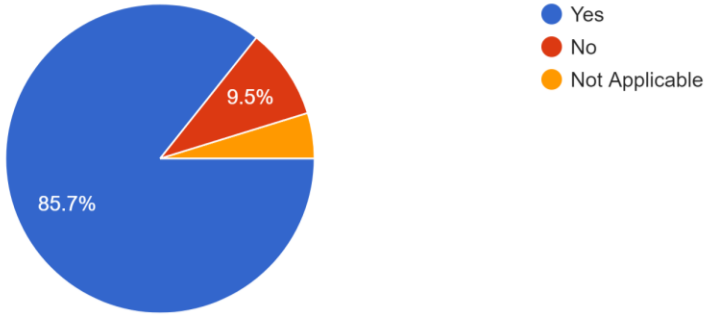
Do you have a systematic/compliance quality control process for the products or services you offer?



Is fabrication and assembly of your products carried out in-house?



Could you increase throughput with a standardised suite of products??



HOW CAN WE USE THIS DATA?

OPPORTUNITIES:
WHAT DO YOU THINK?

- **Turn evaluation framework into a tool**
- **Recognized Quality Mark**
- **Catalogue of Suppliers & Products**
- **Annual survey**
- **Industry/academic collaboration to propel forward**


GOVERNMENT
INDUSTRY

PART ONE: PRODUCTION ASSESSMENT

We asked detailed information on the current & planned production potential of participants. We also investigated internal resources.

Of the 21 participants, we used the data from 16 who are currently making buildings at scale to establish current and future production potential of the MMC sector in New Zealand.

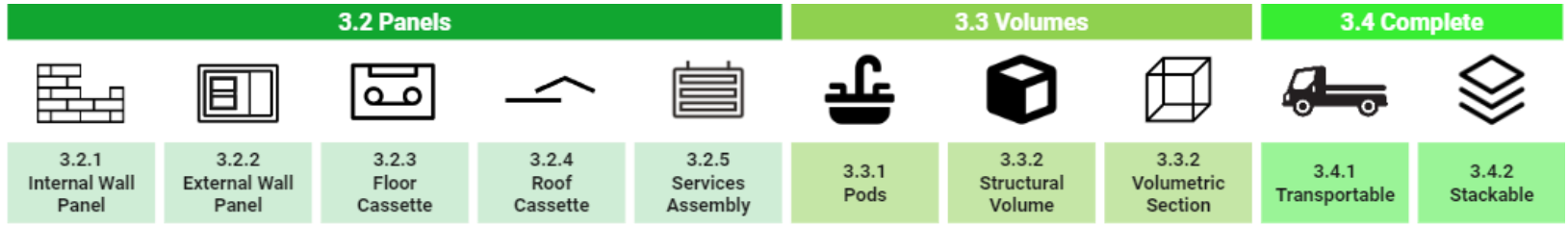
THE MMC PHYSICAL PRODUCT SET

A STANDARDISED WAY OF CLASSIFICATION

Physical Products	3.1 Parts	3.2 Panels	3.3 Volumes	3.4 Complete
	3.1.1 Commodity Parts	3.2.1 Internal Wall Panel	3.3.1 Pods	3.4.1 Transportable
	3.1.2 Pre-Manufactured Parts	3.2.2 External Wall Panel	3.3.2 Structural Volume	3.4.2 Stackable
	3.1.3 Structural Parts	3.2.3 Floor Cassette	3.3.2 Volumetric Section	
		3.2.4 Roof Cassette		
		3.2.5 Services Assembly		

PRODUCTION DATA

We asked all participants their production data – measured in their preference. We then used 13 of them to measure & standardise & map production data.



CURRENT ANNUAL PRODUCTION

MMC Providers
Current Production as reported

1492

674

MMC Providers - Panels
Translate m2 production into 80m2 equivalent Complete units

818

MMC Providers - Volumes & Transportable
Complete Units

PLANNED ANNUAL PRODUCTION

MMC Providers
Potential increase based on current facilities or planned increase in facility area

2399 +60%

1031 +53%

MMC Providers - Panels
Translate m2 production into 80m2 equivalent Complete units

1367 +67%

MMC Providers - Volumes & Transportable
Complete Units

AMPLIFIED ANNUAL PRODUCTION

MMC Providers
Potential Increase based on Industry-wide Standardisation, Pipeline contracts, collaboration etc.

2399+

1031+

1367+

LOCATION & PRODUCTION

A NATIONAL ENTERPRISE

Auckland – 42%
Bay of Plenty – 9%
Waikato – 12%
Wellington – 15%
Other North Island – 4%
South Island 18%

PRODUCTION POTENTIAL

Rationale: Seeking evidence of depth & knowledge in the organization and wider support networks.

This demonstrates the level of expertise available to meet client requirements through MMC.

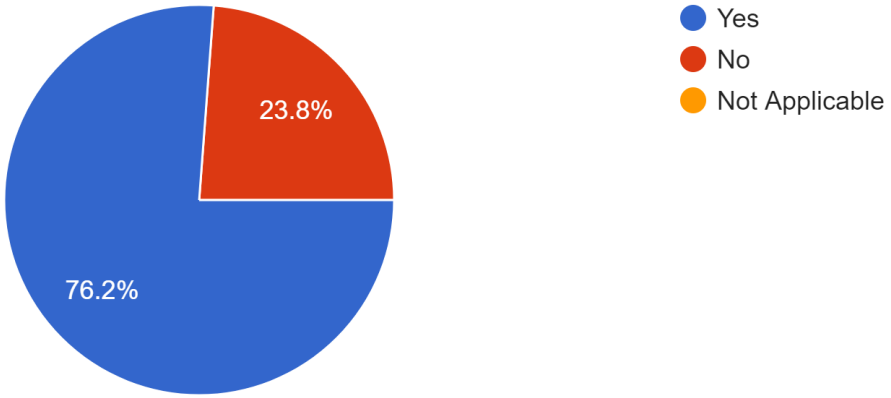
What we learned: Open for Business

Participants are actively looking for additional production facilities – either though expansion of existing facilities or new facilities in other locations to better serve the market.

Unsurprisingly, most participants are looking for additional pipeline.

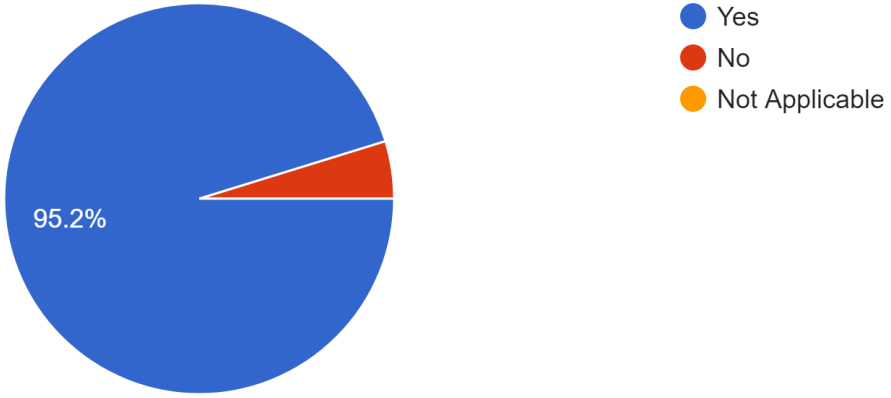
Do you have plans at this time for an additional production facility?

21 responses



Are you interested in additional pipeline at this time?

21 responses



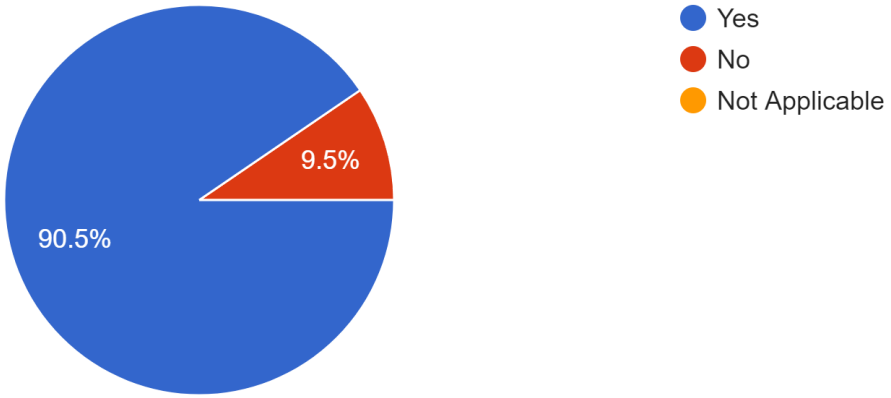
What we learned: Production Scalability

We tested the prospect of existing latent production potential i.e. the possibility of increasing production without further investment. This was resoundingly confirmed.

Similarly, we tested whether throughput could be increased through standardisation with the same finding.

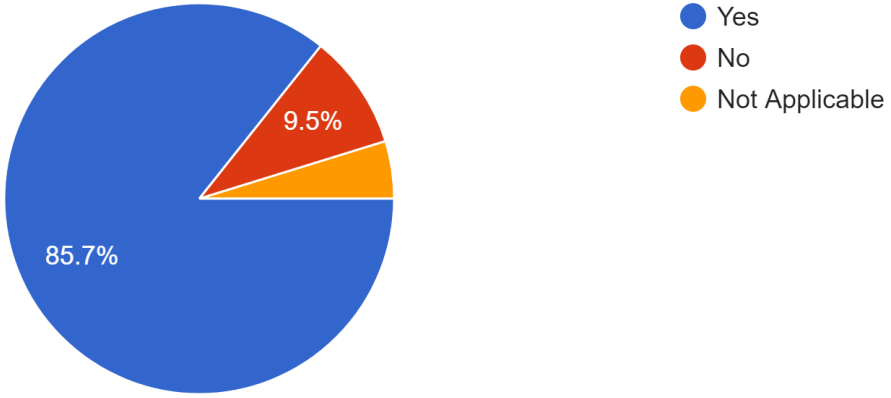
Do you have the capacity to scale up production volume in your existing facility?

21 responses



Could you increase throughput with a standardised suite of products?

21 responses



What we learned: Production Limitations

We asked participants what, if any are the limitations to production capacity – these were some of the responses we received.

- *Time & labour resource*
- *Consistent demand & commitment*
- *Current market demand and facilities*
- *Negotiating supply agreements with one major supplier.*
- *Consistency of contracts*
- *Individual design in projects causing bottlenecks & demand spikes.*
- *Consistency of pipeline in early stages*
- *Limitations are in the demand side right now*
- *Limited by the short notice and lack of forward orders we get from our clients which means we can't build the same building consistently*
- *Compliance changes, product availability*
- *Balancing production capacity with market demand, we can scale up, but we need volume to do this.*
- *Investment*

Respondent feedback:

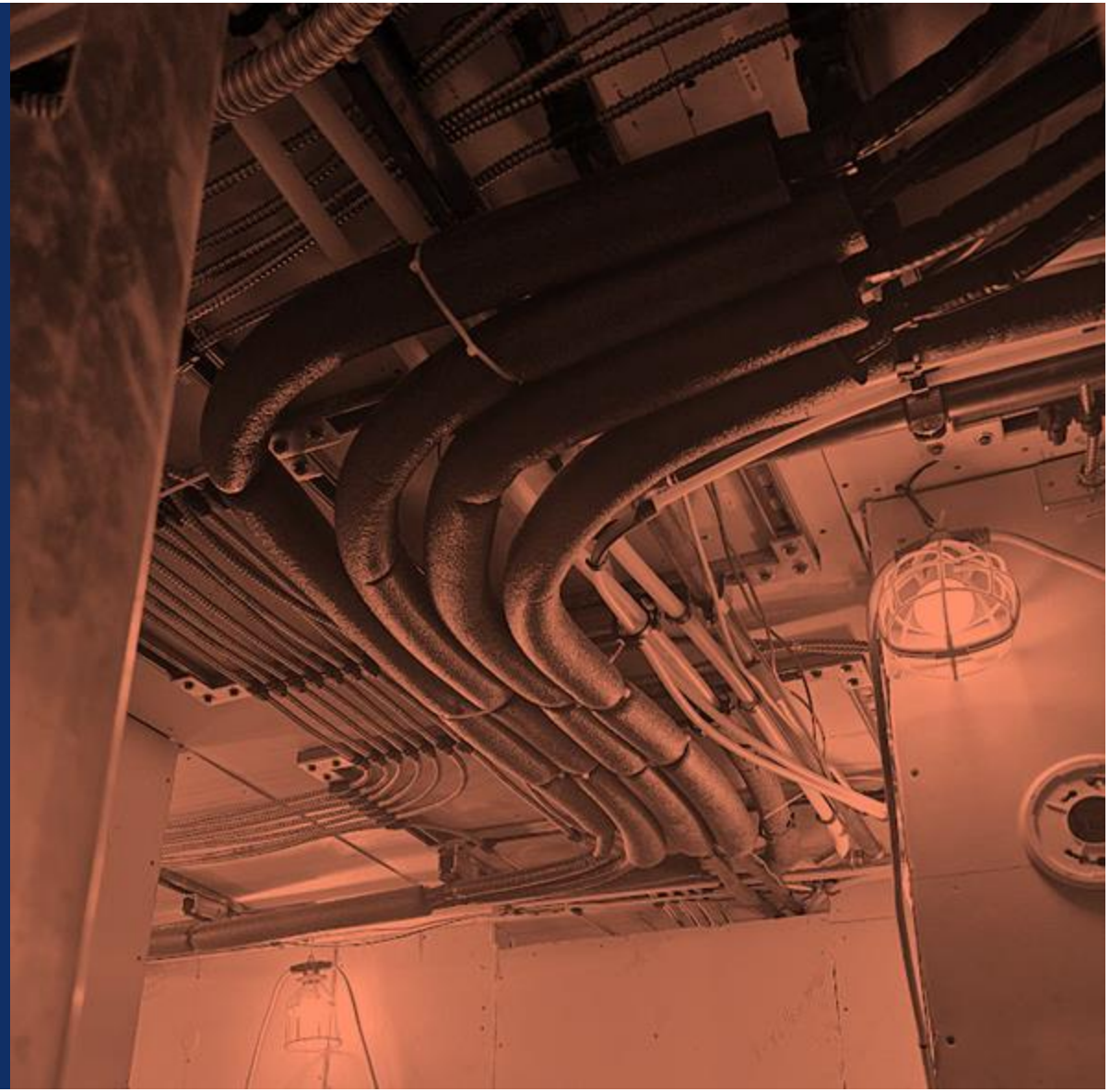
Production Innovation

"We supply directly to builders.. during trial phase. Long term we will supply the tech to either distributers/manufactures or builders to operate as our customer."

CLIENT & BUSINESS MODEL

Rationale: We need to know two things:

- who is the main target of the current business and;
- what are the business models that have been put in place to meet this client's expectations.



What we learned: Meeting the Market

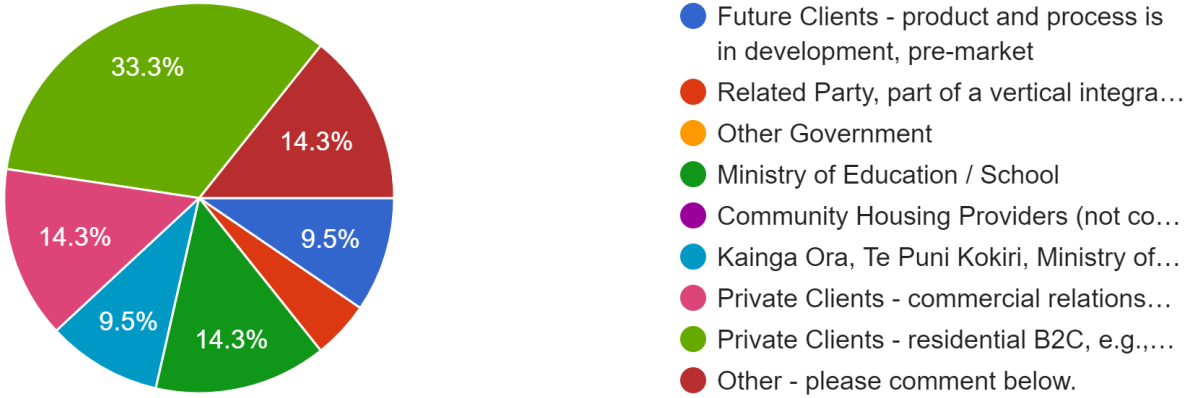
We found 7 major client types, with the majority servicing private clients and internal or related parties.

We also found 6 major business services models which range from supplier products B2B, through to fully vertically integrated contactors.

There is growing diversity in both areas due to innovation in technology, business model and client needs.

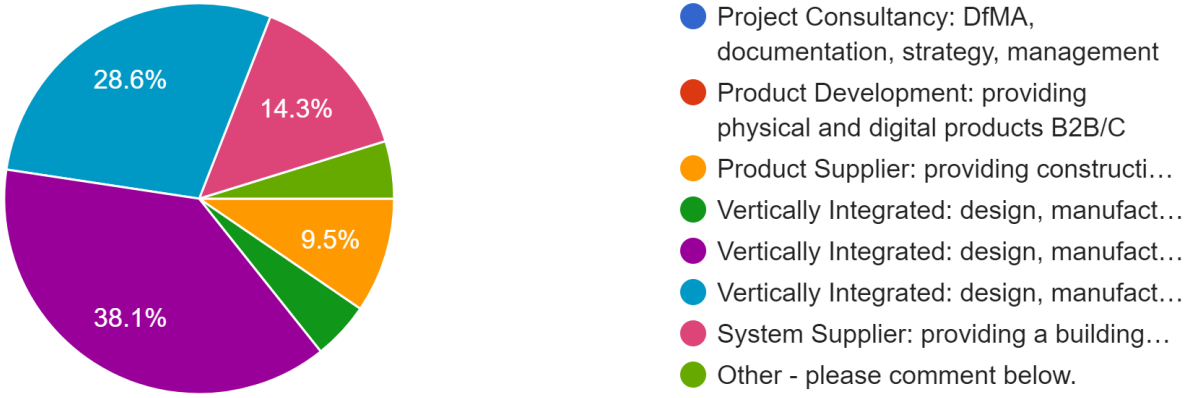
Who is your main client?

21 responses



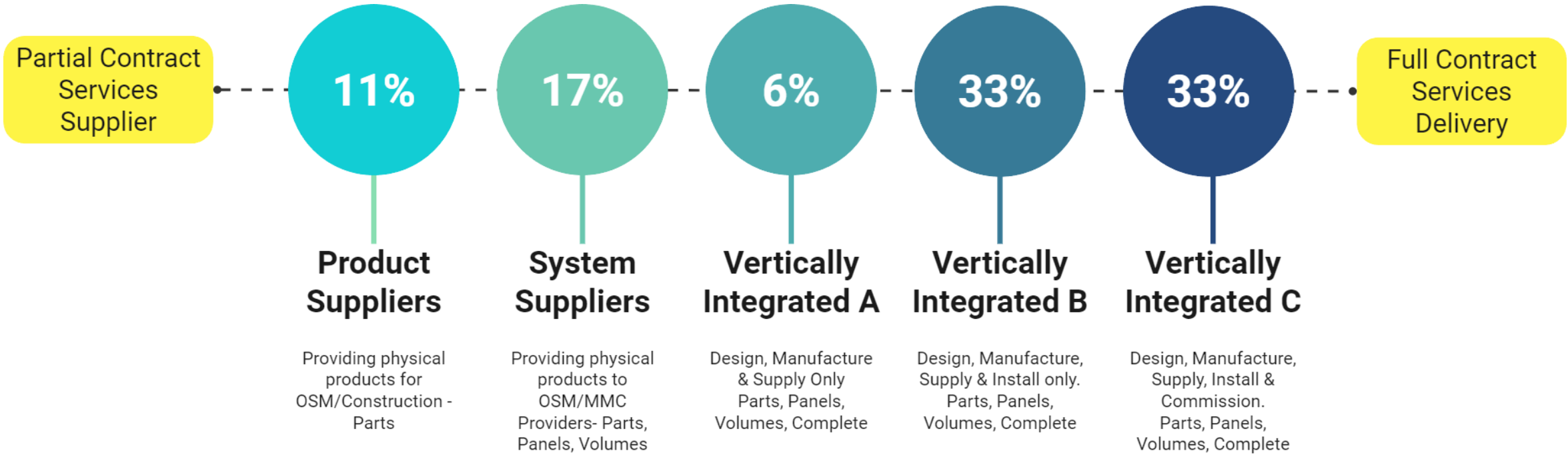
What service do you offer?

21 responses



MMC CONTRACT SPECTRUM

SPECTRUM OF PHYSICAL PARTS ONLY, OR FULL CONTRACT MMC DELIVERY



What we learned: Client Application

We asked participants to expand upon their response to who their main client is – these were some of the responses we received.

- *Our system has application in commercial and residential sectors*
- *80% Iwi, Chps & KO vs private*
- *Kainga Ora, Internal customer, external customers/developers, GHB's (B2B not B2C).*
- *We are starting to offer to commercial clients but mostly private customers*
- *Developing products for residential*
- *Our system has application in commercial and residential sectors*
- *We cover all of the options noted in the selection list*

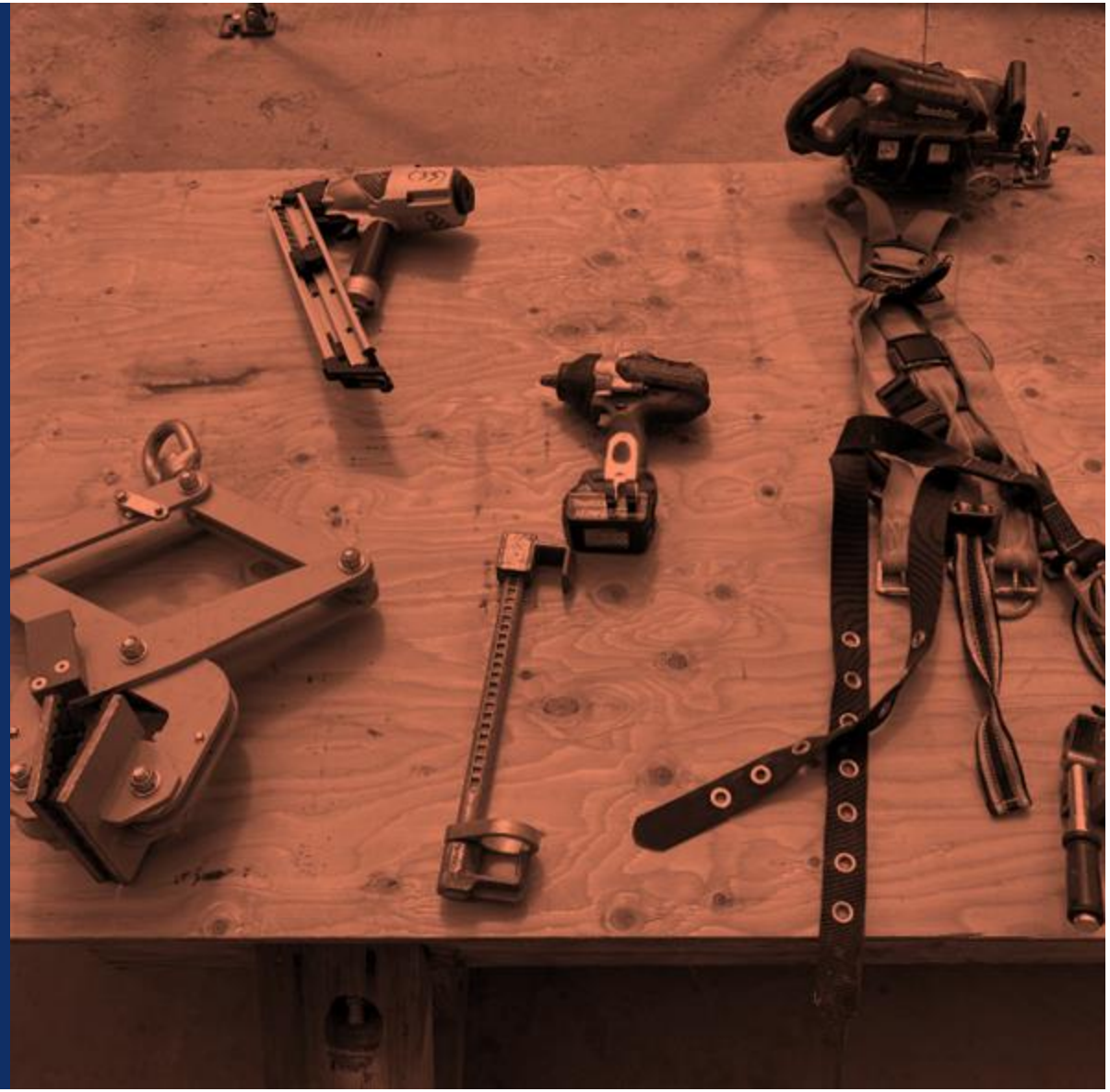
What we learned: Business Model

We asked participants to expand upon their response to business model – these were some of the responses we received. Two thirds of respondents offer full or close-to-full delivery services.

- *From Architecture through DfMA to manufacturing, distribution to sites and installation of the "Core" fully watertight product (External walls, internal walls, floors, roof and roof cladding/flashing) we stop at external cladding of the walls and internal plumbing, electrical, finishing).*
- *We offer vertically integrated design & build with focus on offsite manufacturing solutions*
- *We are product supplier, but we also provide some expertise and advises about DFMA and Off-Site Construction*
- *We have a market leading technical team, wide range of construction products and installation services.*
- *We offer design, PS1, Fabrication & Install of our products*

PEOPLE & RESOURCING

Rationale: Seeking evidence of depth & knowledge in the organization and wider support networks. This demonstrates the level of expertise available to meet client requirements through MMC.



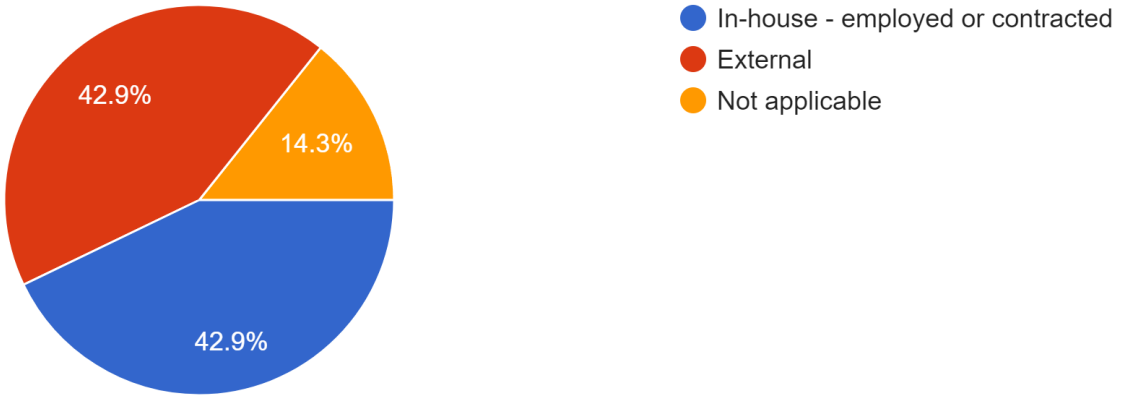
What we learned: Design Expertise

There is a balance between internally and externally sourced design/architecture resourcing. This suggests that working with external architects is common.

When it comes to those with DfMA expertise, the overwhelming majority is in-house. This shows that there is high value internal capability here.

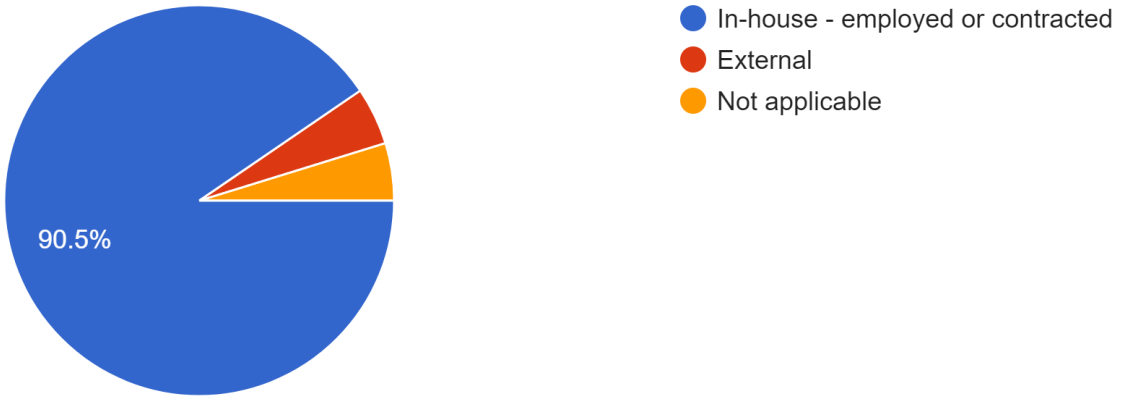
Architectural Design

21 responses



DfMA (Design for Manufacturing and Assembly)

21 responses

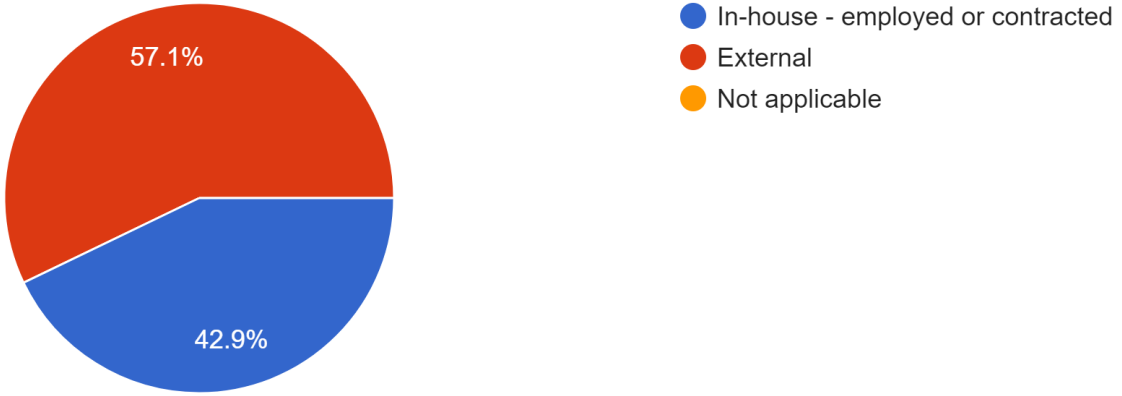


What we learned: Engineering & ESD

There is high knowledge & utilisation of engineering from external professionals. Whilst ESD capability is more likely to be in-house. This is likely related to functions around waste management, reporting and NZGBC-trained people and/or familiarity with accreditation.

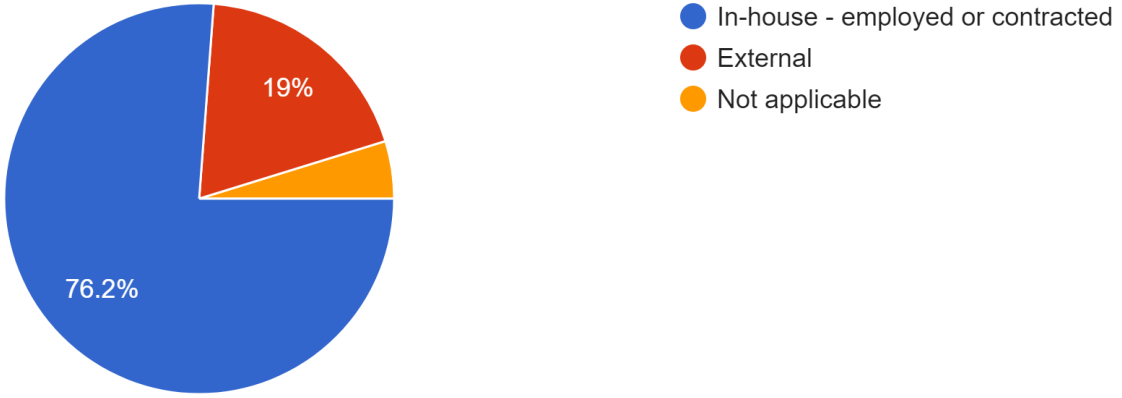
Engineering

21 responses



Environmental / Sustainability

21 responses

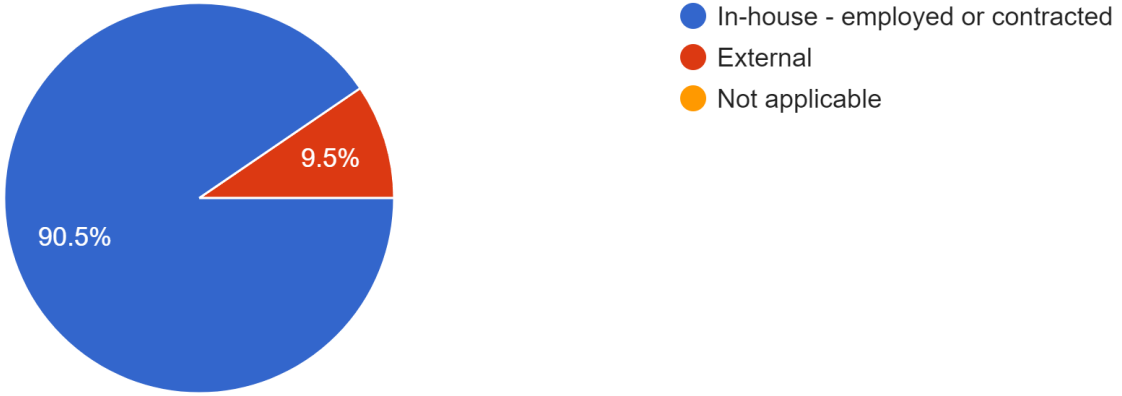


What we learned: Operator & Labour

Participants have a high

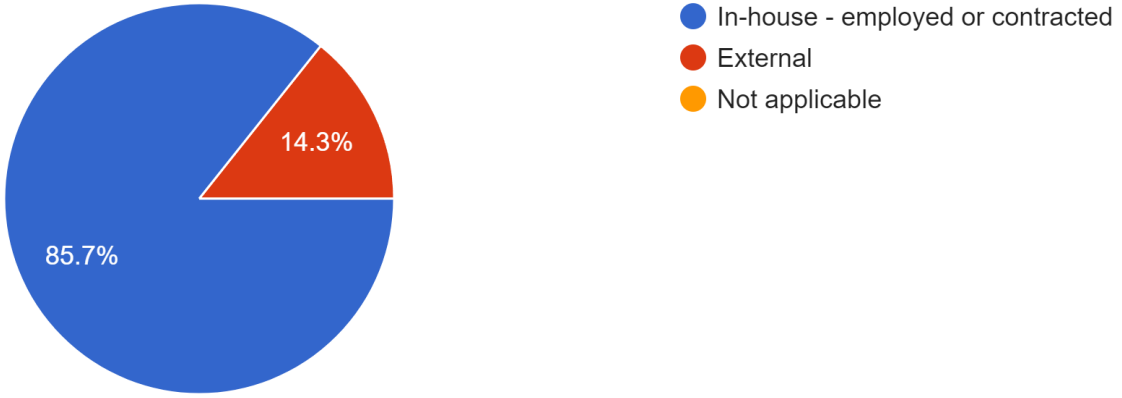
Manufacturing: Operator

21 responses



Labour: carpentry, trades

21 responses

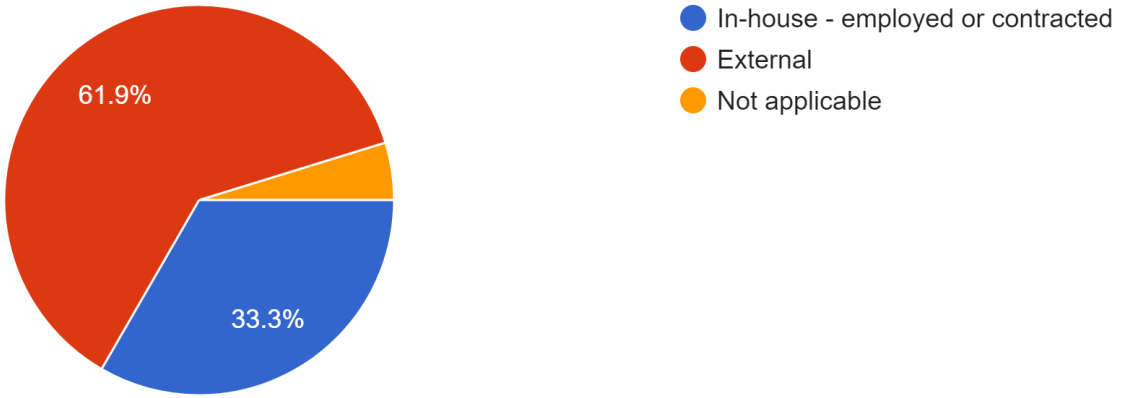


What we learned: Transport & Installation

Participants demonstrated that transportation is sourced mostly from 3rd parties. Installation is sourced mostly internally.

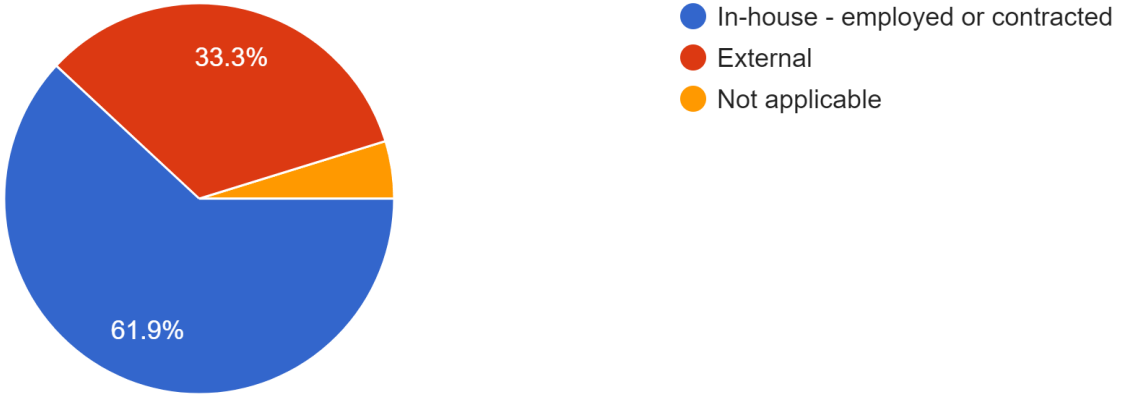
Transportation

21 responses



Installation

21 responses



PART ONE: CAPABILITY ASSESSMENT

One of the key ideas of this work was that current MMC companies have untapped potential. So, we created a way to understand the industry from a deeper perspective than what is typical.

We discovered significant expertise and latent potential that could help to transform the construction industry in New Zealand. Participants showed deep knowledge, experience, proprietary knowledge and capability. We also found areas that could be targeted for support and improvement.

CLIENT & MARKET RESPONSE

Rationale: Seeking evidence that the product or service being offered is responsive to client demand and has been tested through market research.

This includes responding to a client's standard designs and specifications, development of product targeted to a demographic or market gap or need or other engagement strategies.

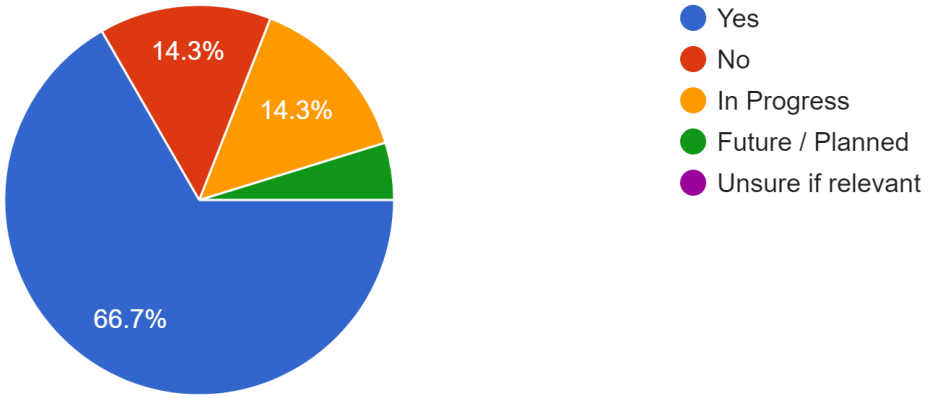
What we learned: Client Selection

Most suppliers have a certain client type that they want to supply buildings to. But just over a third are in the process of identifying the target.

Less than a third actively research the market to support their marketing and business efforts.

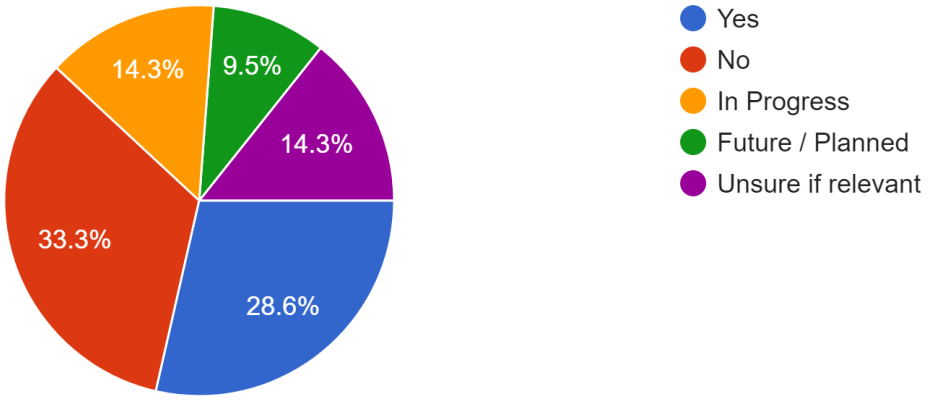
Do you have a defined client that is the target of your business?

21 responses



Do you engage in market research or benchmarking to better meet client needs?

21 responses



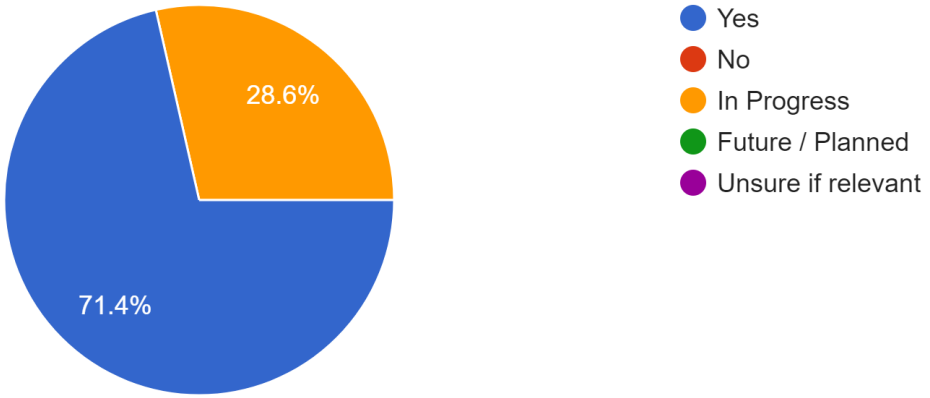
What we learned: Client Engagement

The majority of participants have a system or procedure to capture client requirements or brief.

But less than a third have regular engagement with clients to check on the outcomes delivered.

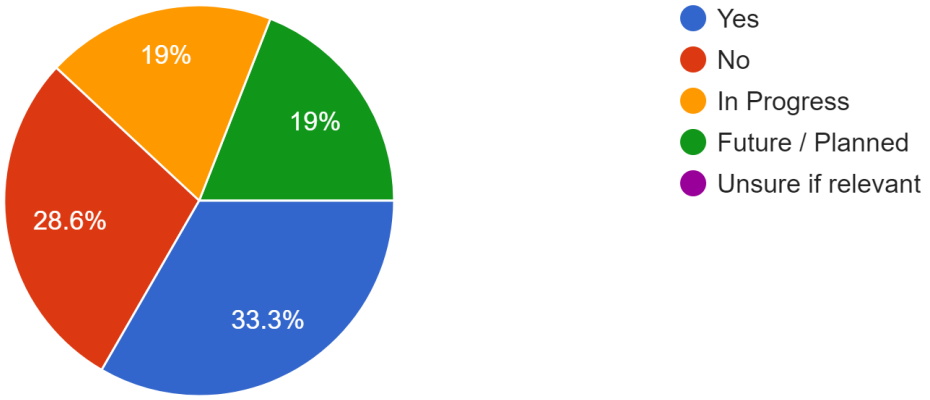
Do you have a system or procedure for capturing client requirements?

21 responses



Do you conduct regular or formal client satisfaction surveys?

21 responses



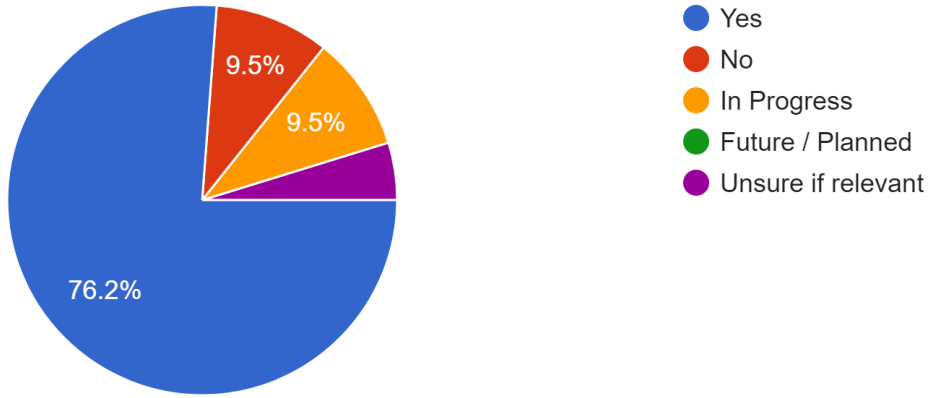
What we learned: Standardised Services

Participants indicated a high level of standardisation of services and costs for what they provide.

Participants indicated in other questions that standardisation of designs would increase productivity & throughput.

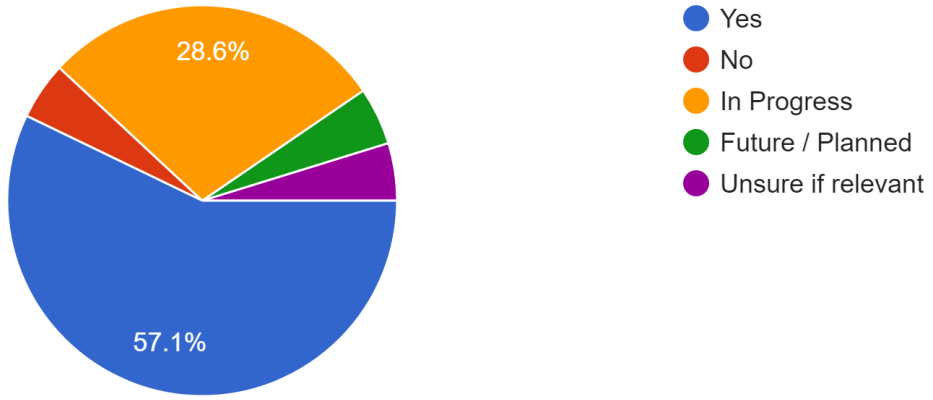
Do you have a standard cost schedule for your product or service?

21 responses



Do you have a standard services delivery schedule with estimated durations?

21 responses



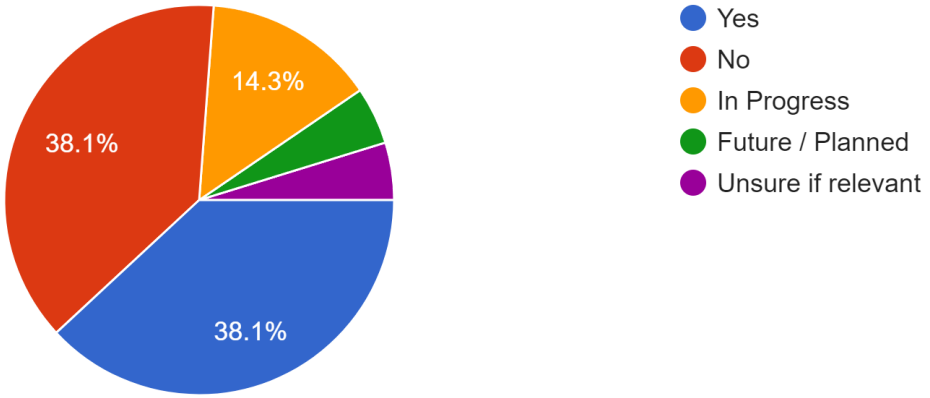
What we learned: Client Strategy

Some participants already provide information so that designers can understand key DfMA criteria aligned with production. But there is still opportunity for more communication.

Supply and pipeline agreements feature prominently at the time of the survey, with a lot of interest in securing certainty.

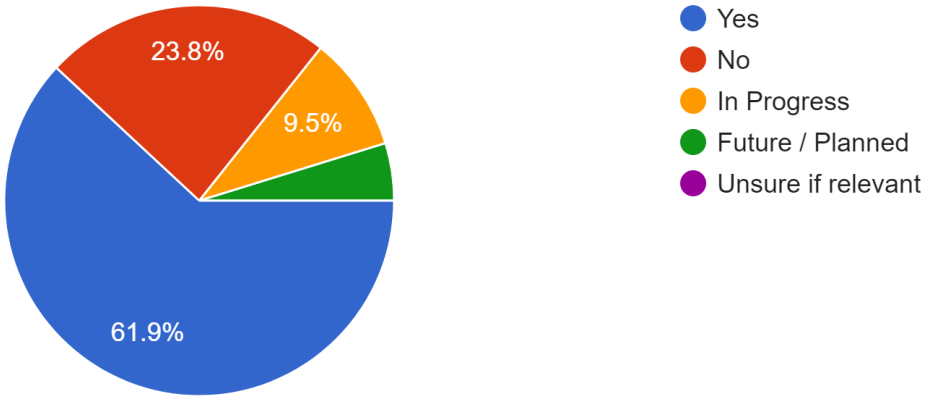
Do you have a published or accessible guide for external designers that aligns with production?

21 responses



Do you have any pipeline or supply agreements in place with a client?

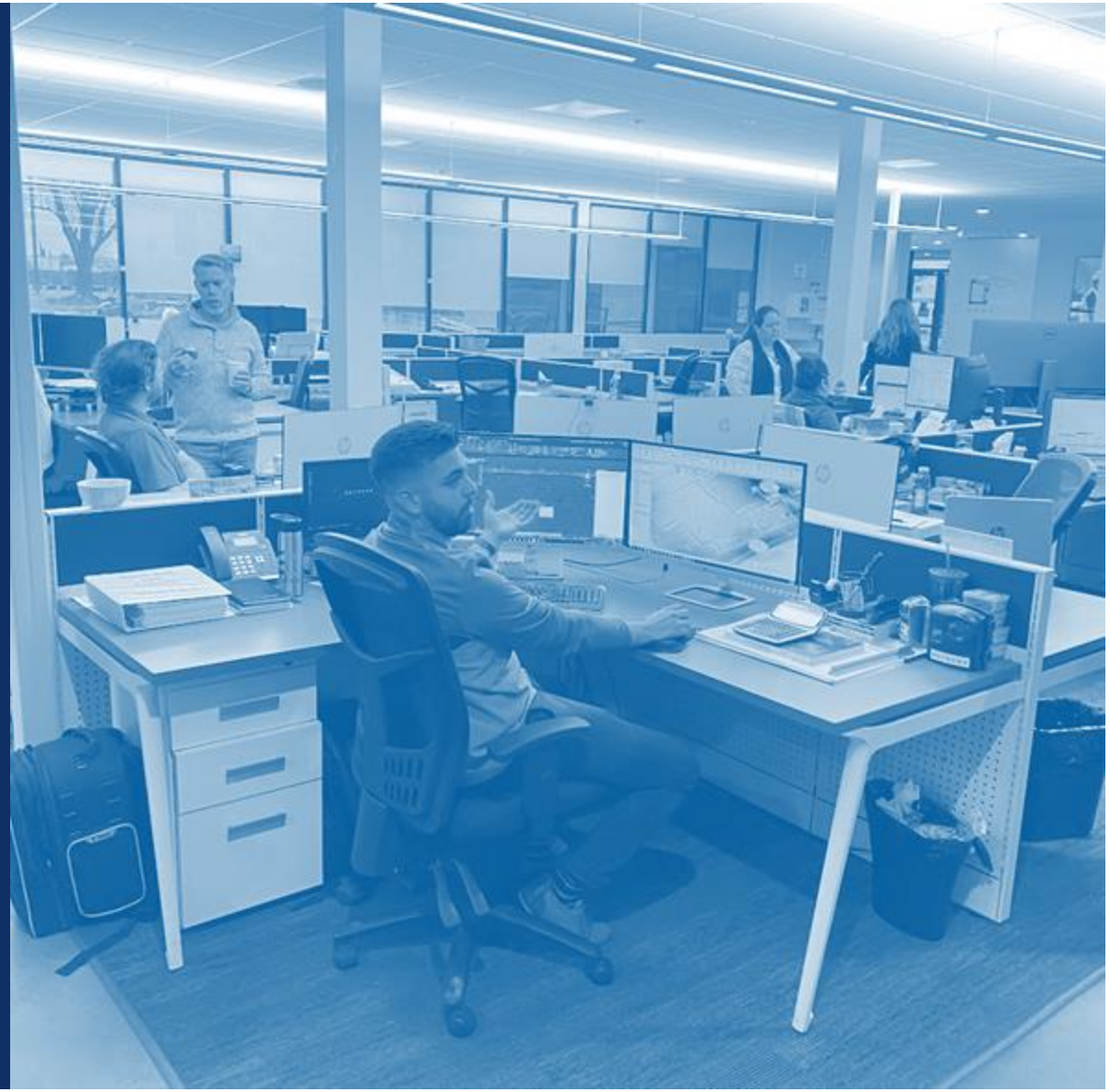
21 responses



DESIGN & DFMA

Rationale: Seeking evidence that design, manufacturing and assembly is well understood and a core part of the business.

Testing communication of this to clients, external parties (consultants, authorities etcetera) and internal capabilities, level of rework etc.



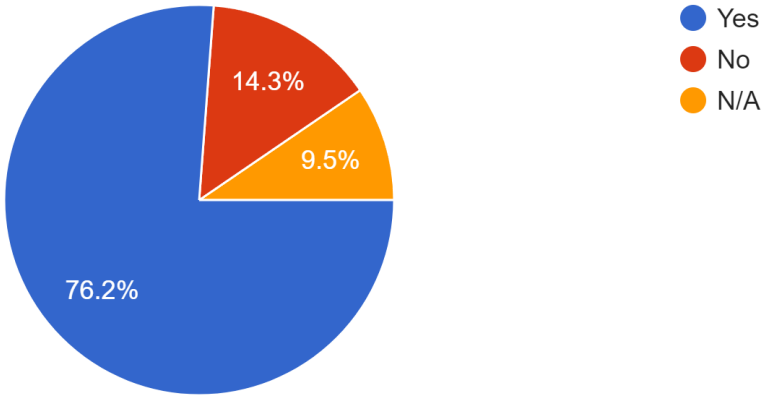
What we learned: BIM & Design Process

Some businesses reported a very high level of digital design maturity, and familiarity with design file interoperability.

More work should be done to compare with other BIM users in accordance with BIM in NZ Project data.

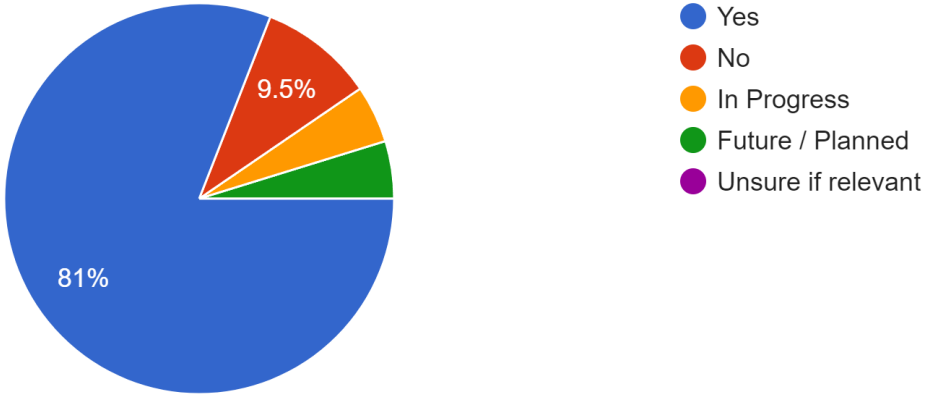
Is DfMA central to your product or service?

21 responses



Is there an internal design guide or process that outlines your standard designs and practices?

21 responses



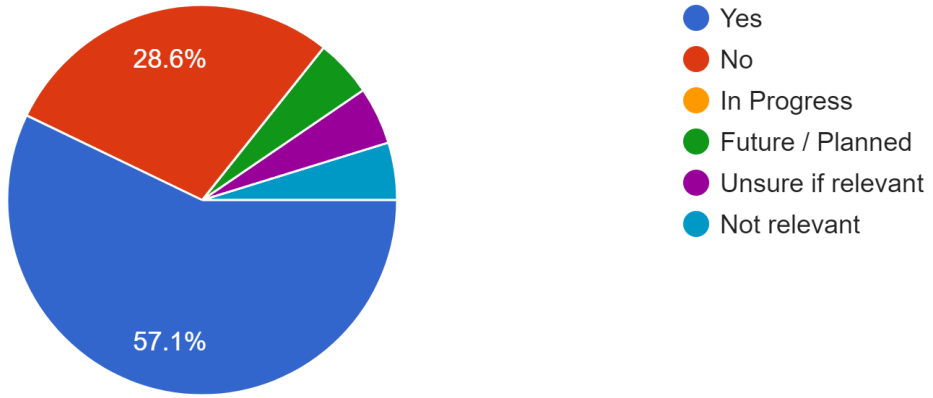
What we learned: BIM & Repeatability

There is a strong use of BIM in managing project requirements

But standardisation of product designs, details and methods is very high. This shows that some of this information may be not in BIM but in other digital and physical information sources.

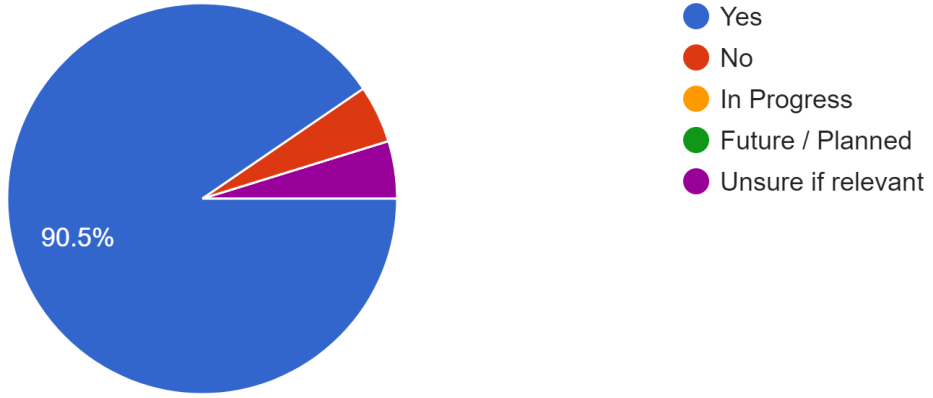
Do you employ Digital/BIM models to capture project requirements?

21 responses



Have you developed standardised details, interfaces, processes, or methods?

21 responses

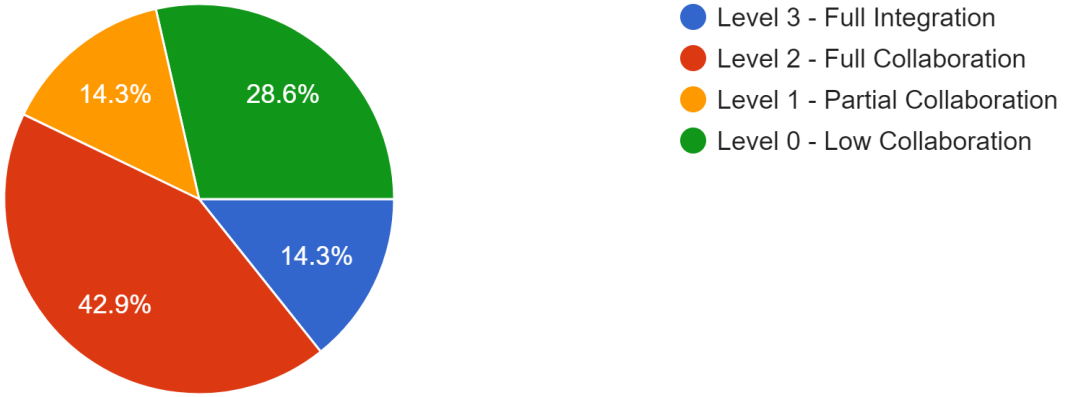


What we learned: BIM Maturity

More than half of participants are operating at a high level of BIM maturity when compared against a global standard (BibLus).

Which BIM maturity level best describes your way of working? - refer here https://tinyurl.com/4by3432f

21 responses



Level 0 –
At this stage, the production and sharing of the information take place with non-interoperable, paper-based documents: CAD drawings are used, but the information of the model is not shared.

Level 1 –
Focuses on the transition of CAD information from 2D and 3D. Despite the presence of a common data environment, the generated models are not distributed among the different stakeholders.

Level 2 –
Two new dimensions of the project are introduced: the 4D, time management and the 5D, calculation of the budget. It is not necessary that all the team members operate on the same CAD 3D models

Level 3 –
Full integration of information in a cloud-based environment using a common shared model. Available to all project stakeholders who can add or modify their own information.

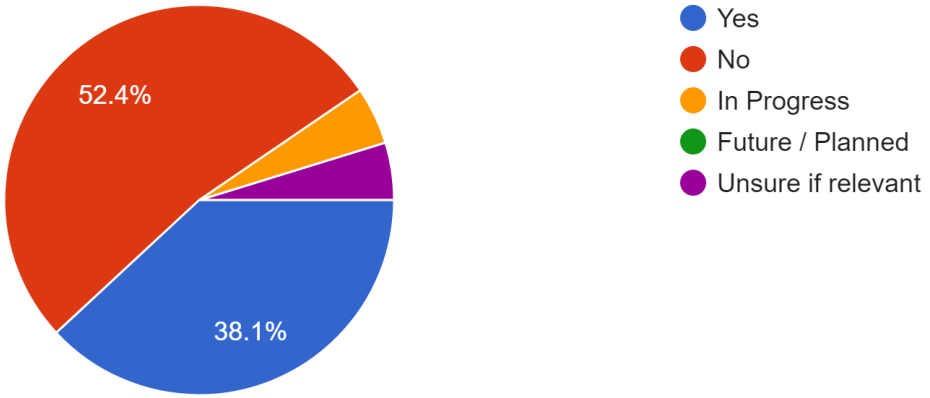
What we learned: Credibility

More than a third of participants have membership or staff that accredited to a licensing board.

Almost half have a product with pre-certification or are in progress or have future plans to do so.

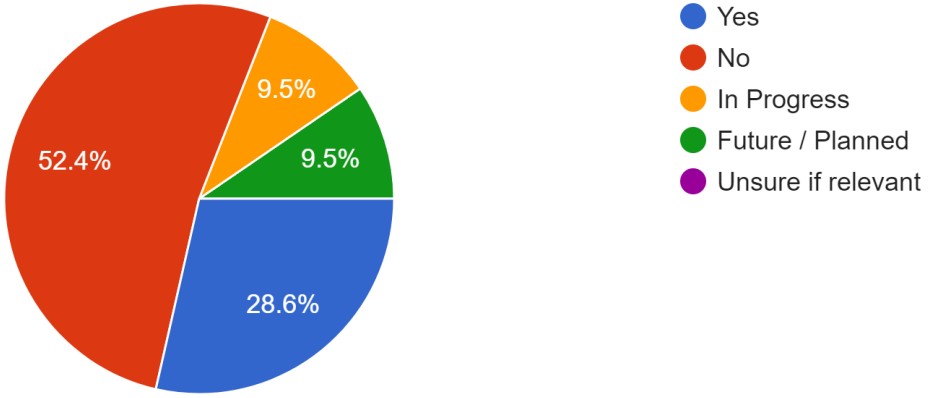
Do you have design accreditation such as membership to a licencing board?

21 responses



Do your products have a CodeMark, Multi-proof, or other independent compliance assurance?

21 responses



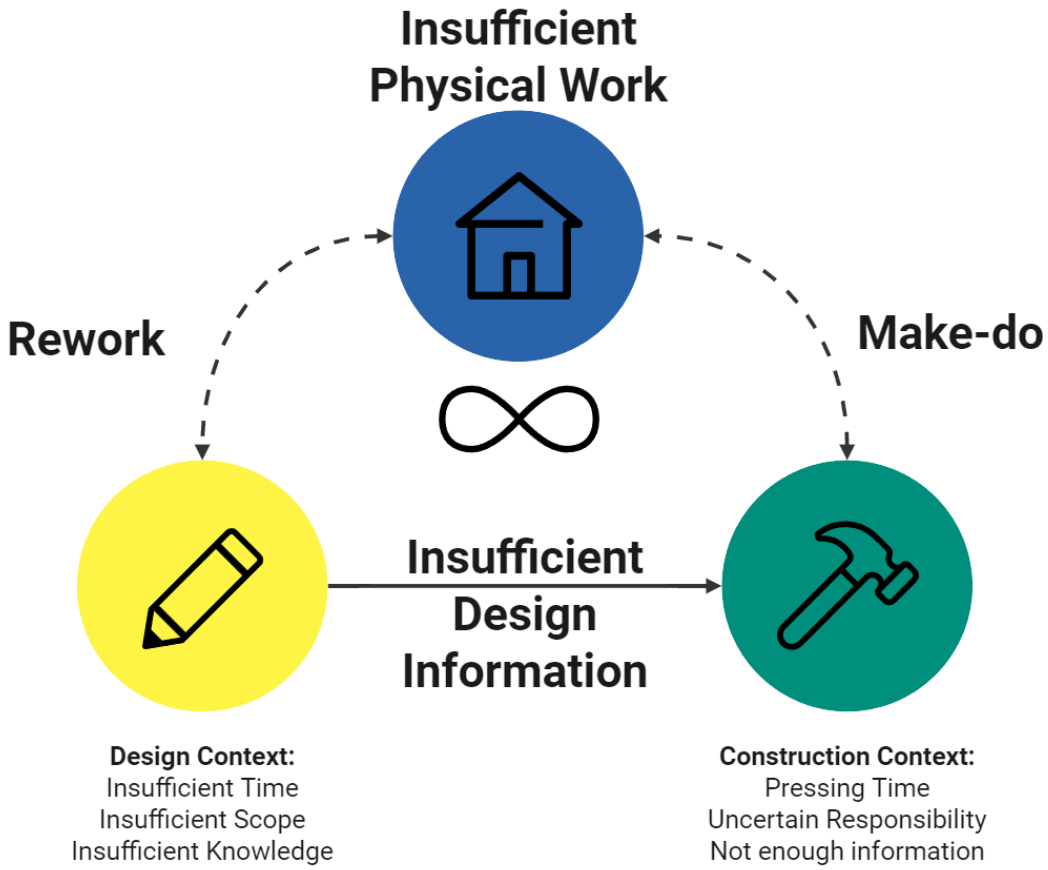
BACKGROUND: THE PROBLEM OF REWORK

STANDARDISATION JUSTIFIED

In a 2021 report, BRANZ found the *economic cost of defects discovered during new residential construction is estimated conservatively at $2.5 billion per year by the NZIER.*

Studies have found that rework can be anywhere from 2% to 9% of a project's total cost, with some estimates extending that to as much as 20%.

The translation from architectural design to manufacturing build details is a critical transition point – **standardisation is the leading strategy for how to remove rework from On-site and Off-site.**



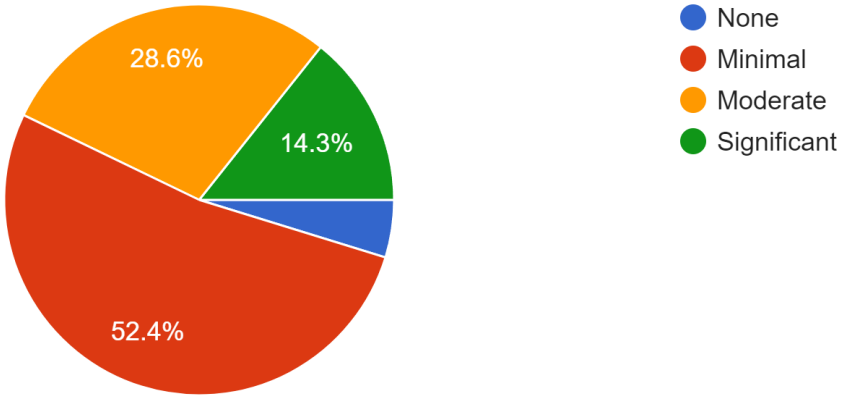
What we learned: Rework & Measuring

All participants registered that here is a degree of rework involved in translating 3rd party designs to conform with their product, with over 40% needing moderate or significant work.

Just under 40% had a standard way of translating 3rd party design files to a format that they could use, and a 1/3 had no process in place.

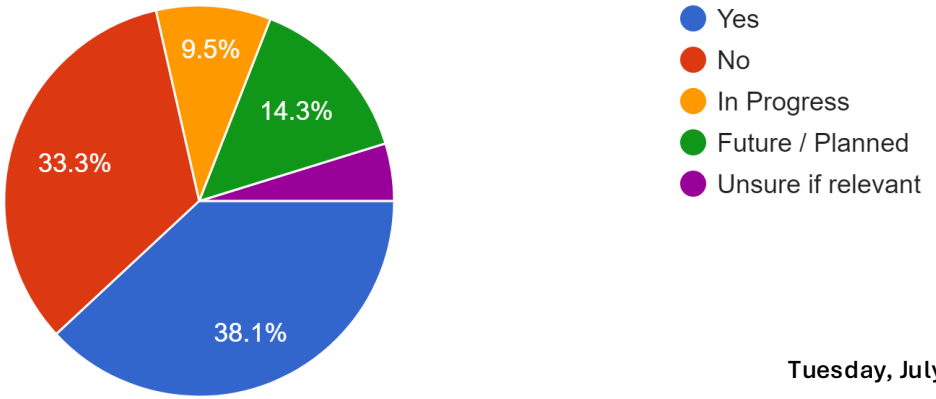
What level of design rework/modification is typical in translating design information received from third parties i.e., designers, engineers, etcetera into production-ready specifications?

21 responses



Do you have a standard design file interoperability process i.e., receiving architectural or structural models and translating to machine files?

21 responses



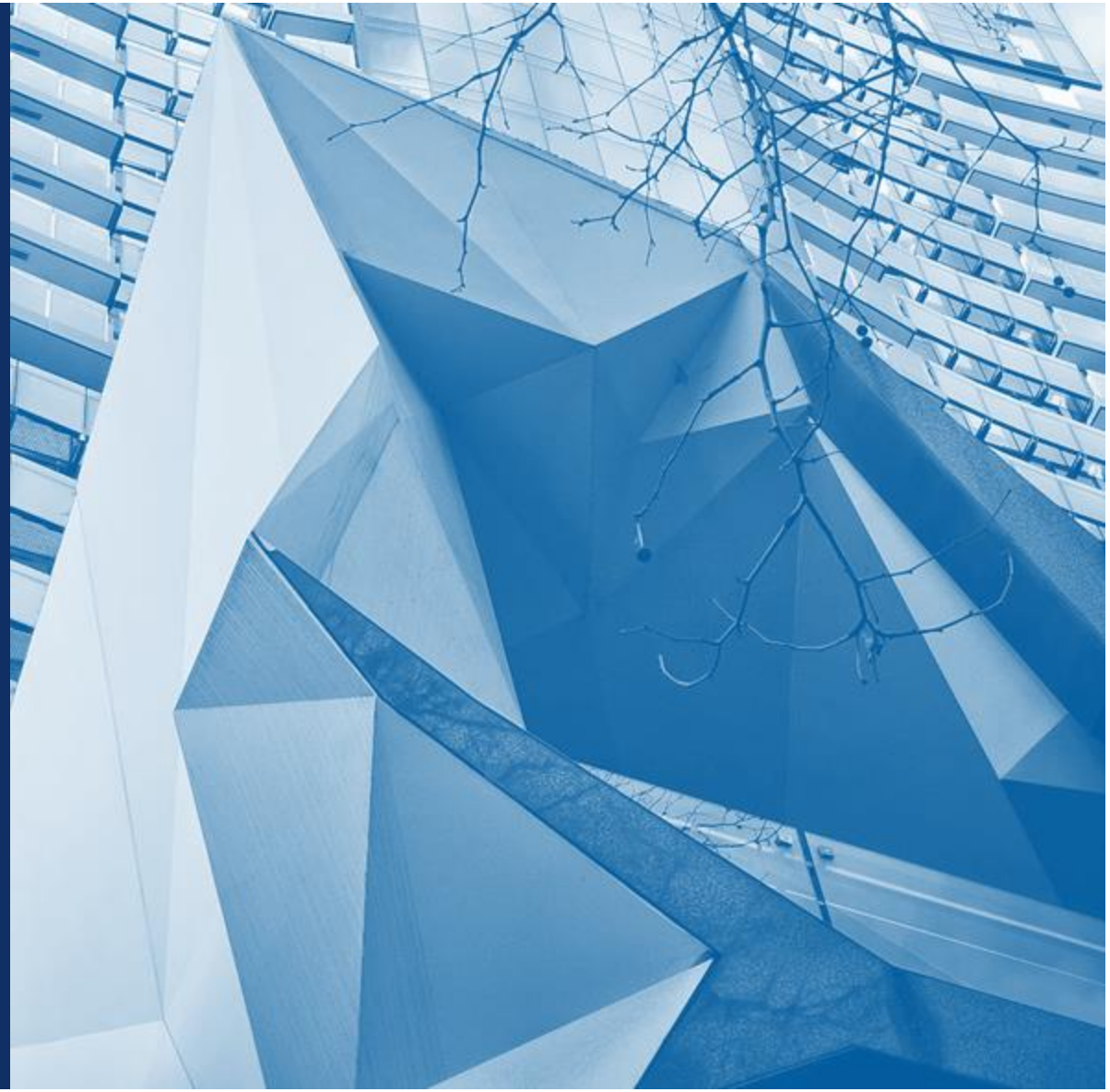
Respondent feedback:

Design & DfMA

"Oftentimes, the design does not match the chosen typology (of OSM product) - DfMA is key"

DIGITAL THINKING

Rationale: Seeking evidence of digital thinking, awareness and incorporation of digital tools in processes, operations and strategic thinking including future plans.



BACKGROUND: INTEROPERABILITY

DIGITAL THINKING

Digitization in the construction industry is multi-faceted: involving digital tools, process automation and digital project communication.

Digitization enables efficient, simpler processes in construction, improves environmental performance of buildings and enables faster workflows through automated processes.

DIGITAL COLLABORATION

Interoperability is the ability of different systems or components to communicate, exchange data, and work together seamlessly.

The process of interoperability reduces time, improves accuracy and reduces errors typically caused by changes during the design phase.

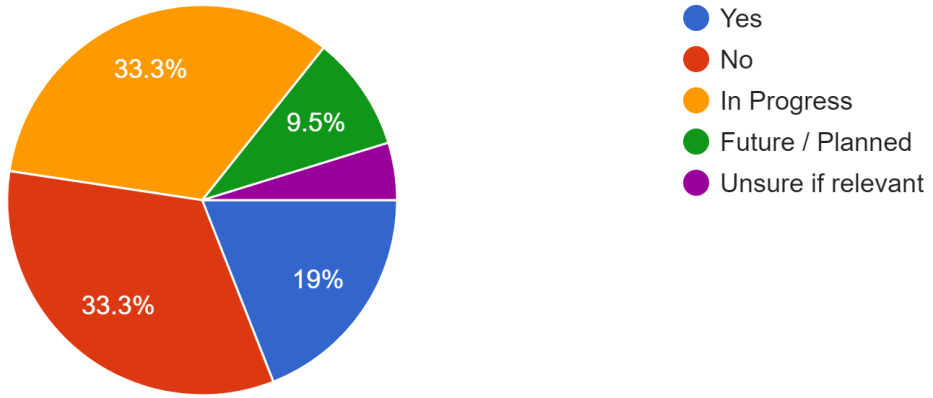
What we learned: Digital Strategy

The rise of digital tools methods and processes goes beyond design information. We wanted to know how deeply thinking participants were about the potential of digital impacts upon business.

We see opportunities for further integration of digital tools into business development, simulation, planning and marketing.

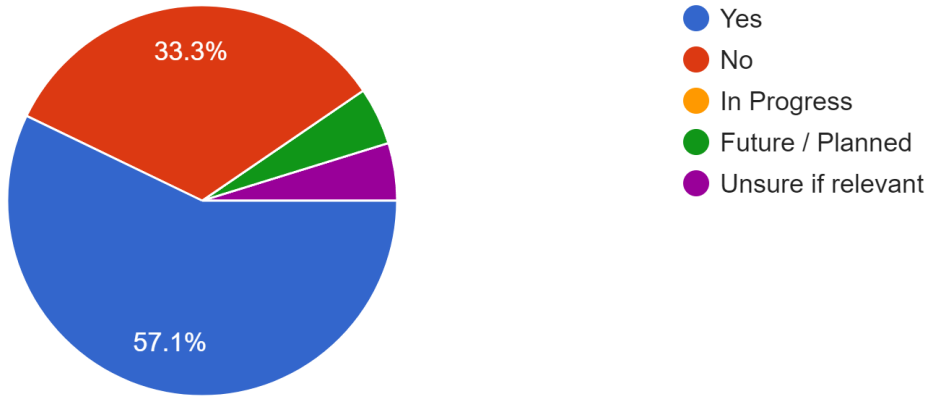
Do you have a Digital Strategy? (a strategy or plan addressing digital impact and opportunities for your business)

21 responses



Do you make your product or service offer available as digital files to clients or other stakeholders?

21 responses

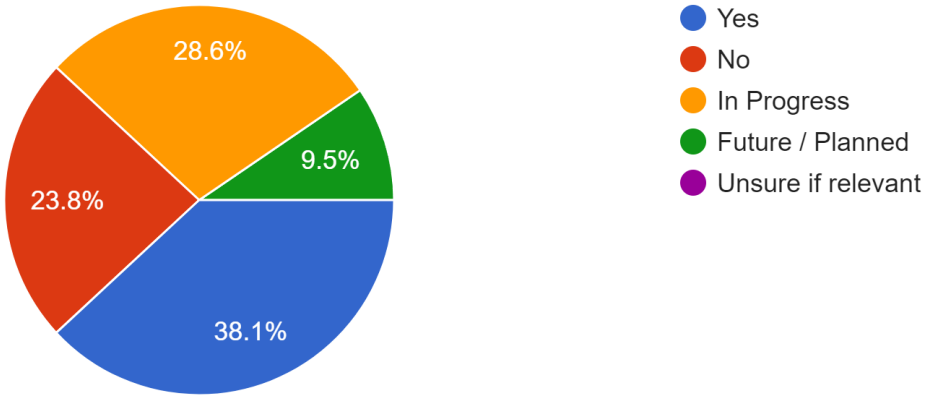


What we learned: Planning for Impact

Participants demonstrate an interest in planning for the impact of automation on labour, production, design and process. Almost 2/3 of

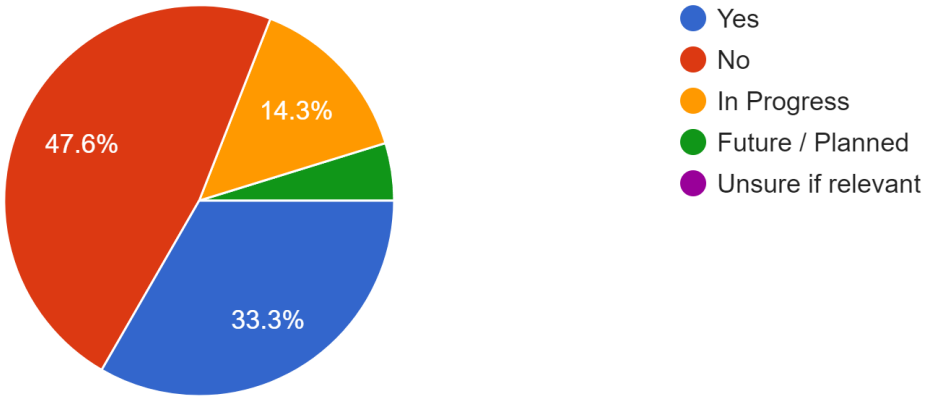
Do you have a future labour and automation strategy in place?

21 responses



Are any of your design, production, installation, or other services simulated or automated?

21 responses



Respondent feedback:

Digital Thinking

"Our system is exportable technology. We are already in talks with overseas parties."

PRODUCT DEVELOPMENT & INTELLECTUAL PROPERTY

Rationale: Seeking evidence of product development thinking, strategy and processes. Also, capability and evidence of the development and protection of intellectual property (designs, trademarks etc.).

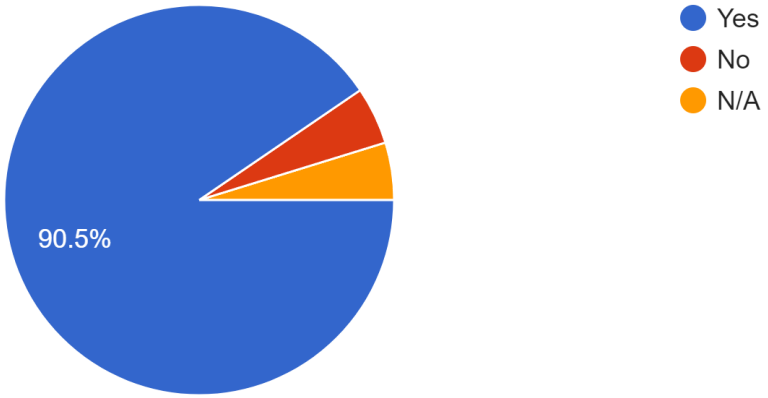
What we learned: Flexible & Compatible

Participants show very strong interest and capability in adapting to different project requirements.

Interestingly – and borne out through further engagement – participants show strong interest in fostering compatibility with other products & services.

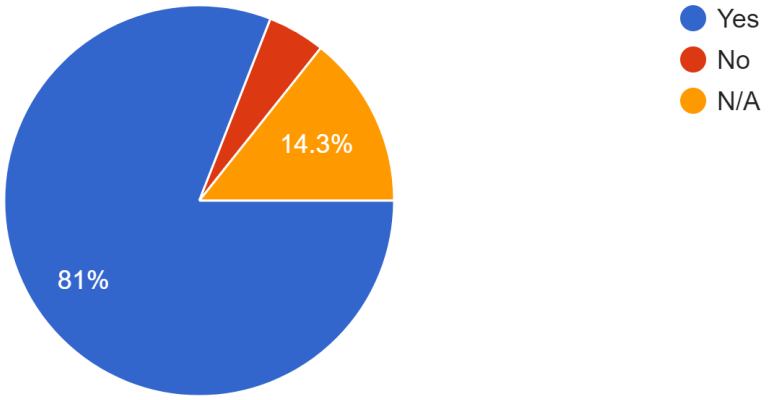
Are your products readily adaptable or configurable to different project requirements?

21 responses



Is your product easily compatible with other manufacturer's products or services?

21 responses



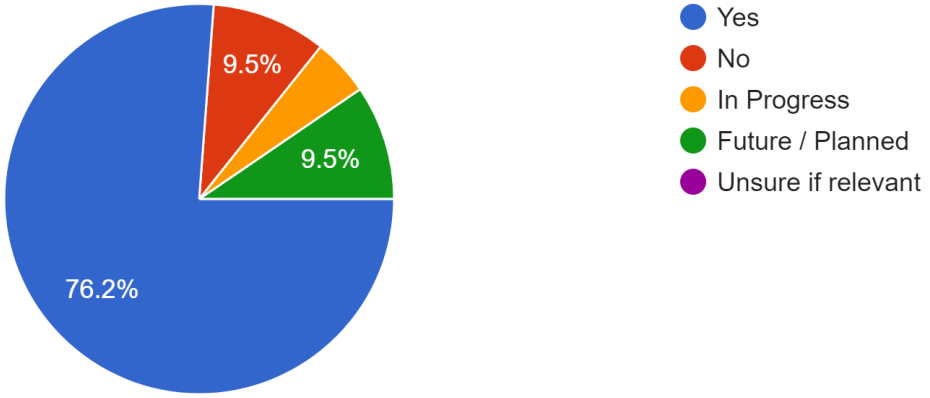
What we learned: Waste

Waste is a big topic in OSM, with most companies focused on identifying, minimising or removing sources of waste.

This reinforces the claims of OSM businesses that they are well placed to design out waste in product development, fabrication and assembly. Responders noted there is not a current incentive for industry that supports waste reduction.

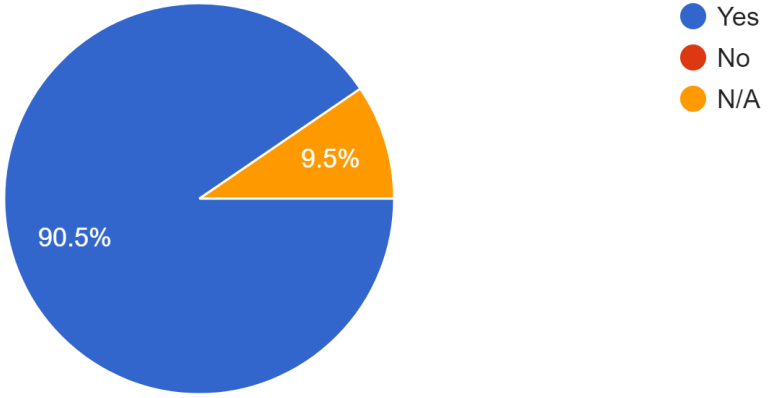
Do you monitor and track waste and account for the additional cost in your product or service?

21 responses



Is waste minimisation a critical factor in materials handling, protection, and fabrication?

21 responses



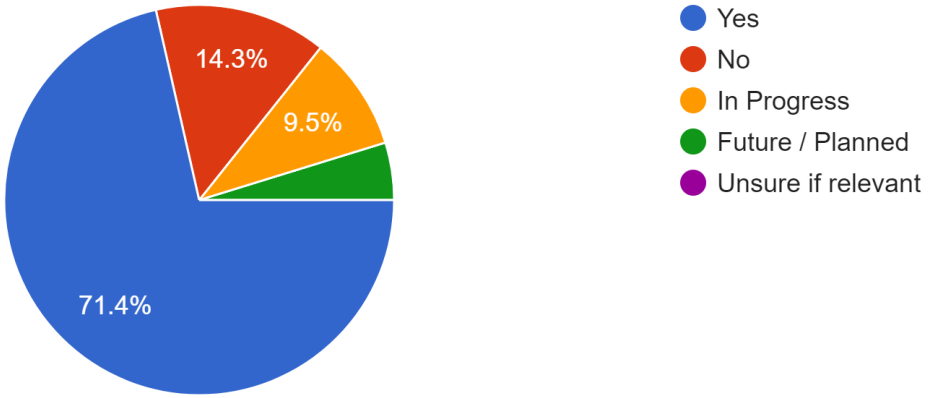
What we learned: R&D

OSM businesses proactively engage in research & development, especially physical prototyping and product development.

Other metrics show that IP is rarely patented or protected – a potential revenue stream that is untapped. More support and expertise could be offered here.

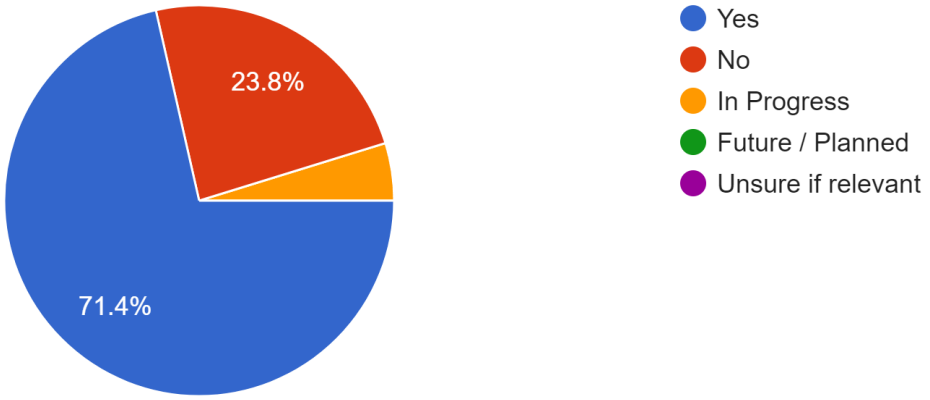
Do you have an R&D / product development strategy?

21 responses



Do you have in-house prototyping facilities or product testing?

21 responses



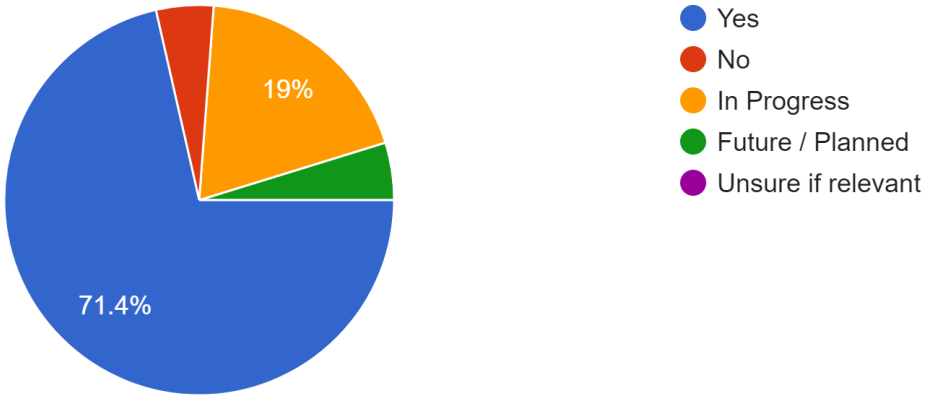
What we learned: Active Improvement

Participants showed that MMC is fertile ground for IP capture and development. Typical LEAN approaches such as capturing improvement ideas through feedback is strong and can be applied in a controlled environment.

Half of participants have developed IP that could be valuable to others.

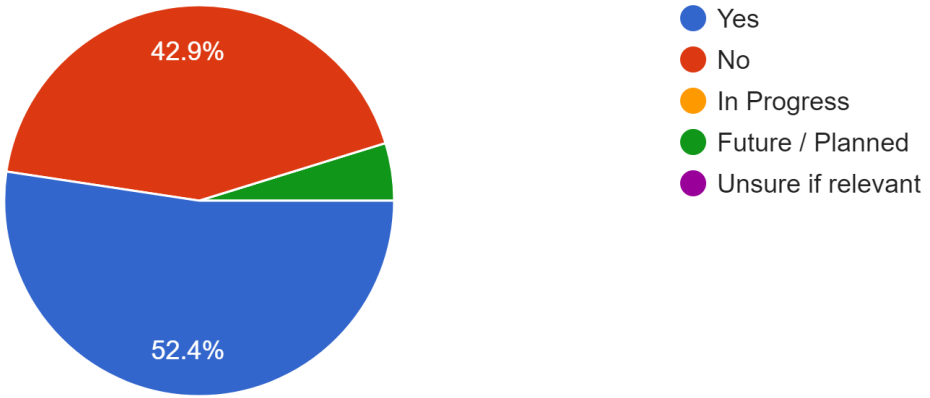
Do you have a process for capturing improvement ideas from the workforce and converting them into results?

21 responses



Have you filed or do you hold any Intellectual Property in product, process, or engineering?

21 responses



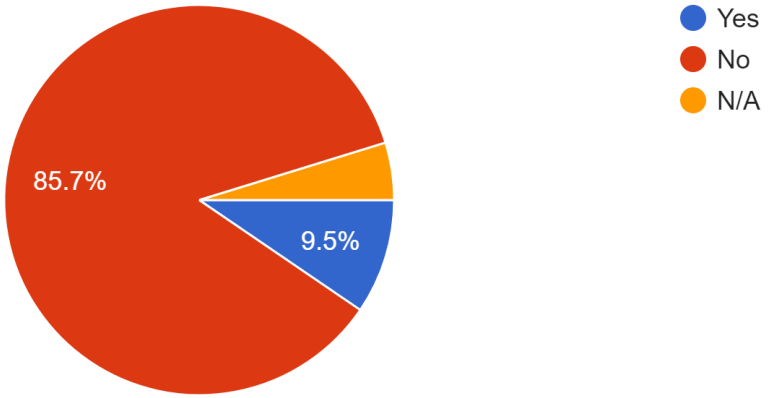
What we learned: Support

Participants showed they engage in developing business cases to support their product development efforts.

Only around 10% of them had engaged with a 3rd party incubator which indicates additional access to this kinds of support could increase productivity.

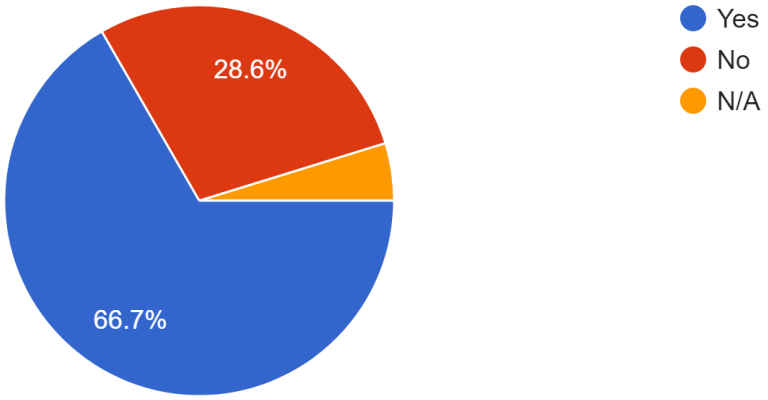
Have you taken part in a business or innovation incubator program?

21 responses



Are Product Development activities and investment supported by a business case?

21 responses



Respondent feedback:

Innovation

"We're an R&D business so have a very defined break stuff/figure out why & fix it process - we have wrecking yards of prototypes both hardware & software – that was the only way we got to our current technology."

SUPPLY & PARTNER ENGAGEMENT

Rationale: Seeking evidence of strength of supply chain partnerships, contracts and other matters relating to the delivery of products. Looking for evidence of key suppliers essential to product/service offer.

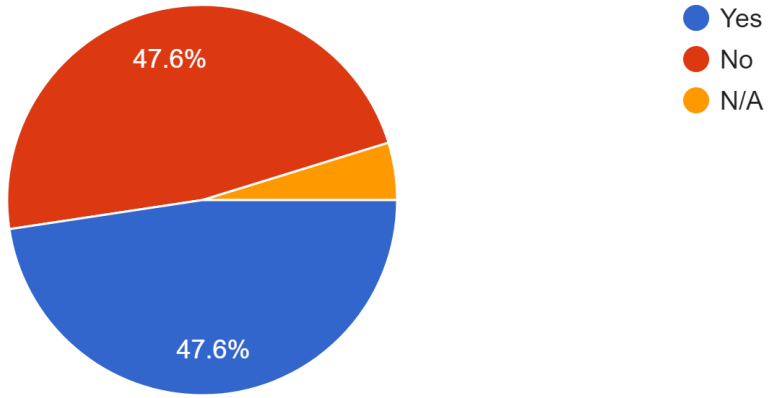
What we learned: Supply Chain & Process

We found an equal split in responses when it came to the opportunities around their own supply chain assessment and evaluation.

This might suggest that there are multiple key suppliers that are relied upon to deliver products & services rather than more of an alliance-type arrangement.

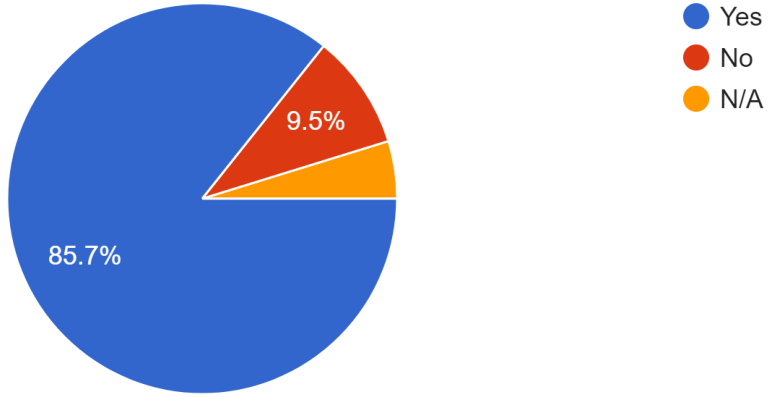
Do you have a systemitzed supplier evaluation and selection process?

21 responses



Are opportunities to drive value improvement with supply partners routinely reviewed?

21 responses



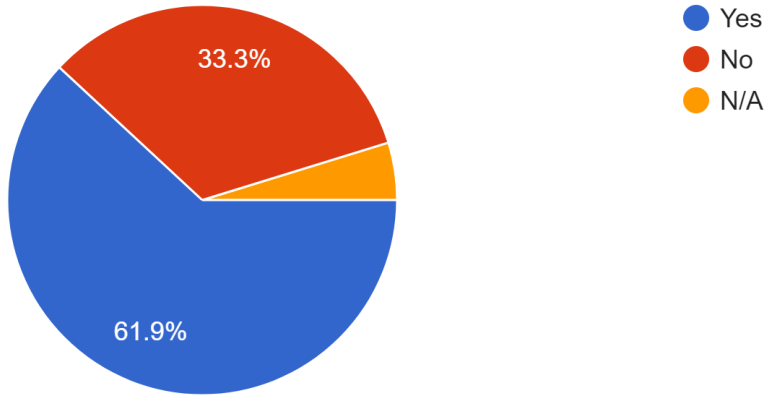
What we learned: Supplier Assessment

We see that critical suppliers are secured through agreement – this is essential for manufacturing throughput.

However, the need for demonstration of environmental credentials was seen as a nice to have. With coming Carbon 2030 requirements, this will become far more important.

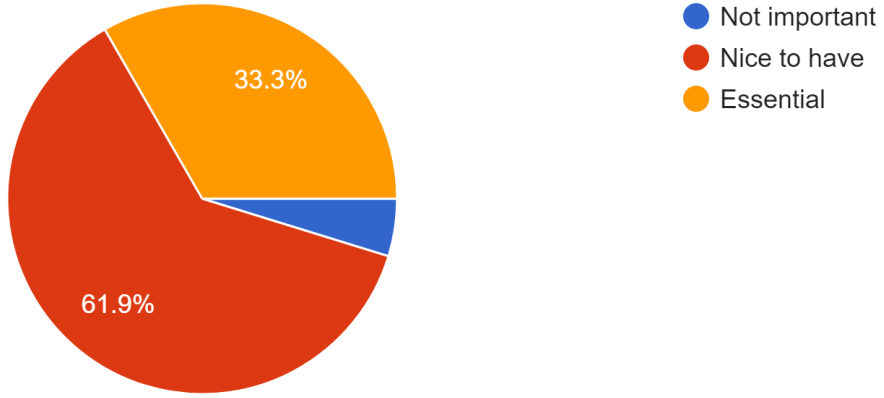
Are your critical suppliers secured through a partnership or other documented agreement?

21 responses



In your supplier assessment, how significant are environmental ethos to selection?

21 responses



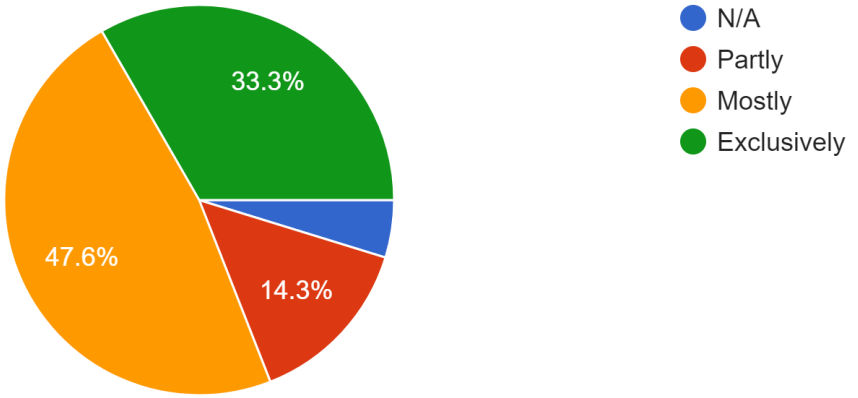
What we learned: Local vs. Global

One third of participants have exclusive sourcing of materials in NZ. But close to 2/3's have some portion of offshore supply.

This is a feature of the wider construction industry.

Are your critical suppliers New Zealand based?

21 responses



PRODUCTION & MANUFACTURING

Rationale: Seeking evidence of manufacturing-thinking, capability and future planning. Includes awareness of production planning, LEAN, physical and digital prototyping and communication.

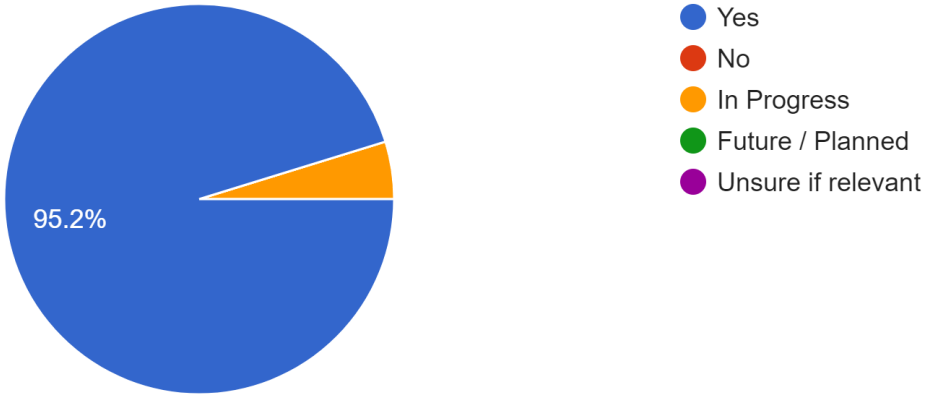
What we learned: Quality Control

One of the key benefits of a controlled environment is echoed here – a vast majority of physical products produced are subject to quality control measures and are carried out by the company themselves.

This is a foundation for increased quality & responsibility.

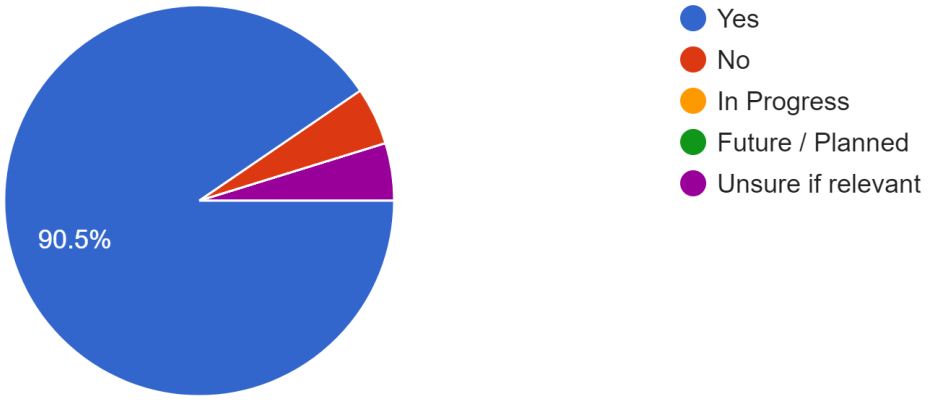
Do you have a systematic/compliance quality control process for the products or services you offer?

21 responses



Is fabrication and assembly of your products carried out in-house?

21 responses

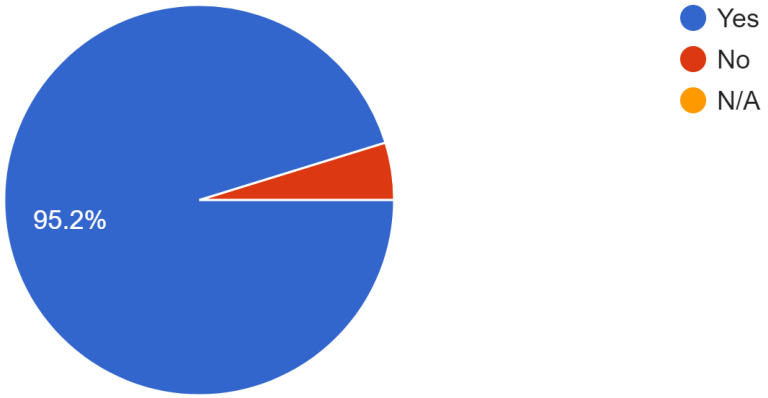


What we learned: Process & Automation

Participants showed a high degree of planning prior to production, and just under half had some level of automation for physical production.

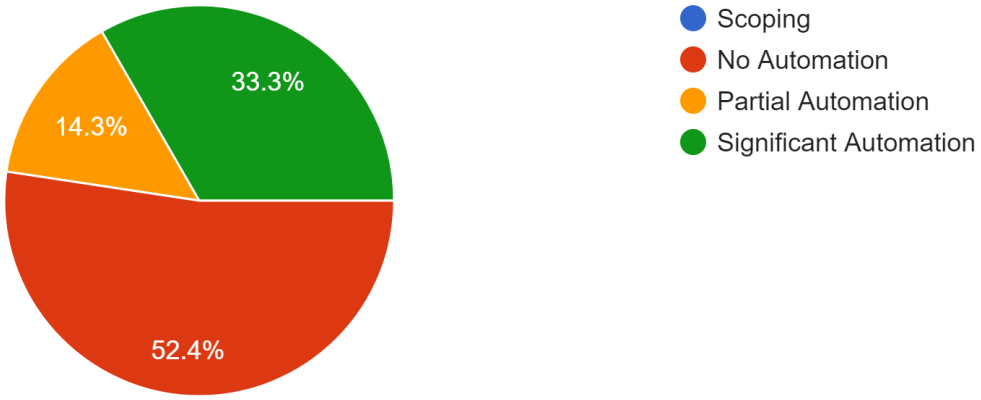
Is your pre-production planning process standardized?

21 responses



What level of automation is in place for production?

21 responses



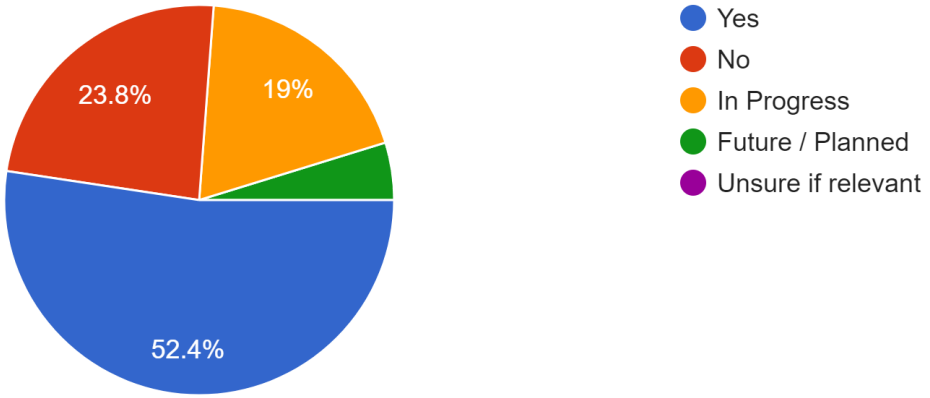
What we learned: Managed Production

Production management systems are widely used by participants, and sloe to 1/4 are implementing or planning to implement these systems.

Again, most participants engage in some kind of product development and design evolution.

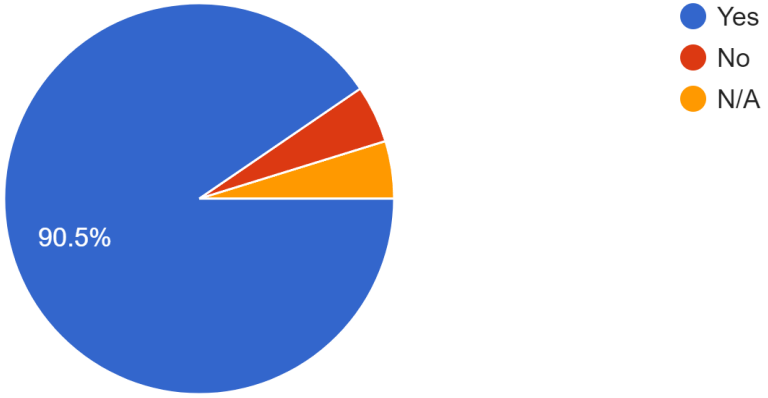
Do you have a digital production management system?

21 responses



Do you engage in ongoing design evolution and product development?

21 responses



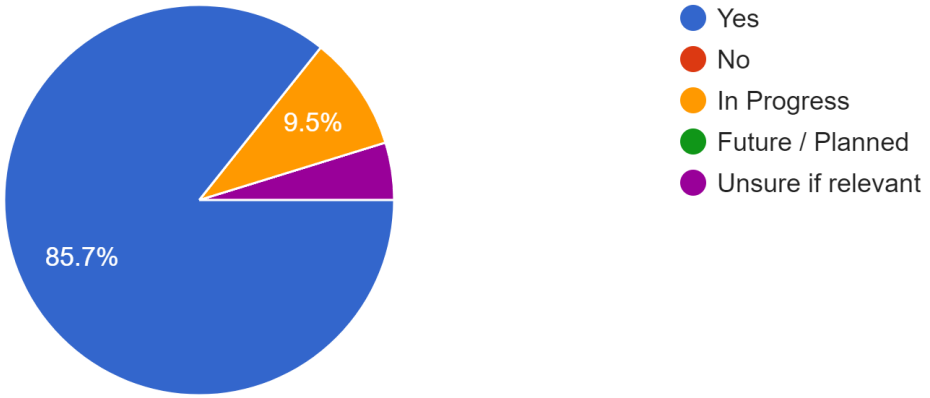
What we learned: Forward Planning

Participants engage in the sustainable management and forecasting of key materials & resources.

This is key to business sustainability and why clients with assured pipeline are so valuable.

Is there robust forecasting in place to ensure successful procurement and storage of materials?

21 responses



FACILITIES & INVESTMENT

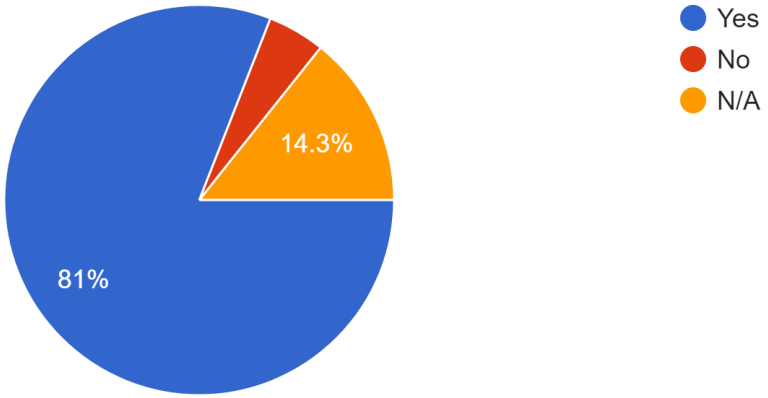
Rationale: seeking evidence that the product/service offer can be delivered with the stated quality, completion of the product/service offer in a controlled environment.

What we learned: Continuity & Maintenance

Participants understand the importance of planned maintenance, storage and other operational activities to ensure efficient manufacturing.

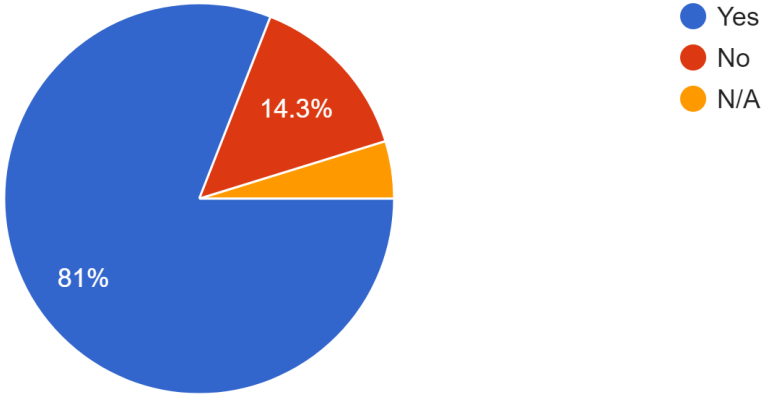
Is there a preventative maintenance regime/system in place for critical equipment?

21 responses



Is there adequate storage for stock and completed products, i.e., buffer storage?

21 responses

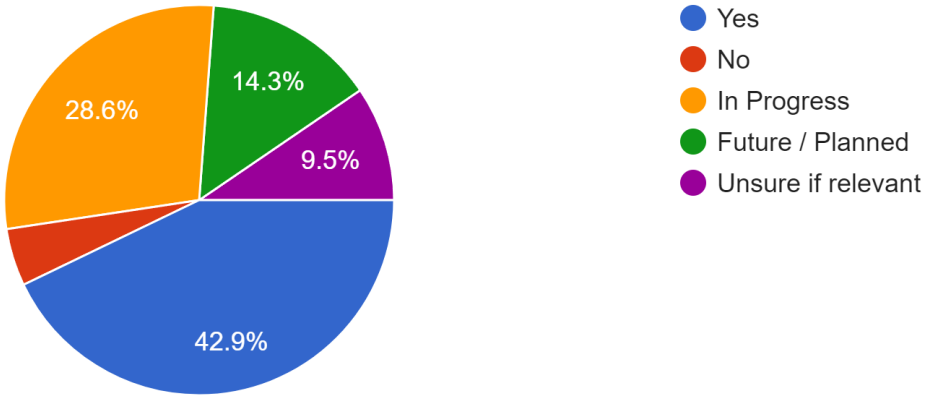


What we learned: Operational Planning

Participants are planning strategically for capital investment into automation, machinery etc. They also engage in creating business cases to support these decisions.

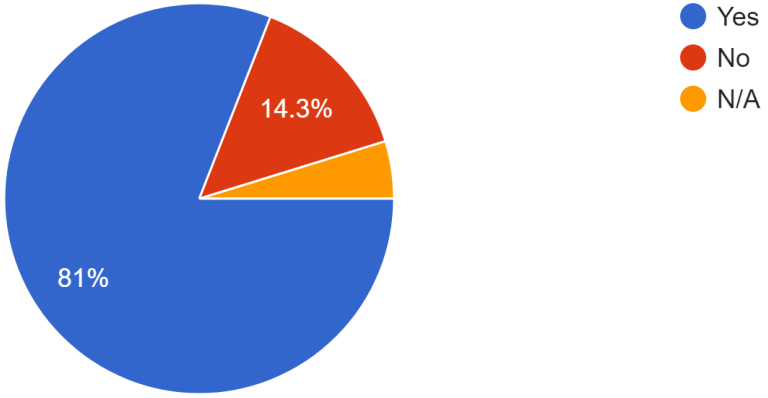
Do you have an investment strategy in place that addresses future significant automation, machinery, or other purchases?

21 responses



Are strategic purchases, capital investments, or other activities supported by business case?

21 responses

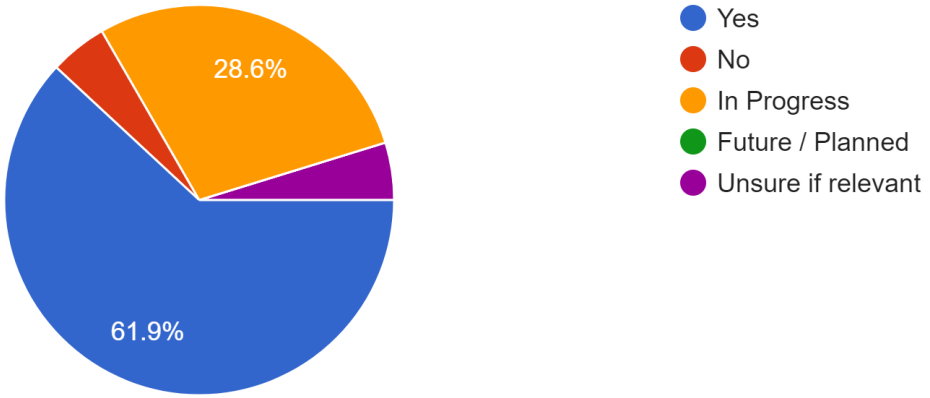


What we learned: Learning & Training

Participants foster training to increase productivity as a regular activity. This might include the provision of manuals for standard activities, and 3rd party training and CPD activities.

Is there a training regime in place for your staff to increase skills and productivity?

21 responses



Respondent feedback:

Business Model

"...(companies die from) gridlocked or frozen money issues & the realities of procurement (caused by non-OSM tailored procurement & contracts)"

LOGISTICS

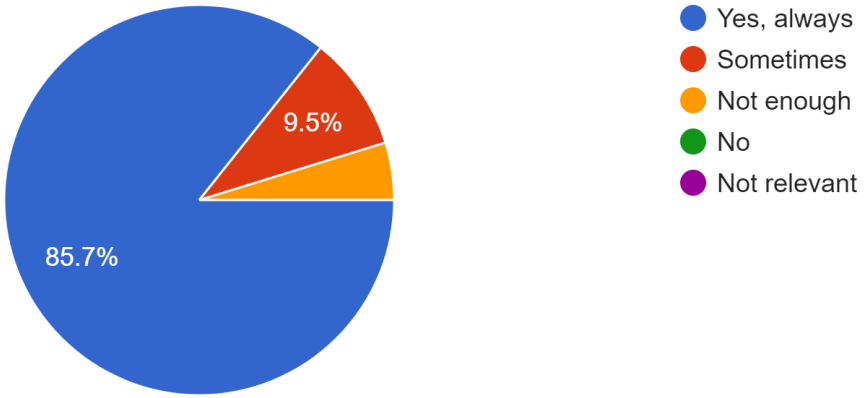
Rationale: seeking evidence of quality management of materials, completed products, and that constraints are known and factored into design, transportation and onsite requirements.

What we learned: Logistics & Constraints

A main constraint of OSM is transportation. As is evident, participants intimately know of these constraints and communicate these as design & installation requirements early on.

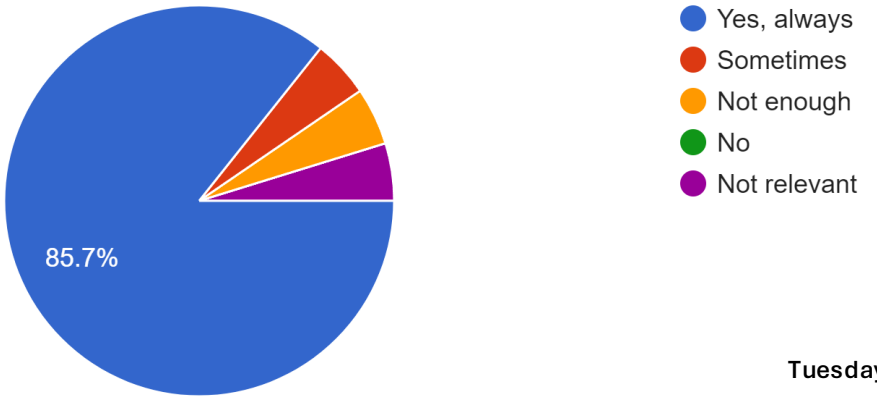
Are your logistics constraints understood and responded to across all processes?

21 responses



Are these constraints communicated to clients and third parties so that they are considered early in design?

21 responses



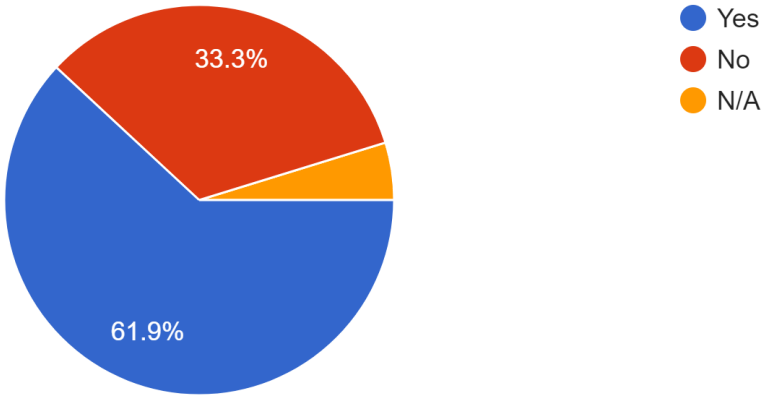
What we learned: Inventory & Handling

An indicator of participant maturity is the level of inventory management. This data point shows opportunity for further integration of management systems to ensure it is grounded within the business.

Basic activities around handling – packaging, securing and labelling - are well understood.

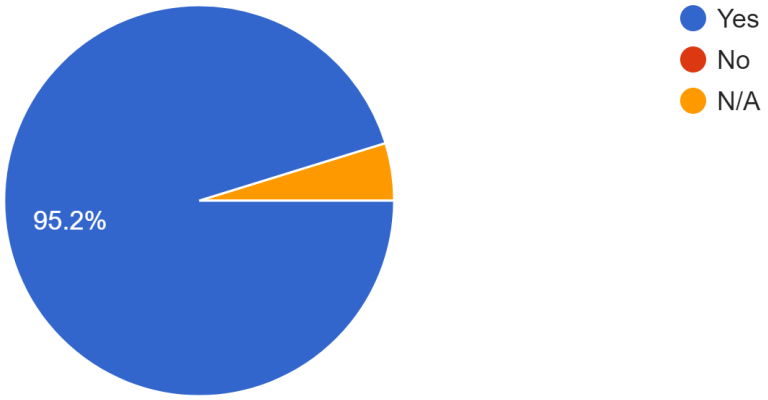
Is the inventory management system mature?

21 responses



Are your goods suitably protected during manufacture and for dispatch?

21 responses

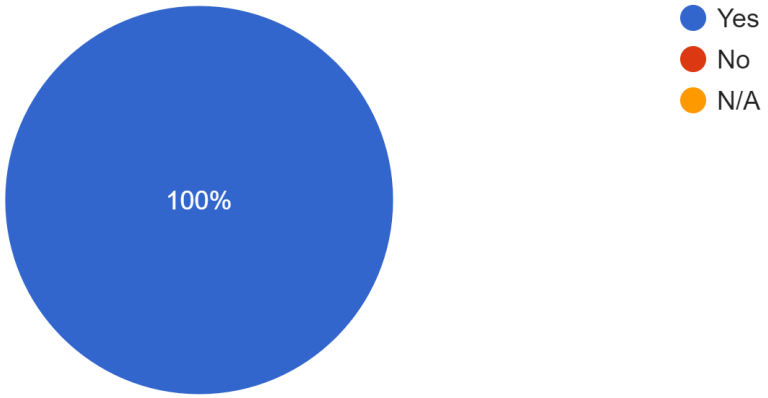


What we learned: Transport Risk

Participants know risk around transportation, scheduling and chain of custody requirements very well.

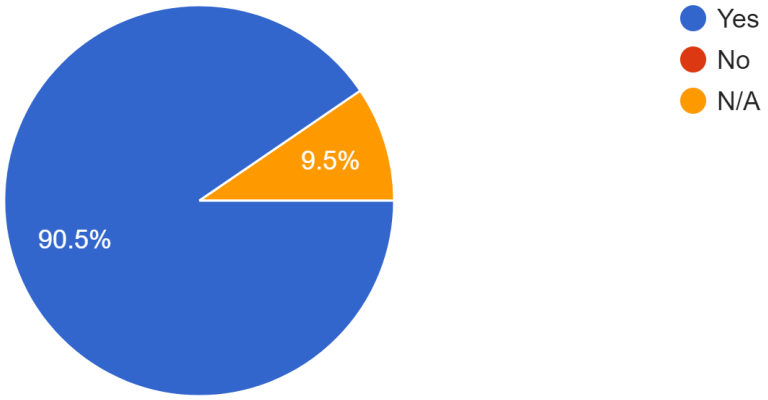
Are your transport risks understood and mitigated?

21 responses



Are your parts/products clearly identified upon dispatch?

21 responses



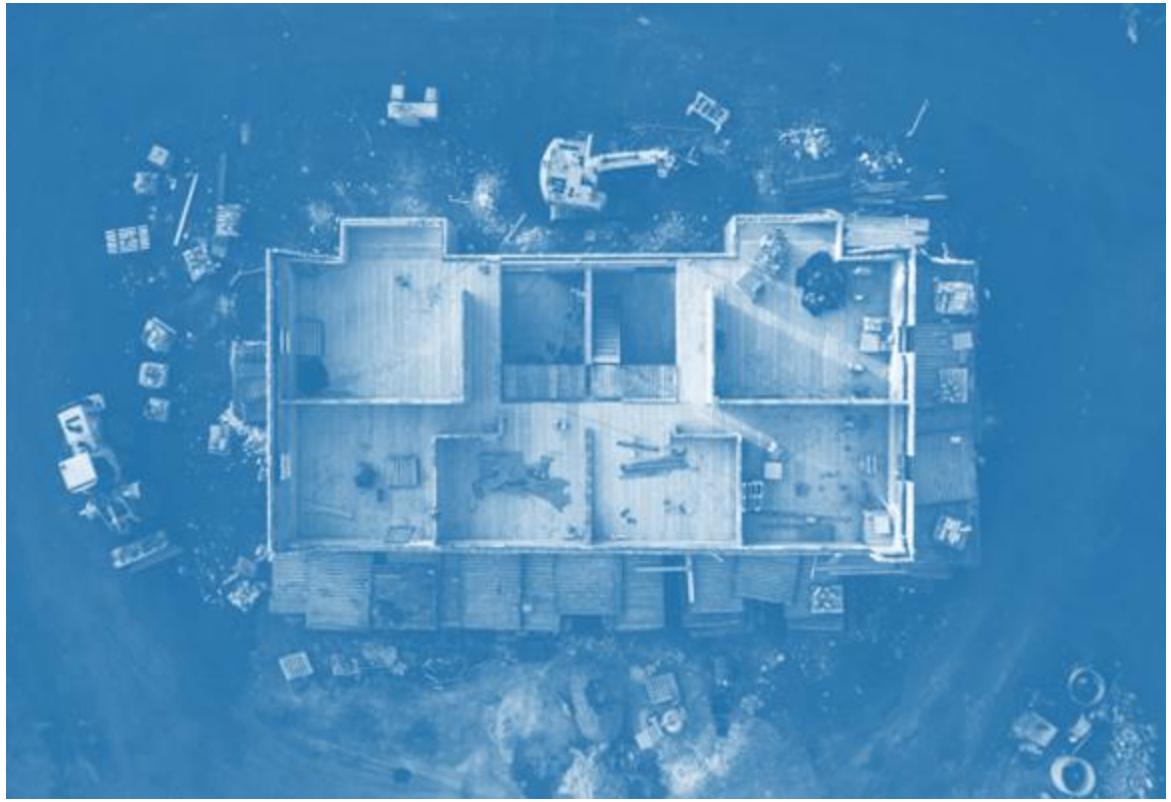
BACKGROUND: WASTE IN MANUFACTURING

OPPORTUNITY TO LEAD

Construction waste is a growing environmental problem in New Zealand - it's estimated that construction & demolition waste makes up to 50% of NZ's total waste going to landfill.

Waste is inextricably linked to resource loss, environmental pollution & carbon emissions. It also imposes an economic burden on both construction businesses & consumers, as building products & materials are often bought & discarded.

We tested the approaches & systems to waste in the OSM sector.



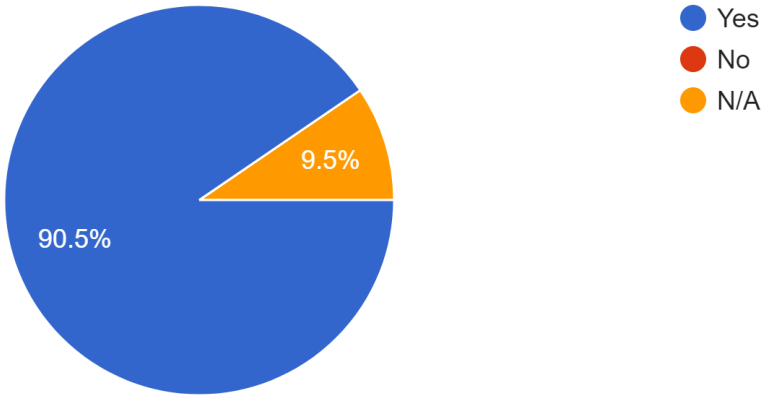
What we learned: Sequencing & Waste

As might be expected, participants pack & provide their products in response to a published construction program.

In addition, waste is minimised in packaging materials where possible to limit onsite waste management requirements.

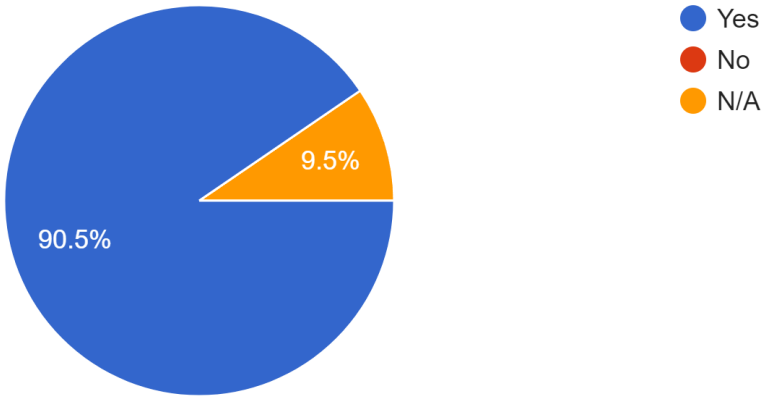
Are your parts/products able to be packed in sequence to suit onsite assembly?

21 responses



Is waste minimisation a critical factor in materials handling, protection, and fabrication?

21 responses



ONSITE ASSEMBLY

Rationale: seeking evidence for forward planning, an understanding of site, and program constraints are factored into an assembly response.

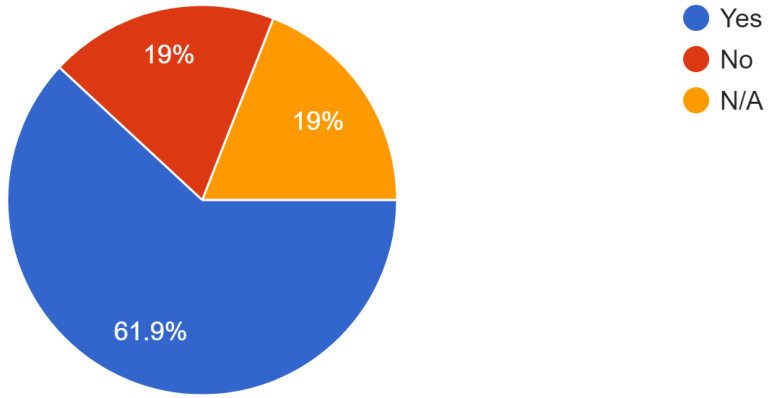
What we learned: Installation Planning

Site management planning will be split between on-site contractors and off-site providers, but participants have management plans developed to account for site engagement.

Participants actively plan for site installation where they have a role.

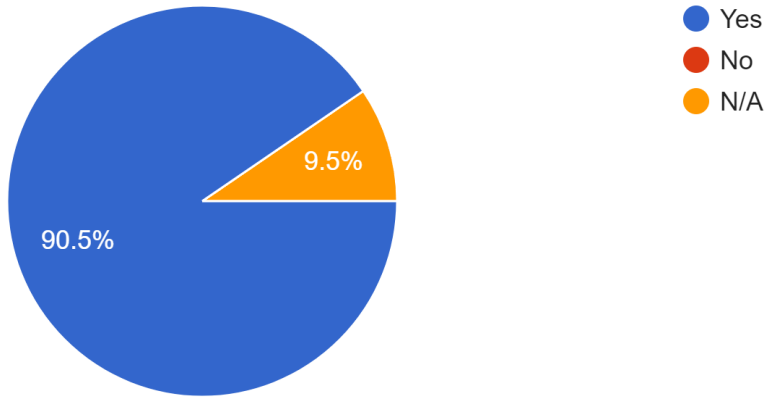
Do you have standard site/traffic management plan templates?

21 responses



Do you create an installation plan that takes into account project, site, environment, and quality factors?

21 responses



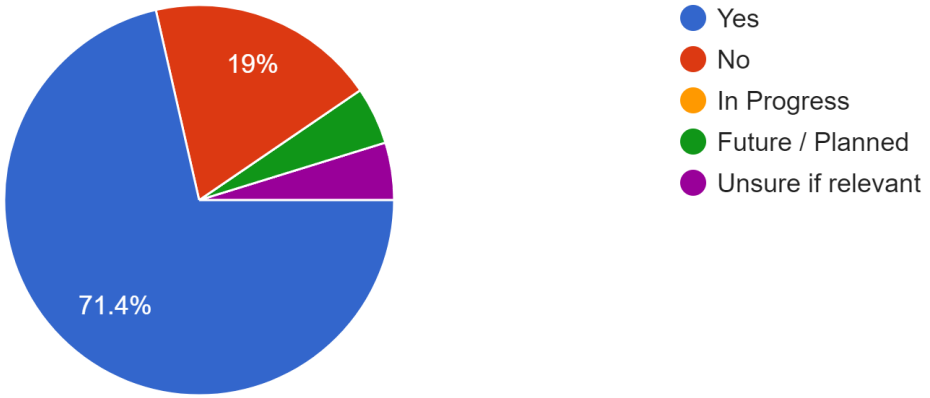
What we learned: Planning & Scope

We asked about Kitting – the activity of organising & supplying the required tools, fittings and fixtures in a package – because we wanted to understand the depth of knowledge around efficient materials & labour. This showed active engagement in this approach.

Similarly, the demarcation of labour activates was well understood, with further improvement possible.

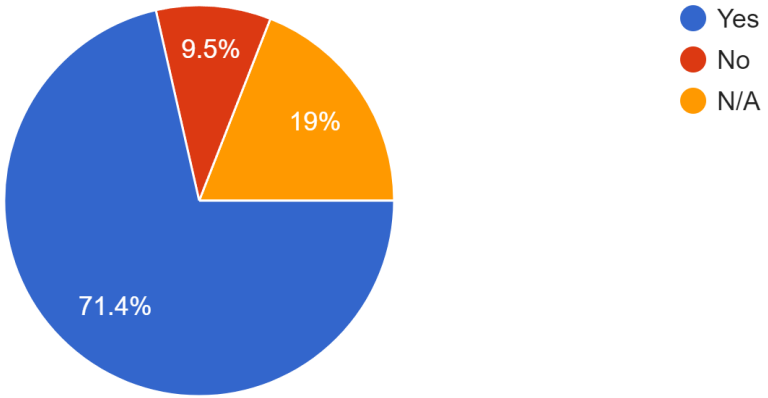
Is there a kitting approach for tools, fixings, and other consumables? E.g., pre-packed fixings, quantity specifically for project install etcetera

21 responses



Do you have a standard and defined scope of services and warranties for installation?

21 responses



What we learned: Compliance & Contracts

Participants understand the building compliance requirements very well and actively manage these.

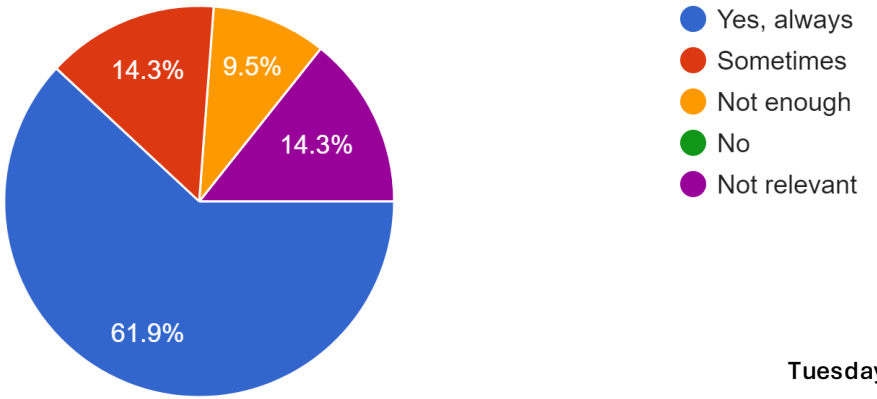
Subcontractor management – related again to scope of work and responsibility – are well understood and managed but show room for better communication and clarity.

Are production compliance requirements and onsite compliance requirements understood and well managed?

21 responses

Are subcontracts between yourself and key suppliers and trades typically well understood by all parties and are executed as planned?

21 responses



Respondent feedback:

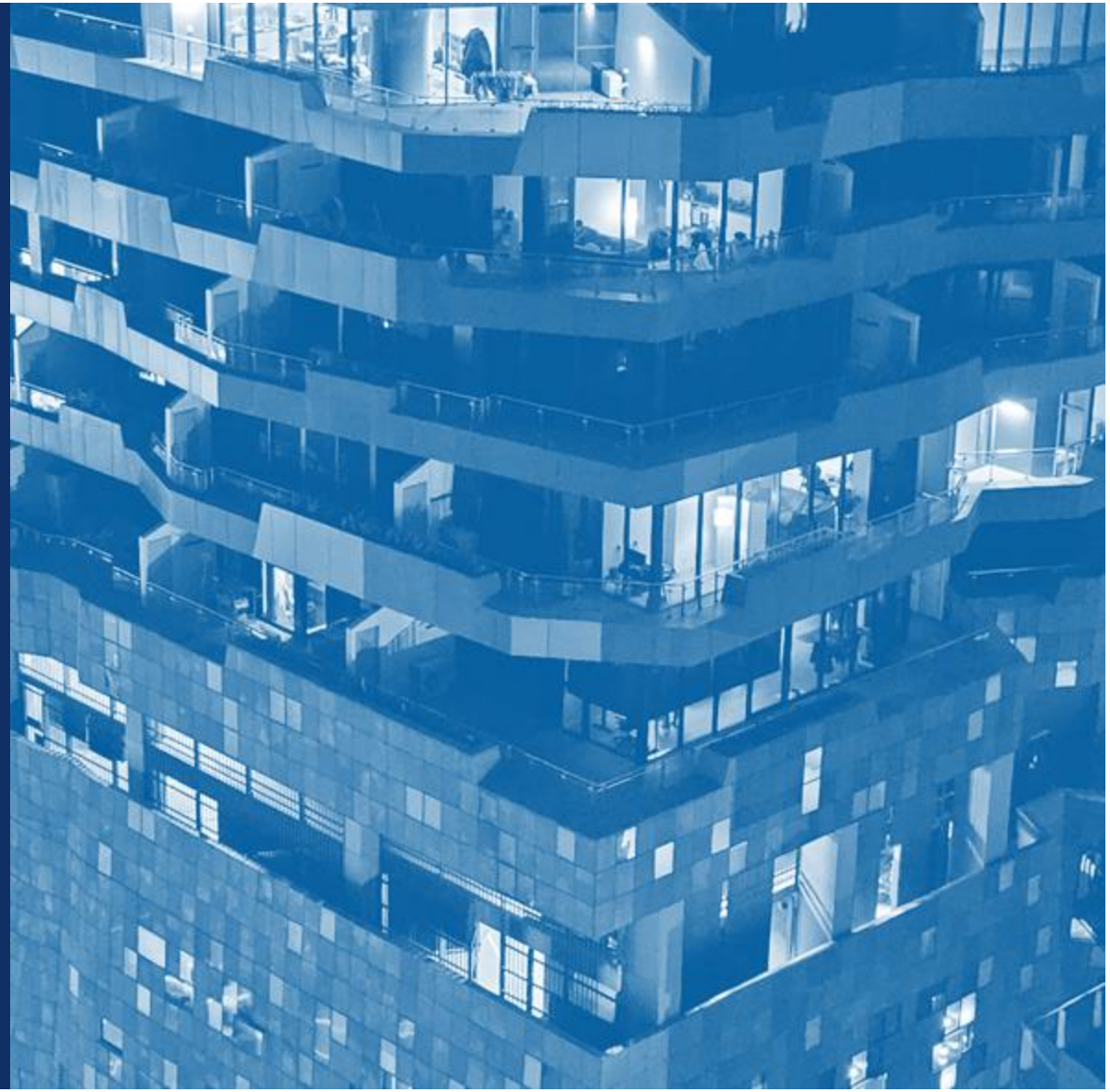
Waste

"A lot of time savings on site are created by having the product sent in perfect order for installation - we estimate 20-30%.

The same with waste saving – just cutting the product from the optimal supply size every time."

PROJECT MANAGEMENT

Rationale: seeking evidence that client requirements are actively and competently managed.



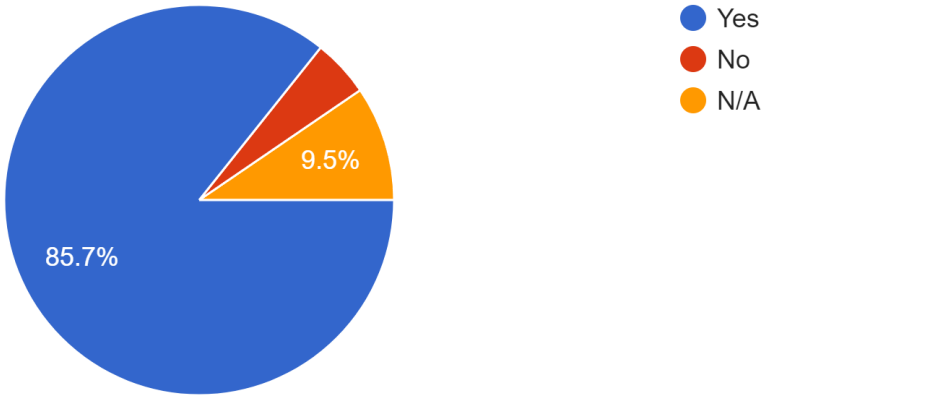
What we learned: Resourcing & Support

Providing the right level of support through proper resourcing and communication and management tools is critical.

This shows that the people & process side is there, but further integration of digital processes might be an opportunity.

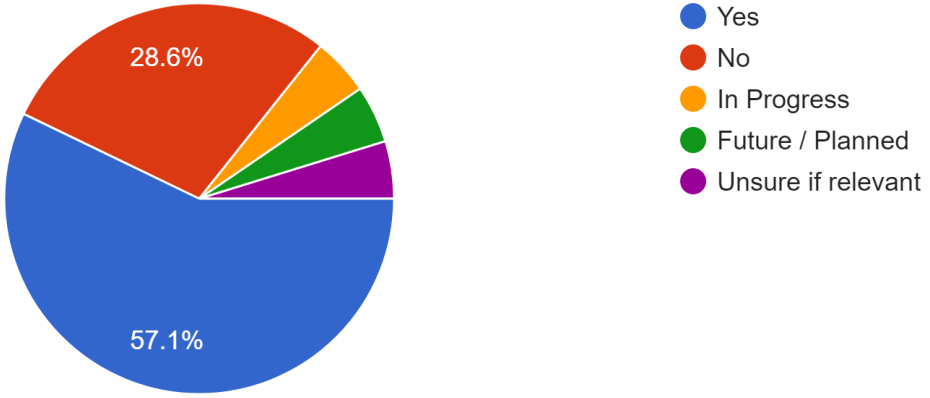
Are your project management resources and processes sufficient to service Client requirements?

21 responses



Do you use an online, 'live' project management platform or software?

21 responses



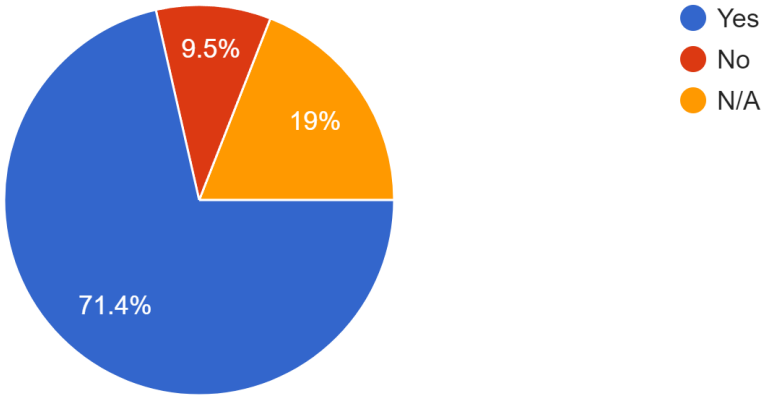
What we learned: Finances & Reviews

Participants actively engage in cost reporting and monitoring to meet client requirements.

This data might point to an emphasis on front-end engagement through tender processes, and lighter checking and verification at later stages.

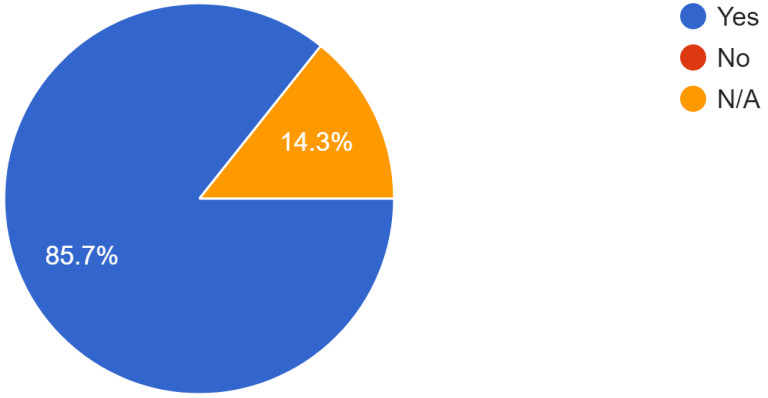
Are Client budgets actively managed through the contracted service?

21 responses



Are project reviews completed at specified and critical milestones?

21 responses



CONTINUOUS IMPROVEMENT

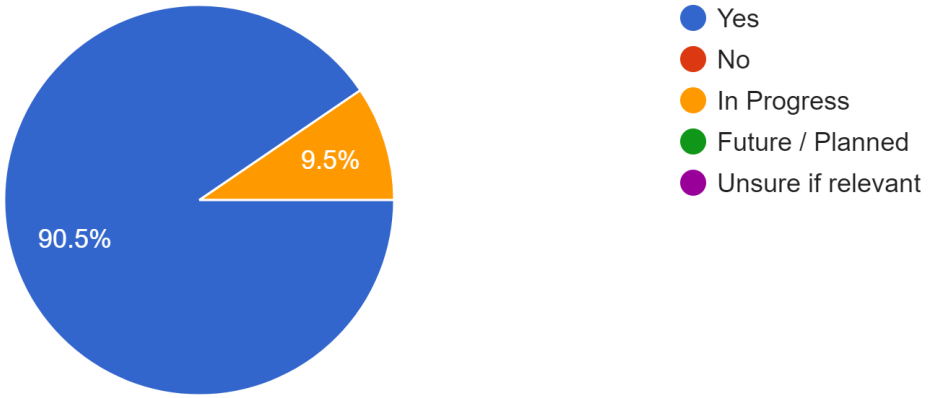
Rationale: seeking evidence of proactive improvement, feedback loops, learning and data gathering with specific focus on LEAN thinking.

What we learned: LEAN & Optimisation

Participants actively pursue improvement opportunities, including the use of LEAN Construction principles. This can be enhanced through operating in a controlled environment where visibility, connection between different trades & testing is more accessible.

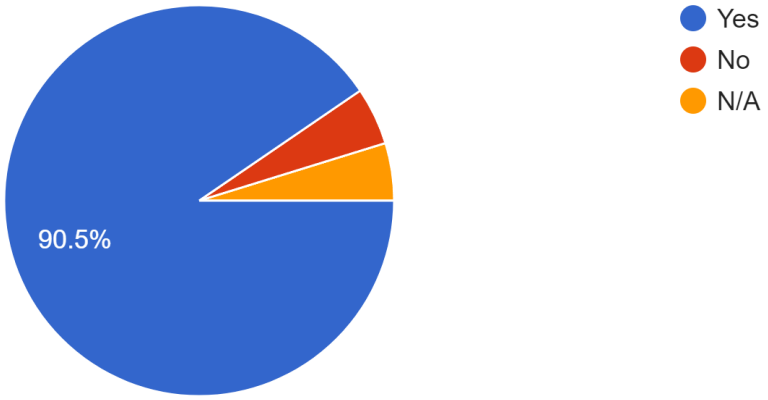
Do you have an active continuous improvement culture?

21 responses



Do you support the use of LEAN Construction including waste identification and management?

21 responses



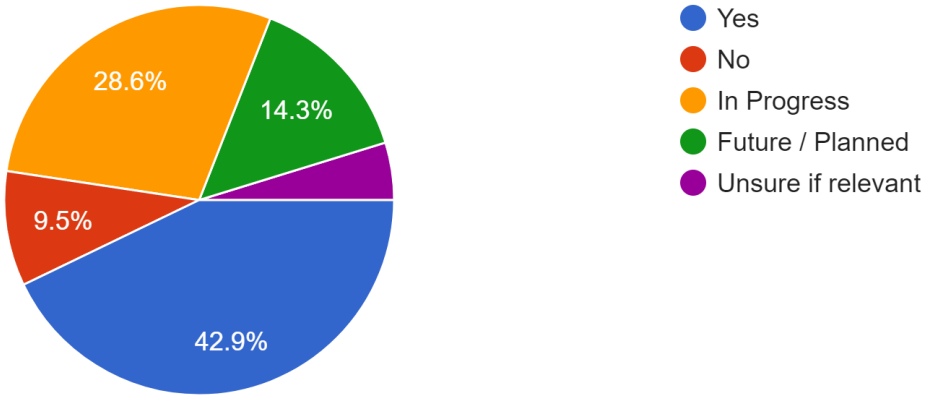
What we learned: Process Improvement

A tenet of process improvement – communicating goals and targets in the workplace – is promoted by some participants, with the same proportion again planning to do this now or in the future.

Similarly, tracking the potential of improvements from a financial perspective is actively pursued.

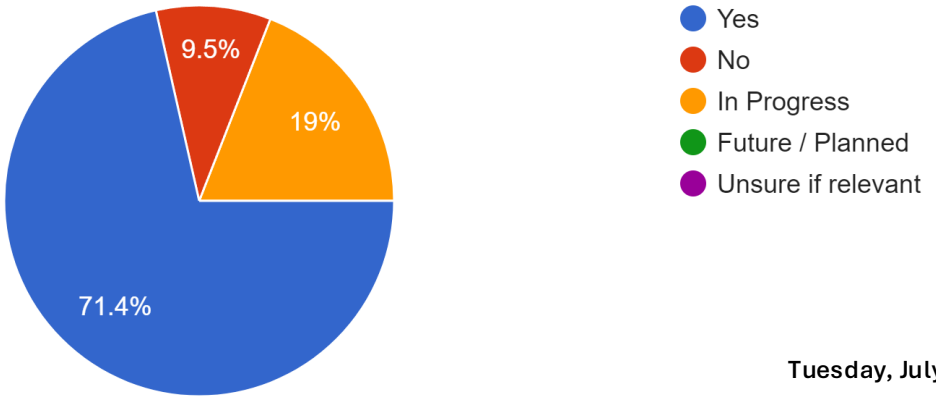
Are KPIs clearly displayed and tracked throughout the workplace?

21 responses



Do you have a process in place to quantify and track the financial aspects linked to process improvements?

21 responses



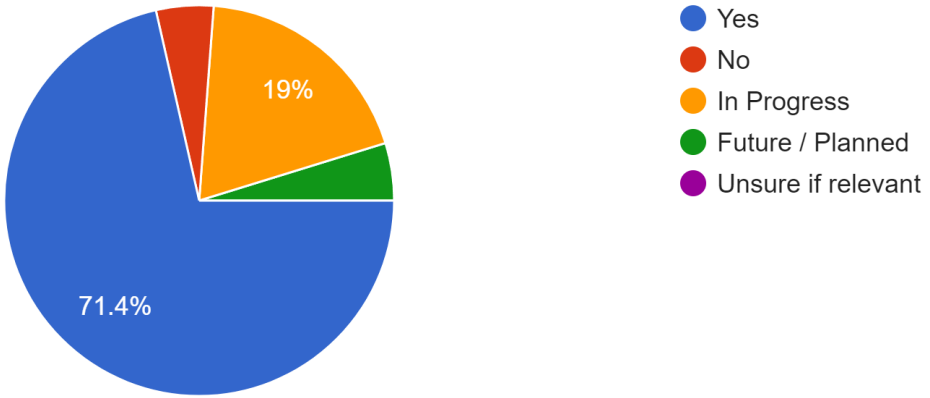
What we learned: Lesson Capturing

Participants showed that feedback from the workforce gets folded into continuous improvement efforts.

Feedback loops from ‘Lessons Learned’ sessions are also commonplace.

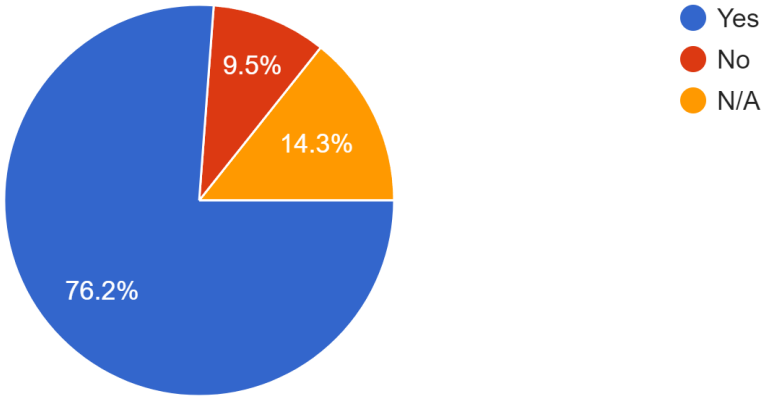
Do you have a process for capturing improvement ideas from the workforce and converting them into results?

21 responses



Is there a 'Lessons Learned' session conducted after each project?

21 responses



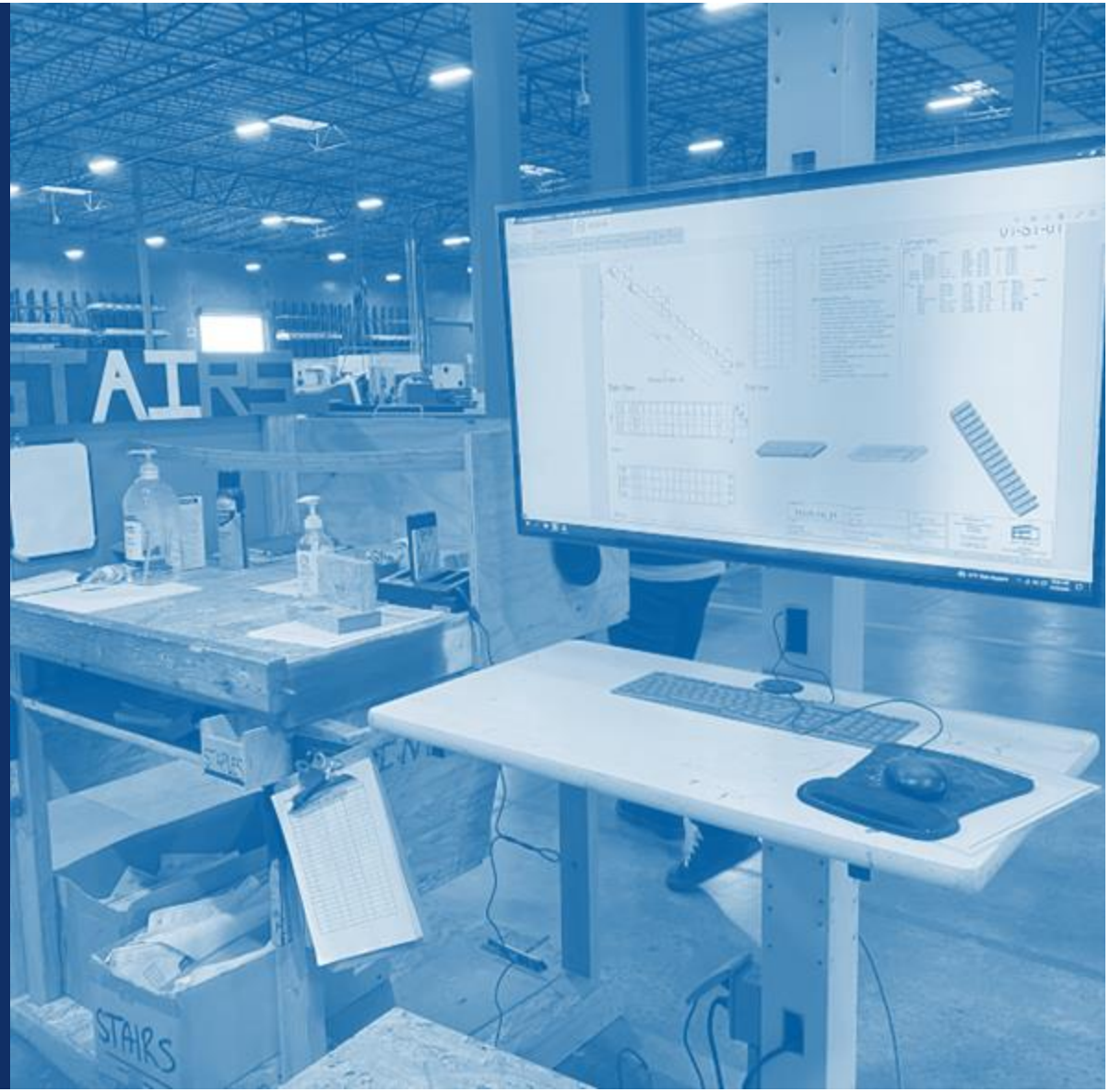
Respondent feedback:

Working together

"A rising tide lifts all boats"

QUALITY & ASSURANCE

Rationale: seeking evidence that claims around product or service offer is backed by internal and external procedures, guidelines and/or accreditations.



CONSENTING & COMPLIANCE

CONTROLLED ENVIRONMENT

A key differentiator of OSM is in companies' ability to internally control what would typically be externalized in conventional construction.

In practice, this often means that **management, designers, builders, transportation and installers are under one contracting entity**. The risk profile is arguably lower than conventional construction due to fewer contracting parties, manufacturing-centric thinking & practice, and internal process & quality assurance.

RESPONSIBILITY TO LEAD

Respondents report the following:

- **94.4% of products are made internally**
- **100% standardised pre-production planning processes**
- **88.9% have a systematic/compliance quality control process for the products or services offered**

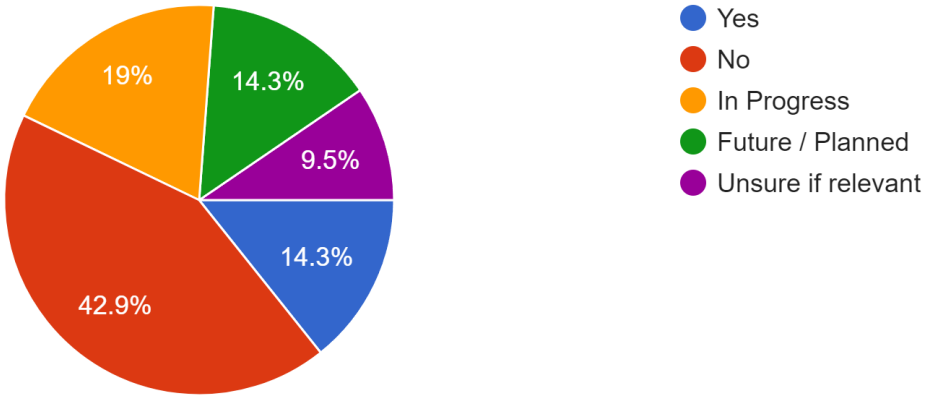
What we learned: 3rd Party Assessment

An important feature of quality assurance is 3rd party accreditation to internationally recognised scheme, .

Whilst a minority has an ISO-certified, management system, more than 30% are working on this. Third party monitoring occurs, but both areas are opportunities for development. There are moves here through MBIE to operate in this space.

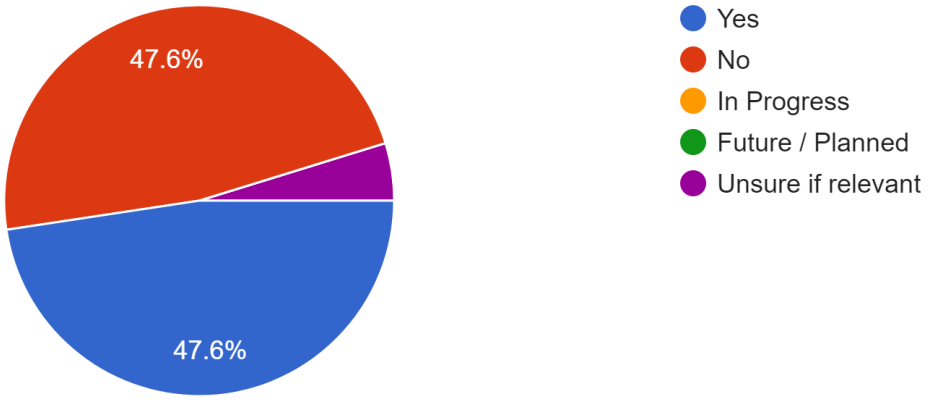
Is there a management system certified under ISO Standards?

21 responses



Is there third-party quality monitoring of your operations?

21 responses



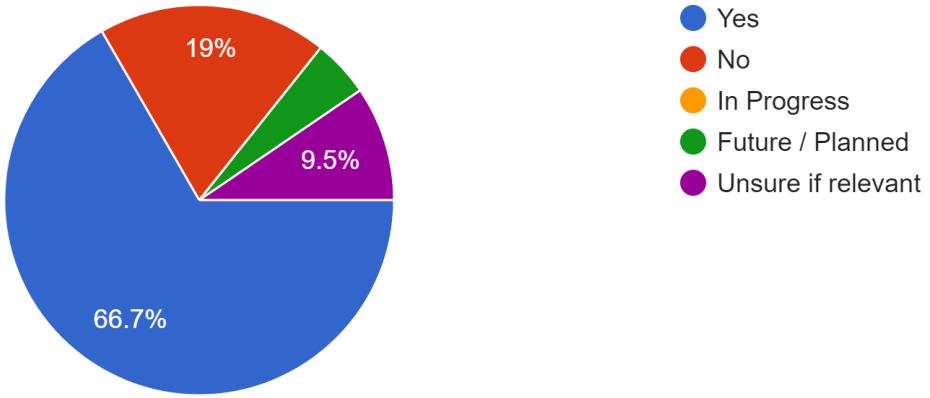
What we learned: Inspection & Panels

From a compliance & integration perspective, there is a huge interest in establishing closer working with local authorities – 2/3 of participants have an agreement in place for council inspections,

But less than a quarter of participants are on a recognized procurement panel.

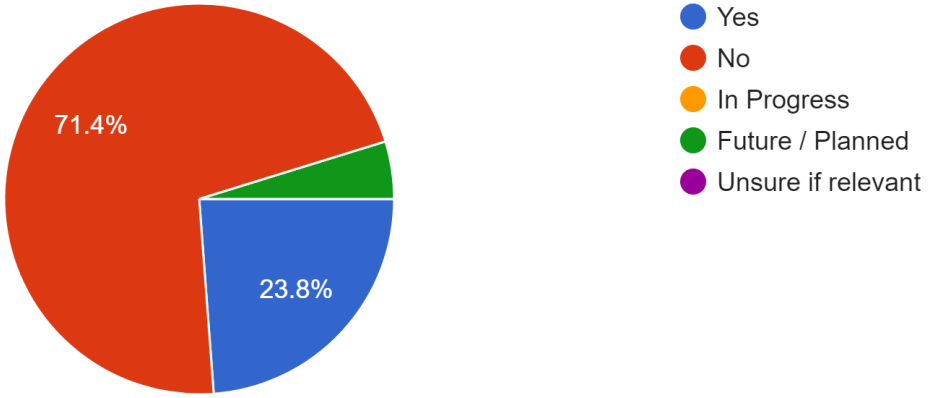
Is there an inspection regime or agreement by a consenting authority or agent? I.e., in premise inspections of key work.

21 responses



Are you a member of a Public/Government procurement panel?

21 responses



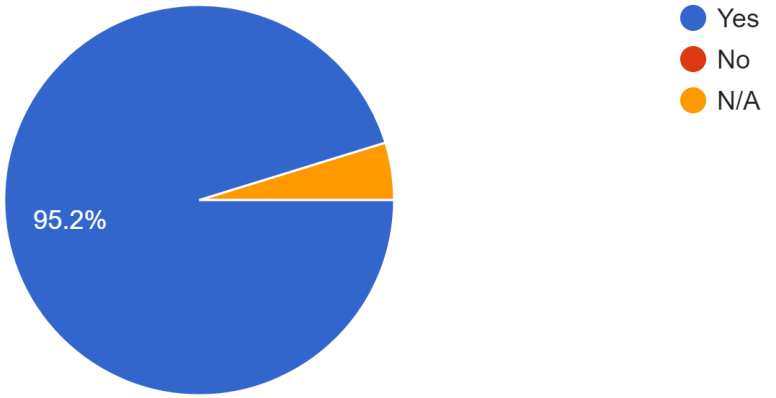
What we learned: Safety & Waste

Participants showed highly positive rates for H&S performance.

Additionally, waste is tracked and accounted for in production – the cost effects of this are communicated back.

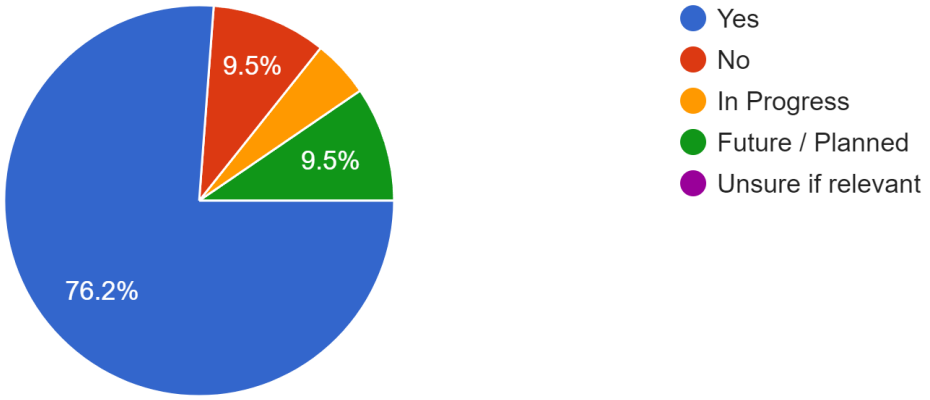
Do you have a good health and safety regime with subsequent low accident rates?

21 responses



Do you monitor and track waste and account for the additional cost in your product or service?

21 responses



Respondent feedback:

Consenting

"Consents could be self-regulated – why are we not afforded the respect of the manufacturing industry?"

ENVIRONMENT, SUSTAINABILITY & GOVERNANCE

Rationale: seeking evidence that regulatory and voluntary requirements around environment and sustainability are factored into production.

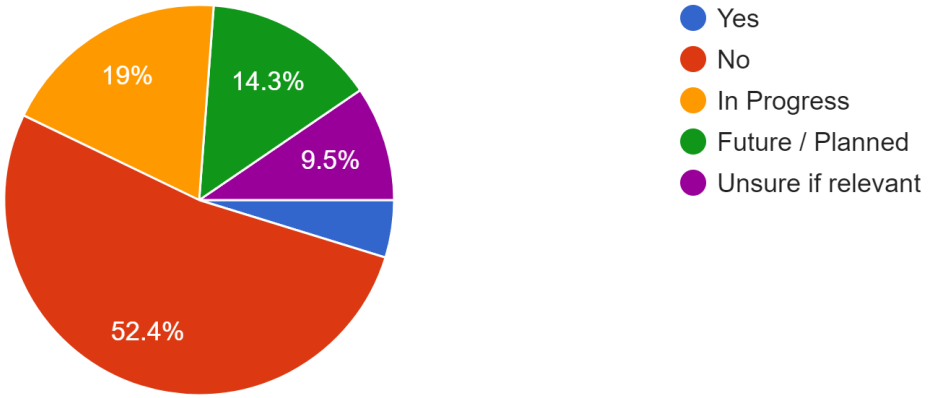
What we learned: ESG & Materials

More than half participants do not have a recognised QA system, but 1/3 are in progress or planning to on the future. Given the cost & time commitment, it is likely to be delayed without pipeline commitments.

And less than 1/3 use renewable or recyclable materials all the time. This is likely to be LGS structural and timber systems.

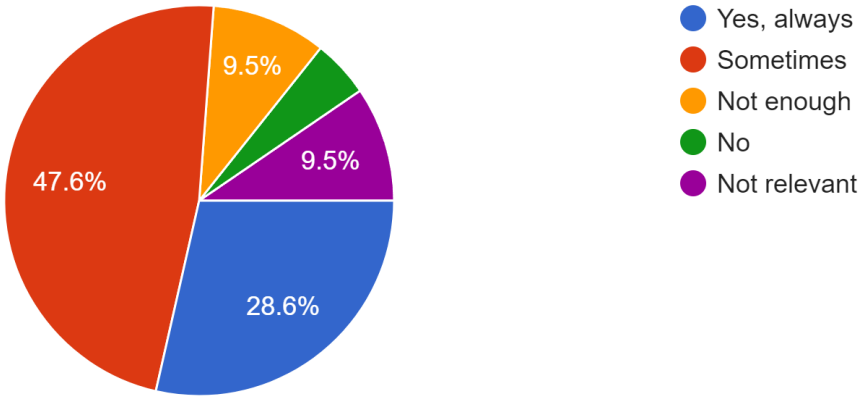
Have you adopted an environmental management system and is it ISO 14001 certified?

21 responses



Do you actively incorporate the use of renewable or recycled materials?

21 responses

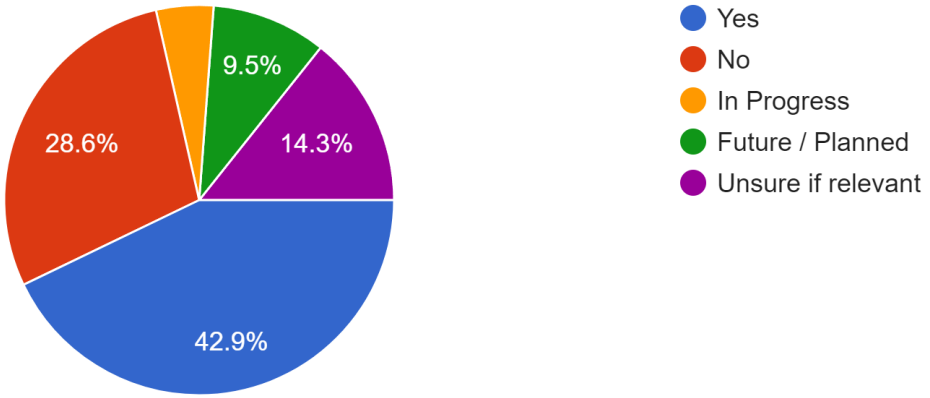


What we learned: Environment & Impact

Data shows that participants are considering the environmental impacts of certain materials in their operation, with around 40% of them having a policy regarding limitation of materials or reporting.

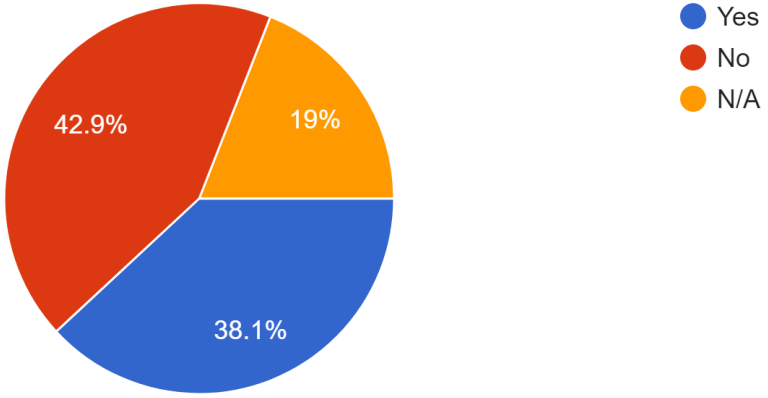
Is there a company policy limiting the use of certain kinds of materials i.e., referencing Red List, Declare, or banning materials that creates silica dust or other toxins?

21 responses



Do you have policies that support the reporting of relevant environmental issues?

21 responses

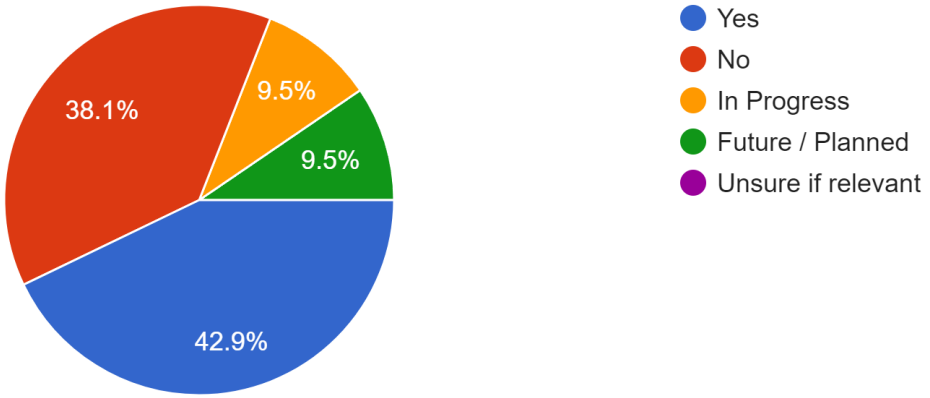


What we learned: High Performance

Participants have familiarity with high-performance accreditation standards like Greenstar and Passive House. This means a higher-level of engagement and work required to meet these demands.

Do you have in-house experience with third-party accreditation requirements such as GreenStar and PassiveHouse?

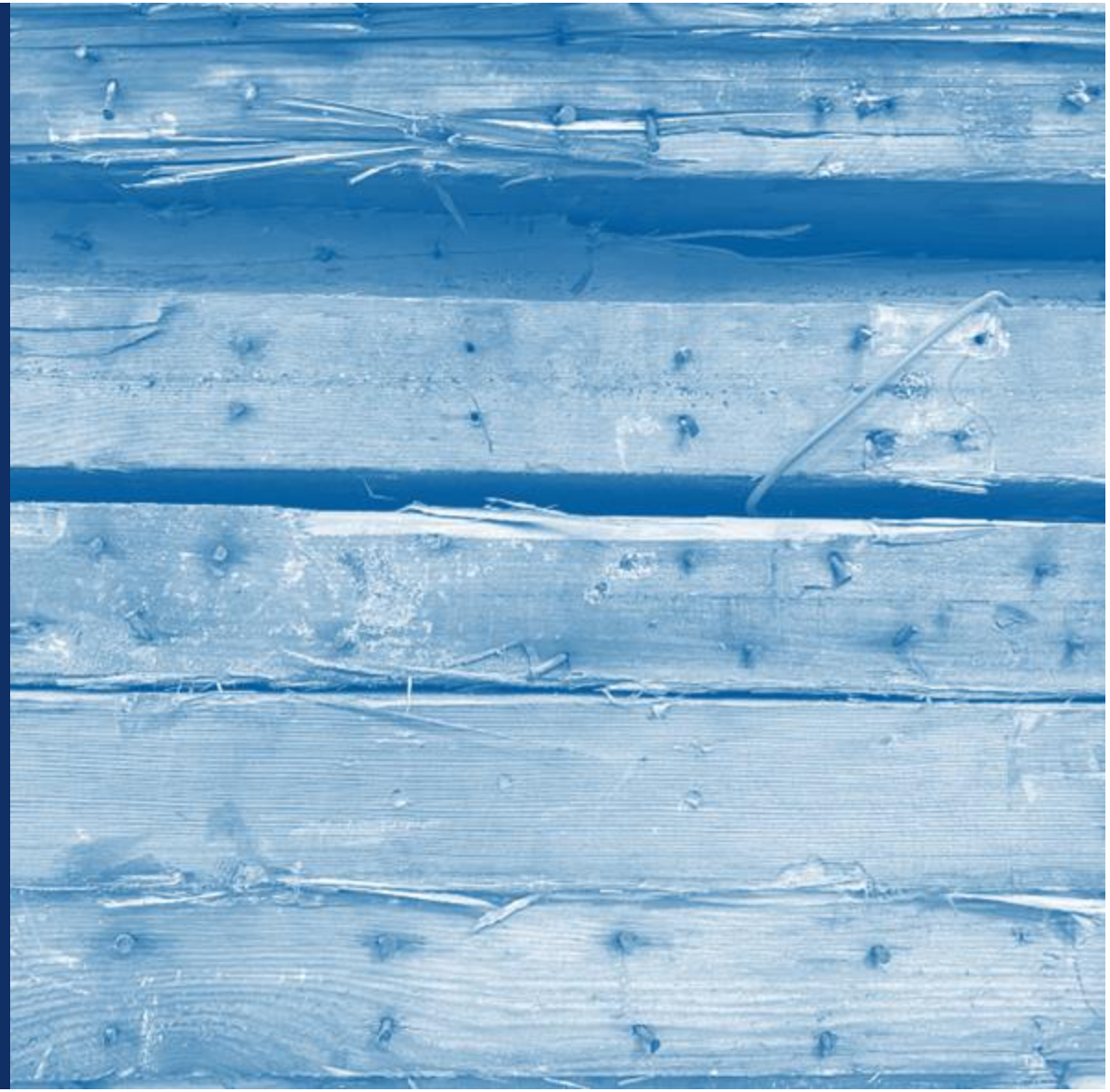
21 responses



FUTURE: CARBON, ENERGY & CIRCULARITY

Rationale: seeking awareness of future impacts on operations from regulatory and operational requirements around carbon, environment and circularity.

This was the prework done for the Carbon 2030 Workstream.



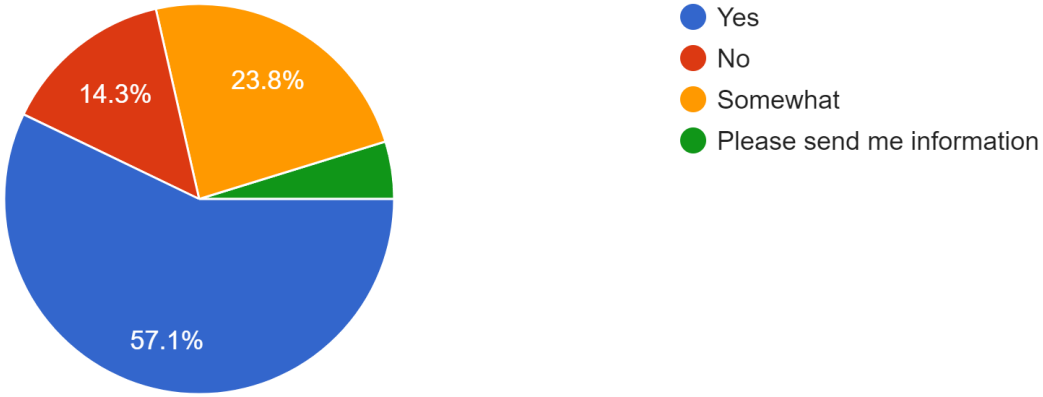
What we learned: Carbon Testing

We asked participants about their knowledge on embodied and operational carbon measurement. There is a good level of knowledge and an appetite for further engagement.

Refer to the Carbon Workstream findings.

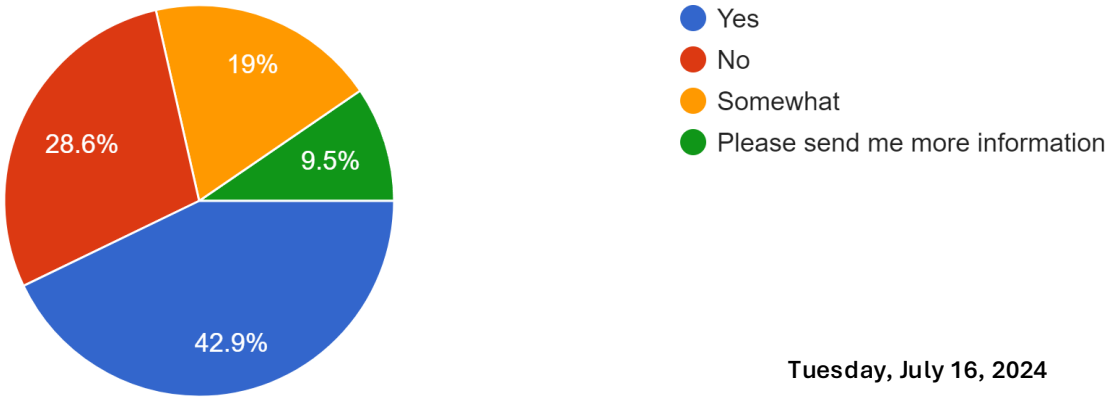
Is your organisation familiar with the concept of operational carbon and embodied carbon in the context of building design and construction?

21 responses



Are you familiar with any industry standards or certifications that focus on reducing operational and embodied carbon in buildings? If so, can you name one or two?

21 responses



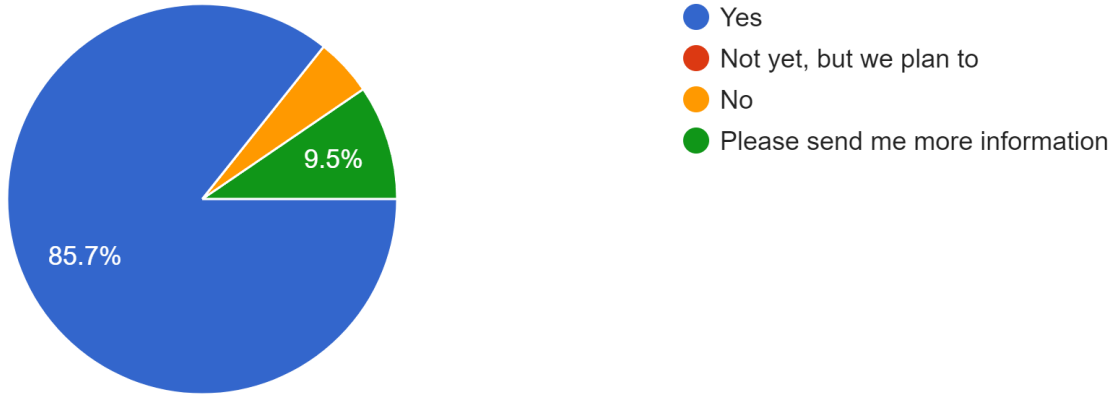
What we learned: Positive Planning

Participants showed an eagerness for learning how their current designs meet future NZBC requirements.

Refer to the Carbon Workstream findings:

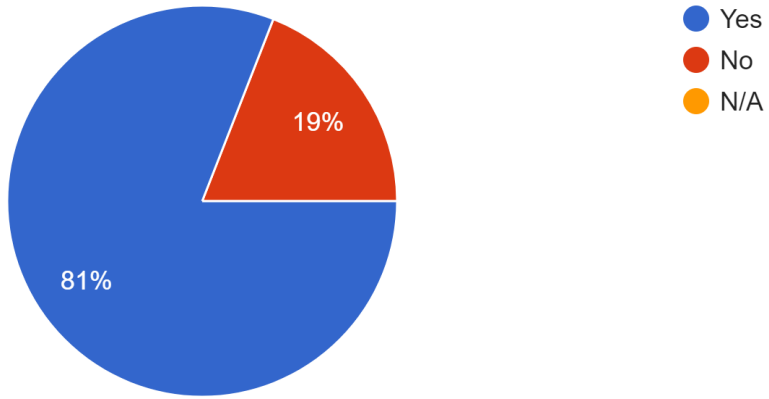
There are a series of changes coming to the NZ Building Code starting in 2025 in order to restrict operational and embodied carbon in buildings. Do ...sustainable homes than the current code requires?

21 responses



Would you like to receive information and support to adopt strategies or technologies commonly employed in the construction industry to reduce both operational and embodied carbon emissions?

21 responses



What we learned: Certainty of Outcome

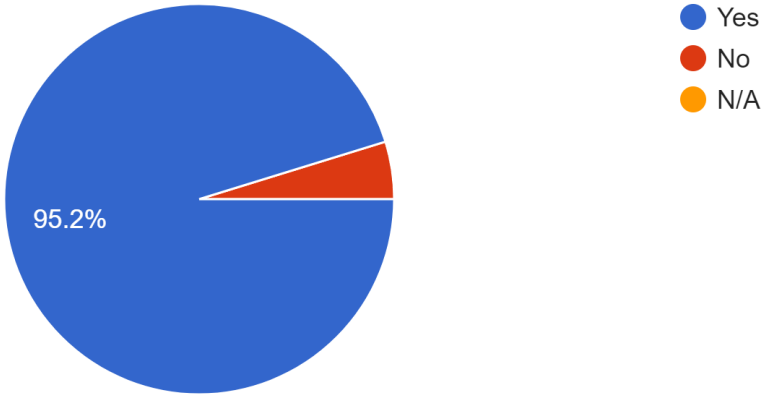
Participants strongly agreed with the idea of responding to a published design criteria aligned with high-performance precut solutions and pipeline.

And to understand the delta between what they currently do and what they will need to do to meet requirements.

Refer to the Carbon Workstream findings.

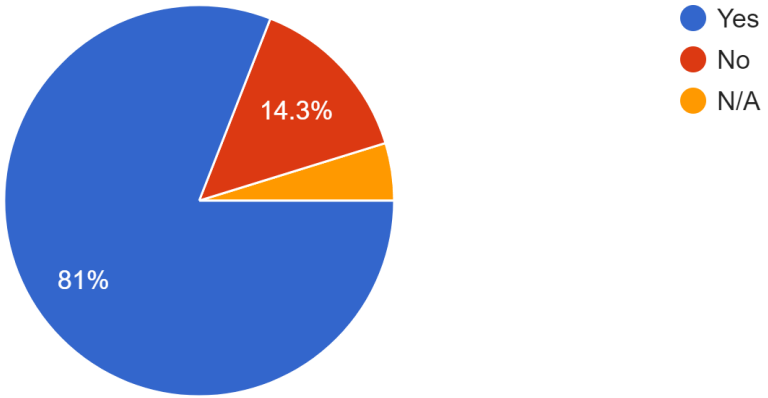
If there was a clear set of design criteria for the procurement of high performance offsite product solutions would you be interested in being considered for this supply and product pipeline?

21 responses



Would you like to avail of a sponsored / free comprehensive energy model of one or your projects / designs in order to understand how close you are ...carbon targets proposed in the upcoming changes?

21 responses



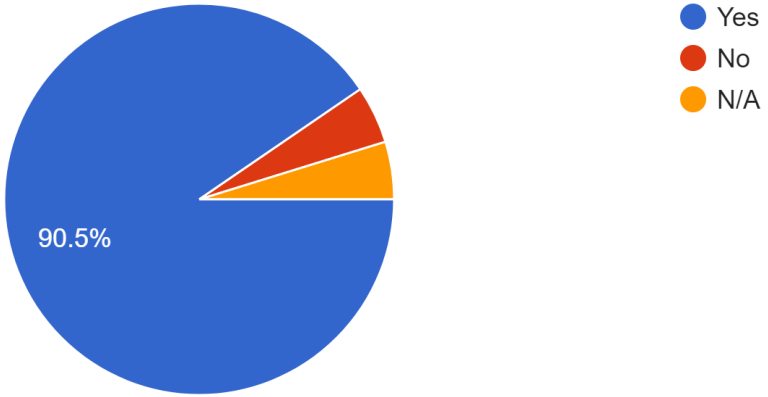
What we learned: Network Effects

An important finding that showed interest in an industry-wide, standardisation & alignment of design & product information that can be specified at the time of design.

Further work around promoting lessons learned as part of the overall work was also highlighted.

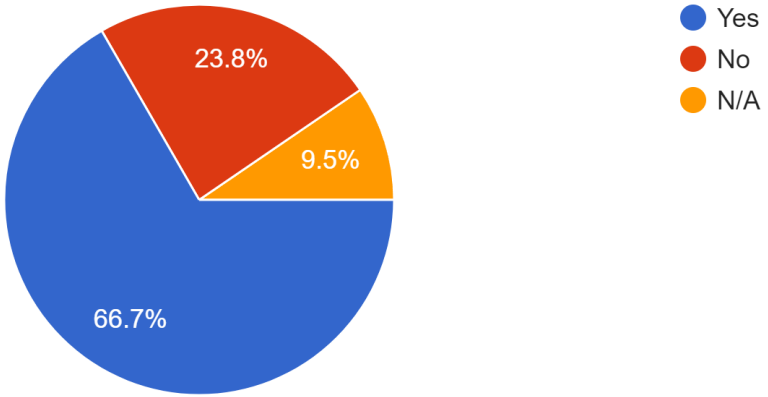
Would you support an industry effort to provide standardized designs, details or systems that can be specified during design and align with supply chain capabilities?

21 responses



Are you willing to share a lessons learned example that highlights an issue, problem, or opportunity, and being a case study for the Accord?

21 responses



Respondent feedback:

The Future

"Collaboration = standardisation"

FINAL THOUGHTS: NEXT STEPS

- **Specifiers/Designers/Contractors** – engage with MMC suppliers, ask questions and understand the capabilities
- **OSM providers** – data talks, make it easier to engage, understand your client & sell on benefits – **evidence wins**
- **Clients** – make space for MMC in your thinking, engage early, evaluate against your needs and **feedback on your assessment so the industry can grow**
- **Keep Measuring the Industry** – this tool can be standardised and rolled out for regular measuring, qualification and a mark of quality
- **Seek better compliance conditions** in exchange for evidence-based manufacturing