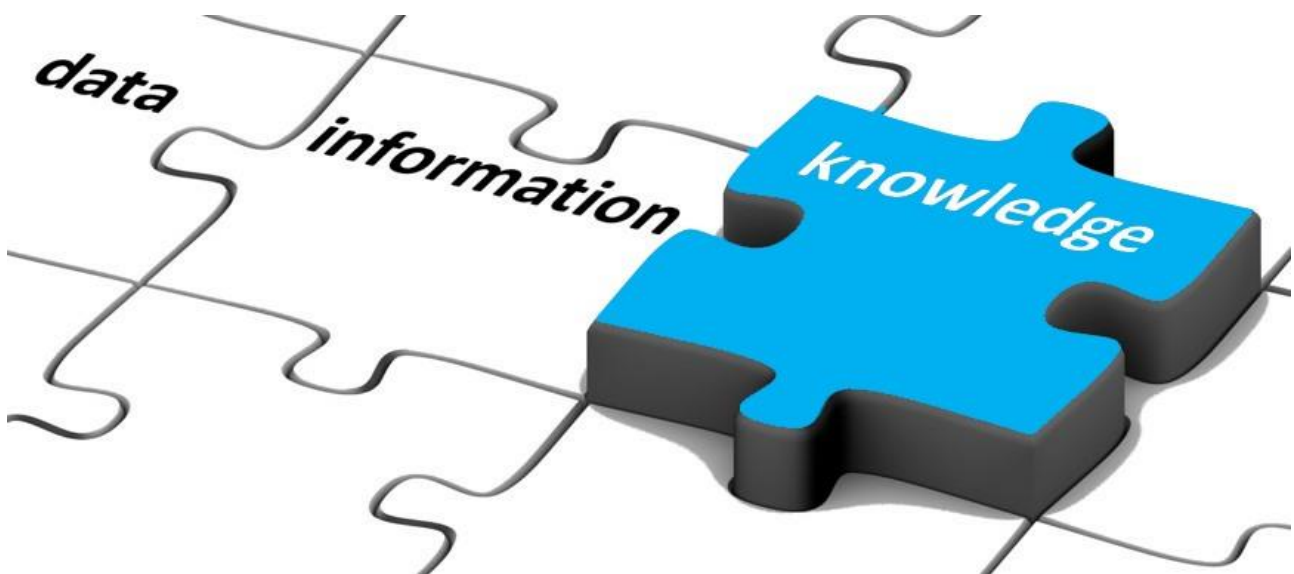


Designing Buildings is seeking a partner for the creation of a construction knowledge API

Designing Buildings Limited, April 2023



Summary

Designing Buildings Limited is seeking a partner with existing software products to help develop and market an Application Programming Interface (API) that allows software providers to offer access to construction knowledge as an add-on for their existing products.

Construction is a knowledge-based industry, and yet knowledge is the one part of the industry that has not been modernised. It remains unstructured, unstandardised, in random classification systems and scattered across a multitude of places. As a result, construction knowledge is hard to find, manage, curate and exploit, making the industry less productive than it should be and less innovative than it could be.

The creation of a knowledge API for the construction industry would allow software providers to develop knowledge plug-ins for their customers, so they can easily find knowledge without leaving their project environment and attach that knowledge to their data and information; making data, information and knowledge interoperable for the first time.

In the first instance this API could be based on the extensive, structured construction vocabulary already developed by Designing Buildings. Once the concept is proven, it could be extended to include knowledge from other key industry publishers, creating a truly comprehensive and flexible construction knowledge tool and unleashing a part of the industry that has been poorly served for too long.

Why is knowledge a problem for the construction industry?

Three pillars underpin the UK construction industry:

- **Data:** The basic ‘raw’ stream of characters and numbers upon which information is based.
- **Information:** The spreadsheets, reports, models and so on generated on individual projects.
- **Knowledge:** The wider industry framework, beyond individual projects; including legislation, regulations, policies, standards, codes, guidance, research, innovations, and so on. Knowledge defines what is required, explains what is possible, and ensures competence and compliance.

Construction industry data has been modernised, digitised and made interoperable by the introduction of sensors, the internet of things, analytics and digital twins. Information has been modernised, digitised and made interoperable by the introduction of Building Information Modelling (BIM).

Knowledge however has not progressed since the introduction of pdf’s in the early 1990’s. It remains scattered in thousands of different locations, unstructured, in random formats and with random classification systems. It is not interoperable and cannot be integrated with industry data and information.

Think back to CAD in the 1990’s when CAD drawings were just dumb digital versions of paper drawings – that is where construction knowledge still is 25 years later.

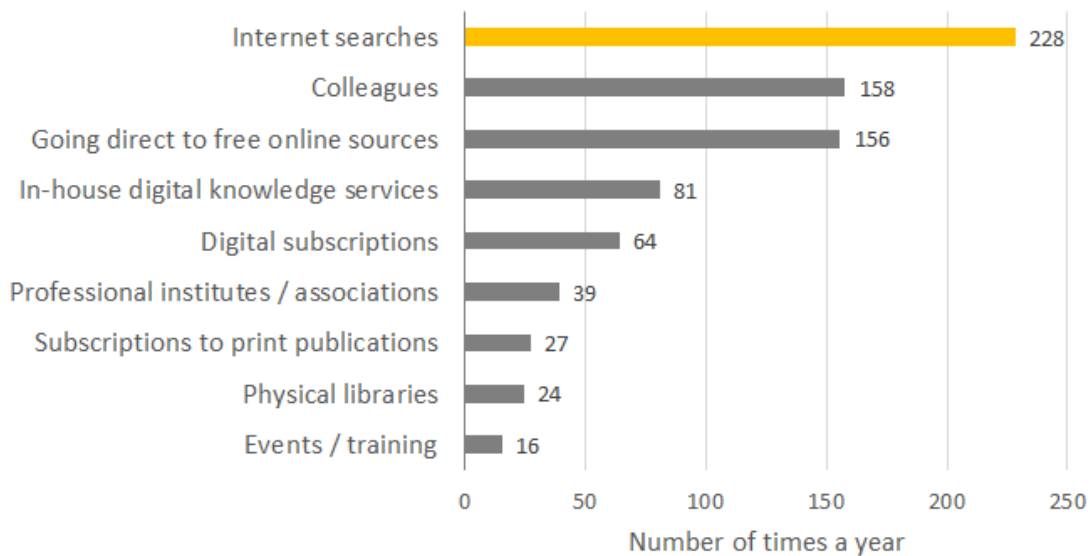
An industry-wide survey published in 2019 found that more than a third of practitioners freely admit they do not have easy access to the knowledge they need to do their job [1].

Do you have easy access to all the knowledge you need to do your job?



The survey also revealed that even when practitioners have subscriptions to all the key knowledge publishers, they nonetheless resort to standard internet searches because they are easier and more comprehensive – even though they do not fully trust the results they get.

Where do you find the knowledge you need?



What problems does this cause?

The unmodernised form, structure and fragmentation of construction knowledge creates several practical problems:

- Practitioners are often completely unaware of available knowledge, meaning they repeat known errors, do not take up research or innovations and sometimes do not even adopt best practice.
- Practitioners use internet search engines to look for knowledge, but these do not give construction-specific results, they do not allow the user to target specific types of knowledge, and they do not reliably direct users to authoritative sources; a group chat is as likely to top search results as a best practice guide by an institute.
- When practitioners use the few available construction-specific knowledge services, such as institute libraries or the Construction Information Service (CIS), they have to repeatedly log into and out of multiple systems, using multiple subscriptions and hoping to find something relevant. This takes too long and does not produce comprehensive results.
- Artificial Intelligence (AI) tools could make this situation even more complex.
- Knowledge is not interoperable with project information or data, so for example, it cannot be easily attached to BIM models, or managed from within the project environment.
- Knowledge cannot be searched for automatically based on activities, or pushed to practitioners when they need it.

As a result, the industry is less productive than it should be, less innovative than it could be and it repeats known errors:

- The damning Hackitt Review identified a lack of skills, knowledge and experience as a major flaw in the industry [2].
- The Get It Right Initiative estimates avoidable errors cost the construction industry **£10 to 25 billion a year** [3].
- The IPA's Transforming Infrastructure Performance identified a **£15 billion productivity opportunity** in construction [4].
- The UK's ambitious carbon reduction targets will only be deliverable if there is widespread uptake of research and innovation by the construction industry. Around 40% of UK carbon emissions are linked to the built environment [5].

What is being done about it?

The Construction Knowledge Task Group [6] created a routemap for modernising construction knowledge, standardising it and making it interoperable with industry data and information. The first step of this routemap has been completed with the creation of the Specification for Discoverable Construction Knowledge [7]. This is a standard classification system for all construction knowledge that is interoperable with Uniclass, the classification system used for BIM.

Cardiff University have undertaken some work to train an AI to recognise construction knowledge and to classify it according to the Specification for Discoverable Construction Knowledge. It was trained to do this using the content on Designing Buildings. Cardiff University have now secured funding to pay a computer science student for three months to develop this work further and create a construction industry search engine.

The Construction Leadership Council has accepted that knowledge should be part of the overall process of digitising the industry and has renamed their digital workstream “Digital, Data & Knowledge”. They are currently seeking funding to progress that workstream.

What is needed now?

The next step is to create a viable product that brings these strands together and tackles the real-world problems the industry faces, allowing the full exploitation of construction knowledge in the same way that has already been done for data and information.

As the industry uses a multitude of existing software systems to manage its businesses and projects, it is proposed that a wide range of possible use cases could be served by a single Application Programming Interface (API).

An API is an interface that gives access to a service to other pieces of software. We are proposing the creation of an API that gives access to a construction-specific knowledge, so that software, such as BIM software or project management software can interact with it, searching for knowledge, finding it, filtering it, and making it available to manage and curate within that software. The API could be licensed to software providers so they can offer it as an add on to their existing products.

Designing Buildings offers a ready-made solution

[Designing Buildings](#) is the construction wiki. It is the only industry-wide, cross-discipline, structured knowledge base for the construction industry.

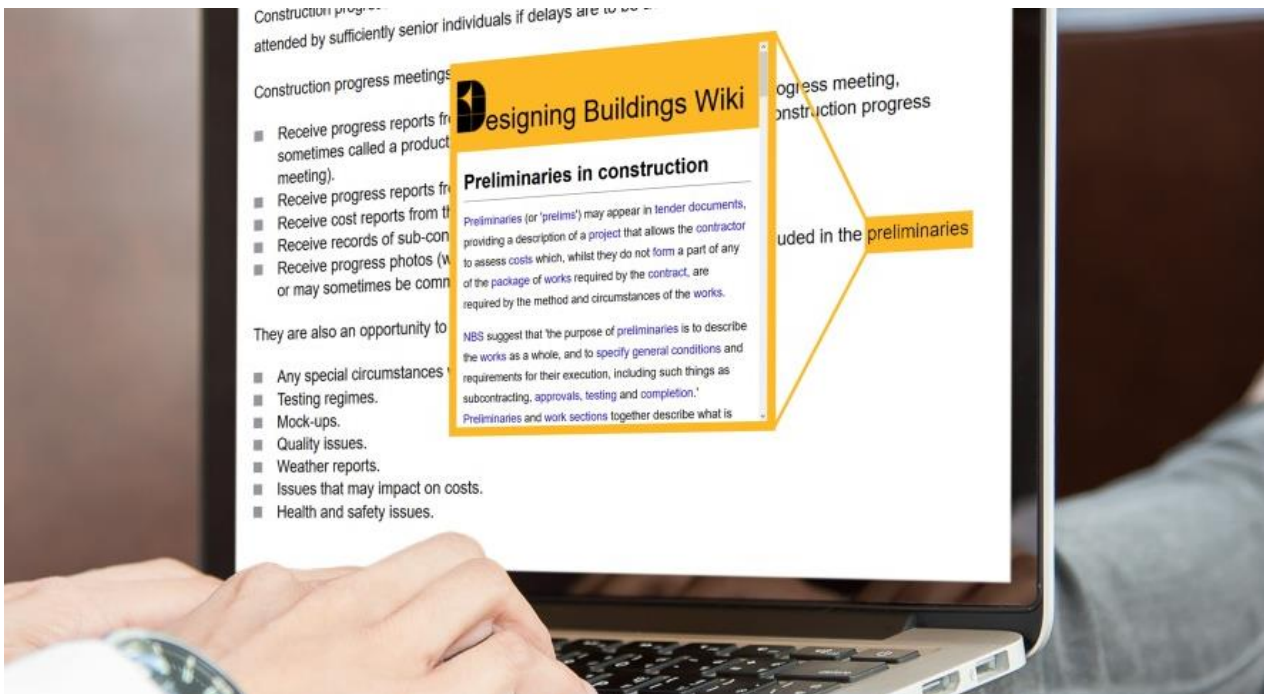
There are more than 16,000 articles on Designing Buildings about everything to do with the planning, design, construction, operation and decommissioning of built assets, including:

- 10,000 definitions – many including explanations, commentary, policy updates and so on.
- 10,800 synonyms (for example, it recognises that “planning approval” and “planning consent” mean the same thing).
- 330 disambiguation pages (for example, it recognises that the word “suspension” could refer to a suspension structure or suspension of a contract).
- 3,500 acronyms.

This constitutes a complex, integrated vocabulary of 25,000 phrases that have been classified according to the Specification for Discoverable Construction Knowledge. And as an open wiki site, Designing Buildings offers users the ability to create and add new content where there may be gaps or when new terms come into use.

In the first instance, an API could be developed based purely on the ready-made content available on Designing Buildings. This would offer a simple, but significant leap forward in increasing practitioner access to knowledge within the project environment and would be a first step in making data, information and knowledge interoperable.

[Designing Buildings Anywhere](#) is an example of a very basic API developed as a test that allows the Firefox browser to interact with Designing Buildings. Users of Firefox can perform searches by selecting text on any website. If there is a direct match on Designing Buildings, the article pops up, if there is no direct match, a list of search results are provided, and the user is given the option of creating a new page to fill the gap.



Developing a more complex and flexible API with enhanced search, filtering and bookmarking options, and making it available so that any industry software can interact with it would be relatively straightforward. It could be rolled out fairly quickly and made available by software providers as an add on to their existing customers.

Once this simple API has been trialled and the market proven, it could be enhanced by adding verified construction knowledge from other publishers. This could involve creating a construction-specific search engine that indexes only verified knowledge providers. The API could allow those results to be filtered by date, publisher, knowledge type and so on, and then linked by the user to their data and information.

In the future this could be developed further to have an AI capability, and subscription models could be developed to allow users easier access to paid-for as well as free content (such as project-wide subscriptions). It could also be enhanced by analysis of user context so that critical knowledge could be pushed to practitioners when they need it.

It is also possible that similar tools could be developed specific to other countries, and for other knowledge-based industries.



The need for a partner

Designing Buildings does not have the development expertise, or a suitable route to market that would allow us to develop and sell an API ourselves. We are seeking a partner with existing software products who would be able to help develop the API and offer it to their customers as an add on, as well as offering licences allowing other software providers to access the API.

The introduction of BIM and digital twins means the industry is already set up to accept digital solutions and to integrate them into workflows. Construction knowledge is the next step. This is an under-exploited part of the construction industry, and the pieces are in place to add knowledge to the menu of offers that software providers can make available to their customers and at the same plugging a serious performance gap.

This is a fast-moving part of the industry, and we are seeking initial expressions of interest to allow us to move this forward quickly.

To express interest in this proposal, contact Designing Buildings Director and Co-founder Dr Gregor Harvie: gregor.harvie@designingbuildings.co.uk

References

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About Designing Buildings

Designing Buildings is the construction industry knowledge base. An open, collaborative wiki that gives free access to cross-discipline knowledge about everything to do with the planning, design, construction, operation, and decommissioning of built assets.

Created in 2012 by project Manager David Trench CBE FCIQB and architect Dr Gregor Harvie, Designing Buildings shares knowledge throughout the construction industry, helping to improve the uptake of best practice, reduce errors and increase the adoption of research and innovations.

Designing Buildings is used by 7 million people a year. It is based on UK practice, but is popular around the world. It has a young demographic, with an average age of 34, compared to an industry average of 44. Its main user groups are designers, consultants, contractors and students.

Anyone can create and edit articles on Designing Buildings, but all changes are checked by our editors.



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BUILDINGS**

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