CES500172

Trial and error of corporate DX with Infra BIM for the next 10 years

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Learning Objectives

- This presentation will show an example of how Autodesk products have been used to create an alternative workflow to traditional civil engineering design.
- Information management methods in Infra BIM and how to break away from Modeling-heavy BIM/CIM will be introduced.
- We propose trial and error and training methods to develop human resources who will become Infra BIM managers.
- In preparation for the next 10 years, which will be a milestone in the decline of the industrial population, we will introduce a trial example of how Infra BIM can overcome the "gap between young and experienced".

Description

Currently, the industrial population in the civil engineering industry is decreasing year by year, and the number of people who will be responsible for the future is decreasing.
Due to various factors, the number of people entering the civil engineering industry itself is decreasing, and the age group of the industry's population is now gourd-shaped.
In my company, most of the veteran employees will be retiring in 10 years. Even in such a situation, the veteran employees have to continue to work as usual, while feeling the time limit of their own age and increasing the amount of time to train the younger employees. In the meantime, young people are making efforts to acquire skills and knowledge from their supervisors by using various tools and cloud computing such as BIM360.
While there are many companies in the industry that are in a similar situation, the civil engineering industry has been developing policies and productivity improvement methods such as "i-Construction" and "BIM/CIM" in an effort to deal with this situation, but I believe that there is still a long way to go to improve productivity.
In our company, young employees themselves use Autodesk Revit, Civil 3D, Dynamo, and various functions of BIM360, while involving experienced managers and partner companies. We also conducted a trial and error process for development.
In addition, the company is confronting the "gap between young and experienced" by de-personalizing knowledge using various functions of Generative Design and BIM360. In this session, we will discuss the active BIM/CIM specialized in management with an awareness of efficiency, which we will call "Infra BIM," the many trial and error processes of corporate DX and their verification processes, and the design of methods for training the next generation of human resources who will be the epicenter of change to adapt to the changing times. We will propose a method for training the next generation of human resources who will be the epicenter of change to adapt to the changing times.

Speaker

Yoshiyuki Miyauchi, born on 1995/10/3, 26 years old.

Born in Nishinomiya City, Hyogo Prefecture, he graduated from the Department of Civil Engineering, Faculty of Engineering, Tottori University in 2018, and joined Asahi Consultant Corporation in 2020. He has been working at Asahi Consultant Co.

While engaged in bridge design work, he belongs to a company's business promotion office and is busy with trial and error of corporate DX using BIM/CIM and training "0⇒1 human resources (Zero Ichi human resources)" who can handle BIM/CIM and derive their own answers. We are also working on the development of "0 ⇒ 1 (Zero-Ichi) human resources" who can handle BIM/CIM and come up with their own answers. He has also conducted BIM/CIM training at universities and other educational institutions, government offices, and various associations.

He is also in charge of hiring new graduates, and is involved in hiring without mismatches, designing internships, and interviewing and following up with students on a daily basis.

His life's work is to answer questions posted on the Autodesk Knowledge Network.

You can check out some of my past presentations and speaking engagements below.

■Construction IT World「Asahi Consultant, a young employee who leads the use of BIM / CIM

, rapidly improves productivity by automating point cloud measurement and design with iPad」

https://www.linkedin.com/posts/ryota-ieiri_ipad-poindcloud-lidar-activity-6803239846400942081-abgA

■Autodesk BIM/CIM Case Study Seminar

http://bim-design.com/infra/online-seminar/asahi-consultants/

Development Cooperation

■Generative Design for Civil 3D Optimal Placement of Erosion Control Weirs (Autodesk, Kitack)

https://www.linkedin.com/posts/ryota-ieiri_bim-dynamo-generativedesign-activity-6841884086949310464-l24K/

Contact address

I am looking forward to exchanging information with you through this AU.

If you have any questions, please feel free to contact me.

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Introduction

In this session, we have listed four learning objectives. However, in this seminar, I will introduce two of those goals. This is because goals ① and ② have already been introduced in previous seminars.Therefore, I will focus on goals ③ and ④ this time.Thank you for your cooperation.

Goal ③, "Propose trial and error and training methods to develop human resources who will become Infra BIM managers," focuses on why corporate DX is necessary now. In this section, we will focus on why corporate DX is necessary now, and introduce our efforts and concerns in developing "Infra BIM managers" who will promote and support corporate DX.

Goal ④, "In preparation for the next 10 years, which will be a milestone in the decline of the industrial population, we will introduce a trial example of how Infra BIM can overcome the "gap between young and experienced workers.

"So, how to overcome the "gap between young and experienced"? This presentation will introduce trial cases, their prospects, and future actions using "Infra BIM" defined from various aspects.

Why does corporate DX need to be done now?

Take a look at the graph below to see the industrial population trends in the construction industry in Japan. The purple line represents the number of people over the age of 55 and the pink line represents the number of young people under the age of 30. From now on, we will define people under 30 years old as young people.

As you can see, the difference between the number of young people and the number of people over the age of 55 is much farther apart than in the past.

Also, represented in orange are people between the ages of 45 and 54. Half of the construction industry is made up of people over the age of 45.
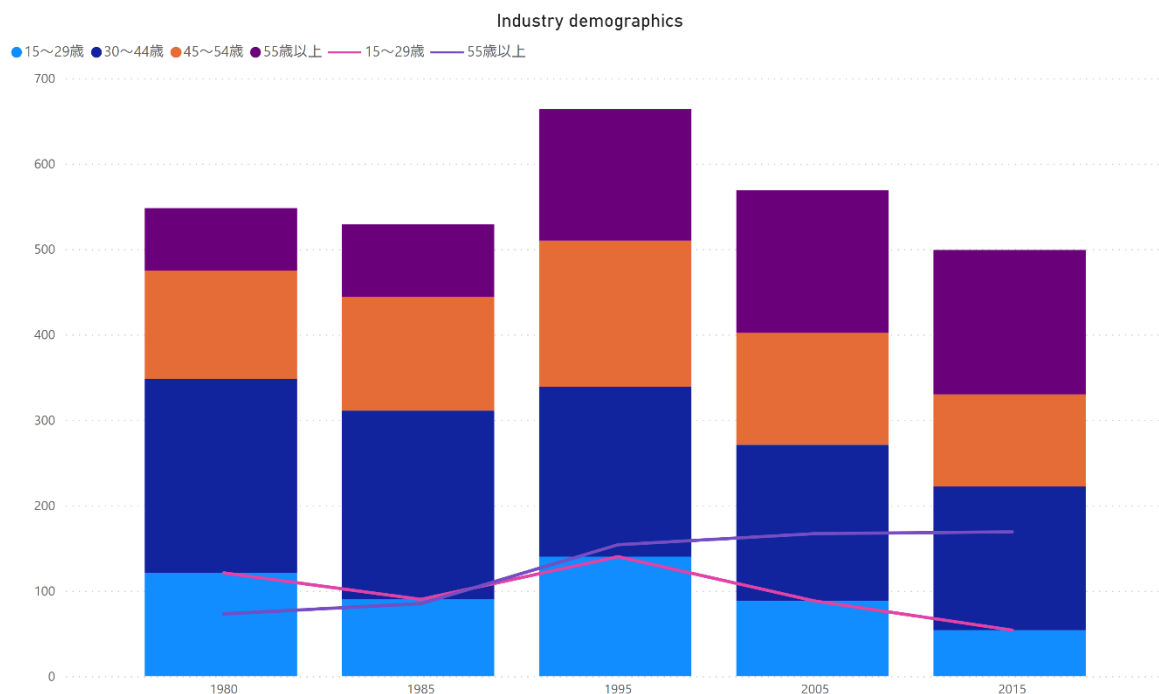
What will these people be like in 10 years?

For example, most of them will have retired for health reasons or have reached retirement age and are retiring.

These so-called veterans are important people with knowledge and experience in the industry, and if we exaggerate a little, losing them after 10 years would definitely be a very big loss for the industry.

In Japan, it is said that it takes 10 years to become a full-fledged employee. If the people who are about to enter the workforce conveniently become full-fledged in 10 years, there will be no problem.

However, this is only if there is a constant flow of new hires.

Since there are only a few young people entering the industry, there will inevitably be a turning point for the industry in 10 years.

In other words, all we have to do is to prepare for the coming 10 years, and we need to initiate DX to change.

As for the solution that will support our changing DX, we define it as "Infra BIM".

What is the Infra BIM that will support enterprise DX?

Infra BIM, as we see it, is a solution for working well with computers.

Since we are going to use computers, we should not create models that are convenient for people, but models that are easy for computers to read.

If we create models that are easy for people to read, we will be able to work well with computers and increase productivity and profits.

We believe that the BIM model we should create is the database itself, which is easy for computers to read, and that BIM software, which is easy to build a database, should be used as the main tool.

Infra BIM Manager Training and Challenges

We will introduce our approach to BIM human resource development.

① Based on commercially available training materials, training is conducted while utilizing BIM360. Initially, we had created training materials from scratch, but we gave up. We will use commercially available materials and accumulate improvements in BIM360 for the time being.

② The feedback obtained from the training will be stored in BIM360 and the training materials will be updated. Initially, we were thinking of using a questionnaire format for feedback, etc., but it is easier to have people write more and more in BIM360, and it is also easier to maintain.

③ The training will be held completely online so as not to interfere with business operations and to eliminate the need to travel. The training was recorded and uploaded to the company's Youtube site and a simple e-learning site was created. Autodesk ScreenCast, which automatically captions shortcuts and operations, is also useful. The training was held not only at the head office but also at branch offices, eliminating the need to travel. Reduce the hurdles to participation in training.

④ To improve IT literacy, keyboard shortcuts should be standard practice, regardless of skill level. BIM usually requires a lot of mouse operations, so we want to make it as easy as possible. The shortcuts that I have learned are now being used for other office work.

⑤ (On trial) Revit journal files are analyzed by Dynamo, and the level of proficiency is visualized numerically.Identify each person's weaknesses and provide individual backup. Once you get used to BIM, you can never go back to being a beginner again, and the best way to improve your weak points is to objectively evaluate the data.We believe that the key to human resource development is the data of beginners.

Trial and error to overcome the gap between young and experienced

In preparation for the next 10 years, we are trying to somehow close the gap between the veterans and the young while we can. In other words, the tacit knowledge possessed by the veterans should be made into formal knowledge and transferred to the younger generation. So what is the difference between the young and the experienced? Let's think about it.

① Knowing the specific flow of work. It is common to say that you cannot understand unless you have experienced it. You can't even have a mock experience.

② Veterans are able to naturally incorporate their own tacit knowledge into the results. This tacit knowledge is a very valuable asset! I would like to somehow incorporate this into Infra BIM.

③ In the course of work, the policy of the work is often changed by the voice of an experienced person.

④ A group of tacit knowledge that cannot be understood just by looking at the report. The whole of the work cannot be understood just by looking at the deliverables and reports, and is not suitable for education.

How did you make up the difference in the past? I actually asked them.
For example, I would go to the smoking area where my boss was, pretend to smoke a cigarette, and ask him things.
For example, I would eavesdrop on the phone calls between my boss and the client and secretly write down my knowledge.
In Japan, there is a problem about communication between young people and veterans, and it is said that young people tend to avoid drinking with veterans, smoking, and other things outside of work at the company anyway. It is said that young people tend to avoid drinking, smoking, and other non-work related activities with veterans. So, where do we communicate? The only place to do so is in the workplace.

Optimal design proposal by Generative Design

Generative Design is a method for using AI to select the best ideas under various constraints.
It can be used in Revit and Civil 3D.
Our problem is how to incorporate experience and tacit knowledge of "constraints" in various design tasks, i.e., "in this case, do A or B", into the program. In other words, how to incorporate experience and tacit knowledge into programs? Generative design offers a solution to this problem.
The computer will then come up with various ideas and propose the best solution. BIM model as a database
We also aim to make it possible to pick up quantities by linking with the BIM model, which will serve as a database.
We are doing civil engineering design, and we are trying to apply generative design to them.
In particular, we are currently working on the design of water supply and sewage systems and erosion control weirs.
For the erosion control weir design, we have already released the program on the Autodesk website, so please check it out.

Building business processes and knowledge databases with BIM360

We want to preserve our business processes as data and be prepared for the next 10 years.
The business process itself and the various wisdoms in business execution must often be tacit knowledge. The visualization of business processes, which branch out into many different types, is one of the first steps in DX.
In order to visualize the business process, we used BIM360 and BI tools.
In addition to the business process, it is also good to use the points to be noted as a reminder of one's own work, like a todo list.
So, why use the cloud for visualization of business processes? Let's talk about that in the next section.

Why the Cloud?

What are the obvious benefits of the cloud?
For example, the ease of data sharing, or even collaborative editing, depending on the object?
So, what if we look at it from a long-term perspective?
The history of various interactions will remain as data, and data that can be used for data analysis can be obtained. By selecting a cloud that can record business processes, juniors can look inside the heads of their seniors, making their knowledge more open.
By opening up various data through the cloud, we believe that we can accelerate the process of de-personalization.
BIM360 has a data connector function that can spit out various history and information in the cloud. Moreover, it outputs the data as structured data in a form that is easy for PC-kun to read.

Use BI tools to visualize the current database.

BI is a tool to take the next next action. The first step is to visualize the data and make the current situation more understandable. It is necessary to do data visualization in an easy-to-understand manner to strengthen decision making from a data-driven and objective perspective. In the remaining 10 years of our lives, we must move away from training our subordinates according to the preferences of the educators. To do so, we need BI as well.
For visualization, we are using Microsoft Power BI (Business Intelligence).
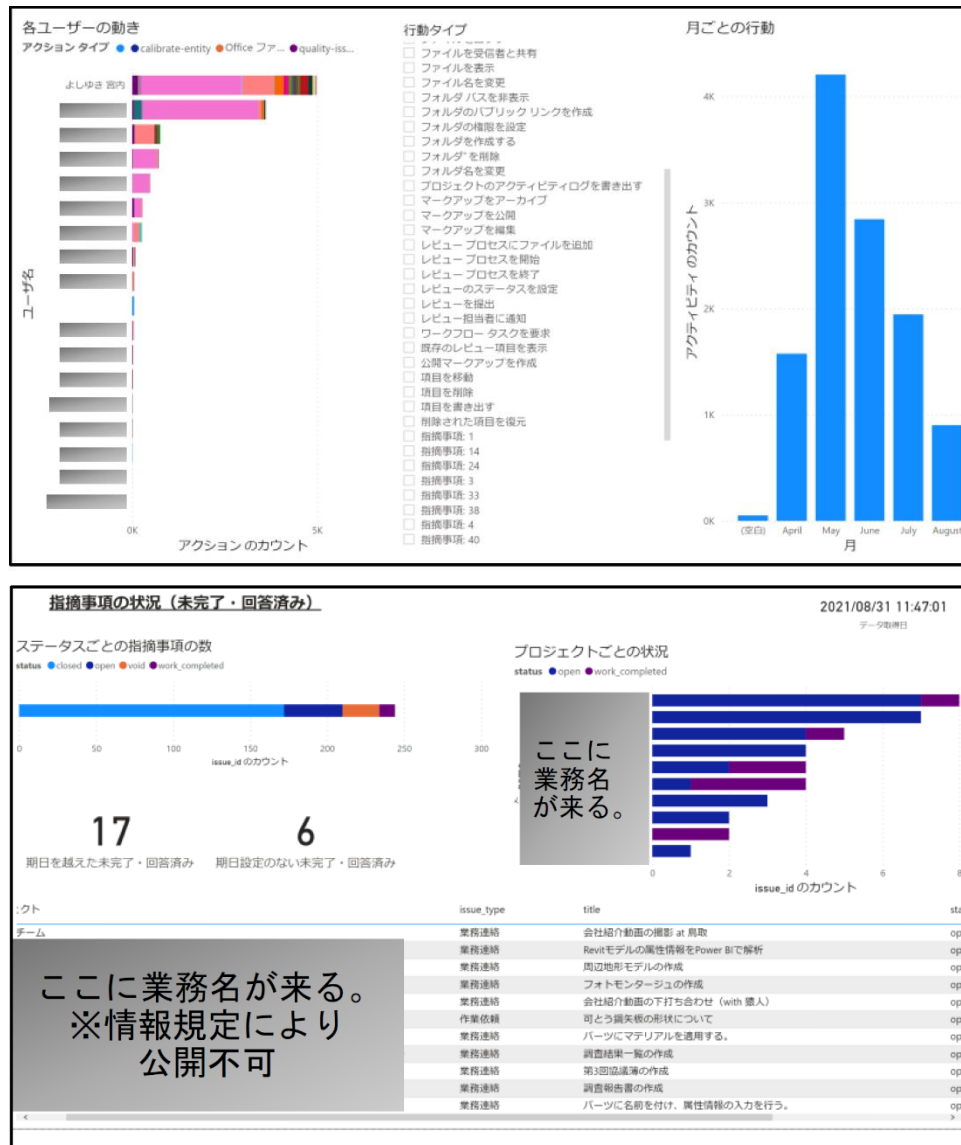
The following graph shows how we are doing data visualization.
This dashboard can be issued with a web URL for sharing, so we can put it on the company portal for everyone to see, aiming to build an eco-cycle where the field analyzes the data in the cloud and feeds it back to the field.

Conclusion

Data is very important, so trial and error is necessary from early on.
Before improving the current situation, the accuracy of "DX" will depend on how accurately you can understand the current situation.
Data management is the key to a highly accurate understanding of the current situation.
If we can make decisions objectively based on data, rather than relying on the experience, intuition, and preferences of each individual, we will be able to make more valuable tacit knowledge.
If we can make objective decisions based on data, instead of relying on individual experience, intuition, and preference, more valuable tacit knowledge will be developed into open knowledge, won't it?
Once the current situation has been visualized accurately and neatly, the next step is to analyze the data to determine how to improve it.
It is up to each company and department to decide how to analyze the data and come up with improvement measures. This is where the data scientist comes into play.