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Research paper

Pilot implementation of a digital building model for operational management

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Abstract: In recent years, Building Information Modeling (BIM) technology has been increasingly used in the design and construction phases of building projects. However, there is still a lack of information regarding the implementation and evaluation of BIM during the longest phase of a building's lifecycle, which is its operation. More and more often, various systems and management methods are being employed for such real estate properties. However, these issues primarily concern newly constructed objects for which digital BIM documentation was created during the design phase. The situation is different for properties that have been in operation for an extended period or for those that lack a virtual model. Highlighting the benefits of creating and subsequently utilizing an existing building model, the authors present a practical example of BIM technology implementation in the management of existing real estate located within the AGH campus. They particularly emphasize the possibility of using readily available tools, which significantly enhance the management of the virtual building model without the need for modeling skills or complex software operation. For this purpose, they propose using an Excel spreadsheet. With the appropriate integration with Revit, it allows for the real-time flow of data, making it easy to incorporate current changes into the model.

Keywords: building information modeling (BIM), maintenance, facility management, operation phase, data exchange

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1. Introduction

The operational phase is the longest period in the life cycle of buildings. During the operation of buildings [1], there is a need to perform various activities aimed at systematically collecting information about the technical and functional condition of the facility. Typically, these activities are planned and coordinated by the owner or property manager. The manager is responsible, among other things, for regularly updating the Building Log Book (BLB) and ensuring ongoing repairs and maintenance of the facility [2]. However, so far, these tasks have required significant effort from the manager, who had to oversee the building's condition, organize regular structural and installation inspections, monitor warranties on various devices, plan necessary repair work, record user reports regarding any irregularities and faults in the facility. Additionally, this required the creation of a large amount of documentation, both in paper and electronic form, in the form of protocols, notes, and photographic documentation. Complex scheduling of maintenance and facility use-related work was also necessary. Therefore, it is worth considering solutions that can streamline and reduce the number of necessary actions to ensure the long-term and efficient operation of facilities [2].

Due to the rapid development of digital technologies in recent years and the digitization of the construction industry, it's worth exploring tools that can streamline activities related to the long-term operation of facilities. The market offers various tools, more or less sophisticated, for property management, but they often require advanced skills to operate, involving complex and costly software. However, simpler solutions can also significantly enhance the efficient management of building properties for years to come. To achieve this one can utilize readily available software, the proficiency in which is commonly widespread [3].

In this article, the authors will present a proprietary procedure for implementing BIM in existing facilities. It is worth noting that the buildings focused on by the authors are structures erected many years ago, for which only paper documentation exists, sometimes incomplete. Based on this documentation, a model must be constructed for operational purposes. In the article authors will provide a comparison of the pros and cons of managing existing properties with and without using BIM. The application of this procedure will be supported by an example of the implementation of the proposed solution. One of the main advantages of property management utilizing BIM is the ability to create a more comprehensive and accurate building documentation. BIM allows for the generation of a precise digital model of the building, incorporating information on geometry, materials, installations, and various other details. As a result, administrators gain a more thorough insight into the structure and technical condition of the building. However, it is crucial to acknowledge certain drawbacks associated with the implementation of BIM in property management. The adoption of this solution can be costly, both in terms of acquiring suitable software and training personnel. Additionally, the creation and management of BIM data can be complex, and inaccuracies in data may lead to imprecise models. It is also necessary to maintain the accuracy of data to keep BIM useful. The introduction of BIM may also require changes in processes and work culture, potentially encountering resistance from staff.

2. Building management with BIM

Building facility management encompasses the entire life cycle of a structure. Depending on the life cycle phase, the information management needs will vary. A completely different set of data will be required during the construction phase compared to the operational phase. Nevertheless, regardless of the phase, efficient data exchange is crucial when managing with BIM. This necessitates the seamless exchange of data generated in various programs and, consequently, in different formats. Swift data exchange and the utilization of previously developed documentation for subsequent participants in the construction project are essential. Open formats, such as PDF for flat documentation, facilitate information exchange in BIM through the use of the independent Industry Foundation Classes (IFC) data format and the Construction Operations Building Information Exchange (COBie) data structure specification format. Models prepared in this way can be managed, for example, through Common Data Environment (CDE) platforms.

Currently, the market is flooded with various building information modeling (BIM) software, most of which share similar functionalities. The key factor in this context is the ability to save the created model in the Industry Foundation Classes (IFC) format. The lack of capability to save the model in an independent data format results in the inability to fully harness its potential, rendering it useless in subsequent BIM dimensions. Hence, it is crucial to utilize programs that can convert their native format to IFC files. One such program is Revit, which was employed in modeling the building analyzed in the article.

BIM technology enables data exchange among multiple stakeholders at every stage of a building's lifecycle [4]. Support for maintenance activities may include:

– Maintenance of system efficiency: overseeing installations tailored to various user needs.
– Planning and organizing inspections and services: coordinating the scheduling of regular checks and maintenance.
– Planning and designing renovation work: identifying and prioritizing repair, modernization, or changes in building usage.
– Demolition organization: for temporary or decommissioned structures.

The information gathered during the creation of a BIM model should be available in a single, shared database that the building manager has access to for both viewing and editing during day-to-day operational activities. This allows for continuous data exchange about the building in one digital repository accessible to all stakeholders [5]. In the case of building maintenance, a BIM model can be used for:

– Building information management: The BIM model contains comprehensive building information that can be used to create a database and manage the facility, conduct inspections and maintenance, and handle technical maintenance.
– Condition monitoring: Enables real-time monitoring of the building's condition and its components, identifying issues and maintenance needs, and efficiently managing repairs and maintenance.
– System efficiency maintenance: Provides control and adjustment of installations according to user needs and weather conditions.

– Cost management: Cost information within the BIM model aids in budget planning and expense control related to building maintenance.
– Work planning: Aids in scheduling and planning maintenance, modernization, and repair work, increasing operational efficiency.
– Energy efficiency analysis: Allows for the assessment of a building's energy efficiency and helps identify areas in need of improvement.
– Feasibility analysis of changes: Enables the evaluation of the feasibility of changes to the building, such as remodeling, expansion, or changes in use, along with cost estimation.

These BIM model functions are incredibly useful in building operations, allowing for effective data management, issue identification, and planning of activities. Consequently, maintenance becomes more efficient and cost-effective, while building users enjoy comfortable conditions. Data access is centralized, making information management and model modifications easier. Data is updated automatically across all applications and views.

Constructing a BIM model for a building already in operation and lacking digital BIM documentation can be developed based on existing as-built technical documentation, typically presented as 2D drawings [6], and a site survey of the property. In cases where there is a lack of software capabilities or expertise, the building owner can outsource the modeling to an external company. After creating a multidisciplinary model, parameters need to be added to support property management during the operational phase. Here, it's essential to consider how property managers want to utilize the created model. Seeking a solution that doesn't require specialized and costly training appears rational. Hence, the authors suggest using a widely available tool, Excel spreadsheets, present in practically every office. Implementing and connecting the building model with an Excel spreadsheet enables straightforward transfer of current information from operational activities to the model, simultaneously streamlining the management process. Due to the still somewhat challenging implementation of Common Data Environment (CDE) platforms in the operational phase, it is worthwhile to explore intermediate solutions. These solutions may not fully leverage the potential of specialized platforms but can enhance activities related to managing existing real estate. Introducing even a few improvements to current management practices, virtually cost-free, can also pave the way for convincing the investor/owner to invest in professional building management software in the future.

3. Building a digital model for a selected existing object

The building for which the digital building model was created is a public utility facility located on the campus of the AGH University of Krakow (Fig. 1). Currently, various programs are available on the market for creating models, and the key aspect is their ability to save files in an open format used for information exchange, namely Industry Foundation Classes (IFC). Among the programs for three-dimensional building modeling, the most popular ones include Revit, Archicad, Sketchup, and Tekla [7]. The authors chose to use the Revit software by Autodesk for modeling documentation. The object model was created using the Revit software based on as-built documentation provided by the Technical Department of AGH University of Krakow. The provided as-built documentation was created in AutoCAD with a .dwg extension. The drawing documentation was compared and verified against the actual state of the building by the investor's site supervisor. The development of the object model was supported by photographic documentation and a site vision conducted by the authors.

The built model in Revit is a rectangular-shaped structure with dimensions of approximately 38 m x 16 m. The building has 5 above-ground levels and one below ground. In the underground section, the building outline expands and is contained within a rectangle with dimensions of approximately 38 m ×21 m. The object constitutes one of the wings in a complex of three buildings separated by expansion joints. The structural system of the building was designed as a slab-column system with local reinforcement in the form of reinforced concrete beams. The slabs were designed with a thickness of 25 cm, with thickness increments in the area of column supports and wall corners of 40 cm. The slabs are supported by columns, core walls, and perimeter pillars, and the reinforced concrete walls are designed monolithically with thicknesses of 20 cm and 25 cm. The entire structure was placed on a direct foundation in the form of a 60 cm thick reinforced concrete slab with locally shaped footing under 90 cm thick columns. The building's roof is covered by a reinforced concrete roof slab. On the roof, various installations are installed. The building was put into use in 2019.

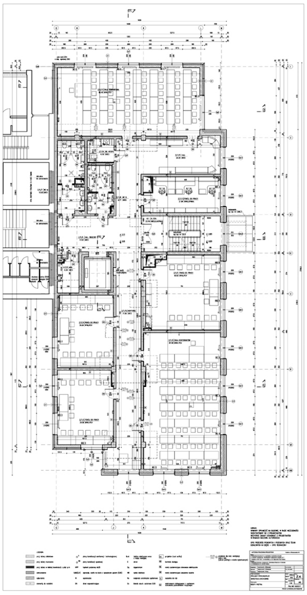
Fig. 1. Current appearance of the building, 04.03.2023; source: authors' archive

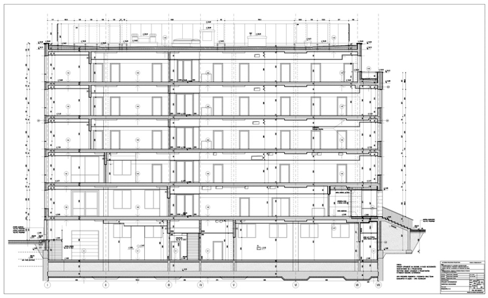
The next steps in modeling the prototype [8] of the digital building model are presented in Fig. 2. The methodology for creating a three-dimensional digital model of an object can be described through the following steps:

- Creating a grid of axes and levels from existing documentation.
- Inserting .pdf or .dwg documentation into data views (plans, elevations, sections).
- Establishing the level of detail for modeled elements in consultation with the building administration.
- Generating types of partitions and elements along with their corresponding materials from the documentation.
- Adding parameters enabling the control of the building during the operational phase.
- Modeling the building in the fields of construction, architecture, and installations, as well as site development design.

Summarizing the presented procedure stages in Fig. 2: in steps 1–5, it is explained how the multi-discipline model for the specified object was created. In steps 6–8, the process of entering data related to individual elements of the object is described, taking into account operational needs. Subsequently, it outlines how these data can be filtered and, finally, it demonstrates how changes can be made to the model using the Excel program.

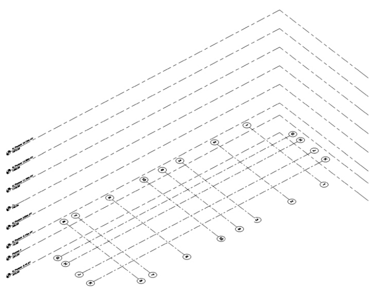
1. Preparing a template for standardizing the input of information about the facility based on the provided technical documentation (in the figures, sample floor plans and cross-sections from the provided documentation)

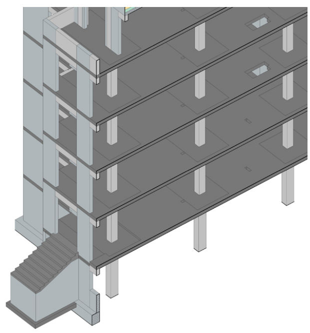




2. Adding axes and levels from the technical documentation

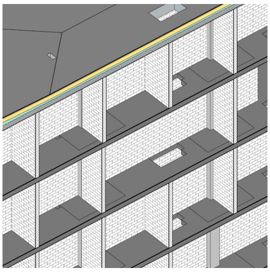
3. Creating structural elements



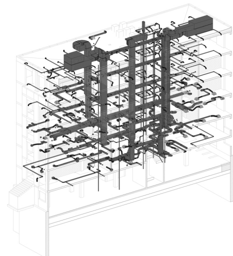


4. Creating architectural elements

5. Creating installation elements

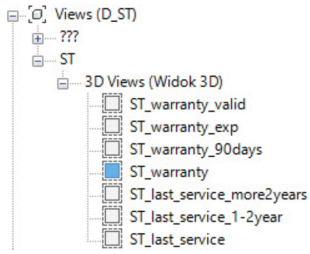


6. Example data regarding individual elements constituting the object, taking into account operational needs, including warranties and servicing



7. Creating appropriate filtering views to display the object based on the parameters introduced for operation

Data	
ST_documentation_URL	D:\PROJECTS\2301_AGH_D...
ST_last_service	20220915
ST_warranty	20230901
ST_documentation_symbol	AT-01



8. Enabling changes to be made in the BIM model using an Excel program

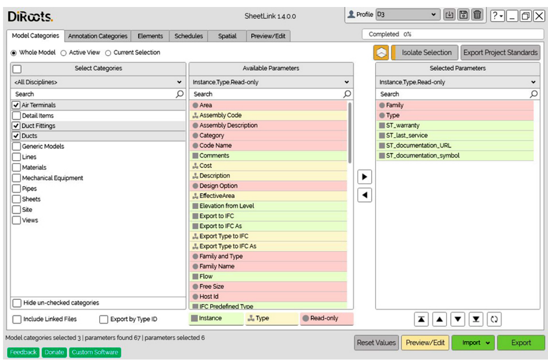


Fig. 2. The subsequent stages of modeling an existing objec

4. Implementation of the BIM model for operational purposes

In the context of building management using BIM models, the possibilities are extensive, but one of the more advanced applications is real-time monitoring of ventilation systems [9]. By introducing parameters and automation, the BIM model can be a tool that goes beyond being merely descriptive and becomes predictive. The process based on Building Information Modeling (BIM) for building operation consists of two main stages: BIM model preparation and building operation management [10]. In the preparation phase, models for the construction, architecture, and installations are created together. Then, model files are integrated, and specific parameters are added in Revit for the Technical Department. Standards for parameter completion and views with filters, displaying relevant model elements, are also established. In the operation management phase, the BIM model is used in a cyclical manner. Model elements are displayed in views with appropriate filters and then exported to Excel using the DiRoots plugin. Parameters are filled in Excel by the Technical Department and imported back into Revit, updating the model. This process allows for efficient building management, ensuring that the BIM model is always up to date and reflects the actual operational parameters. The subsequent steps of the procedure are illustrated in Fig. 3.

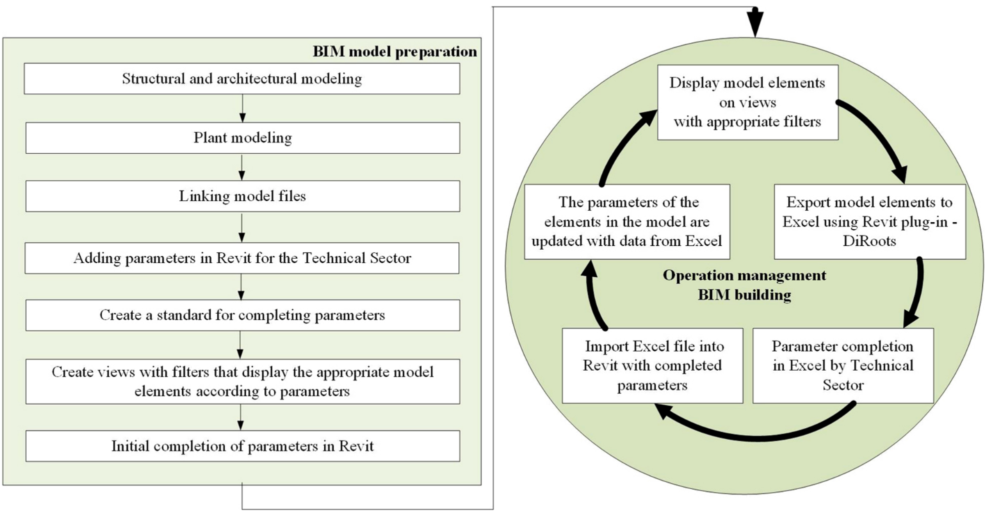


Fig. 3. The subsequent stages of modeling an existing object

The procedure we present aims to forecast future events in a building using a BIM model [11]. This methodology integrates structural and architectural elements with installations into a single model, enabling dynamic building management. A crucial aspect is the continuous update of model parameters based on real building usage data. The example below illustrates the implementation of the model for effective building resource management, using the example of ventilation system installation (Fig. 4).

An example of a ventilation installation in the BIM model is color-coded in various shades of yellow, providing a visual indicator of the technical condition and maintenance needs (Fig. 5 and 6) [12]. This greatly facilitates the work of facility managers who can quickly identify elements that require attention at a glance. The model parameters include the last service date, enabling the display of elements approaching the next inspection or maintenance date. Such functionality not only increases management efficiency but can also significantly reduce building maintenance costs [13]. Automating processes and continuously updating data allows

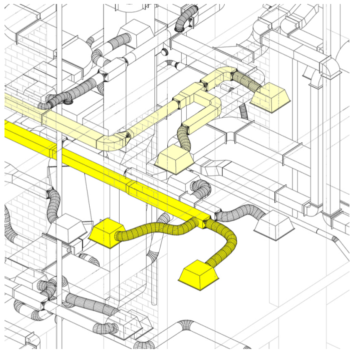


Fig. 4. Elements that require attention during the building's operation

focusing on planned repairs rather than reacting to breakdowns. Moreover, information about upcoming inspections can be easily exported to external databases, enabling integration with other management systems.

In this context, the ability to define access roles in the BIM model becomes even more important. Technical staff may have access only to the information necessary for their tasks, while facility managers can have a comprehensive overview of the technical status and maintenance planning [14]. All of this makes the BIM model an invaluable tool in building management, especially in the context of operation and maintenance.

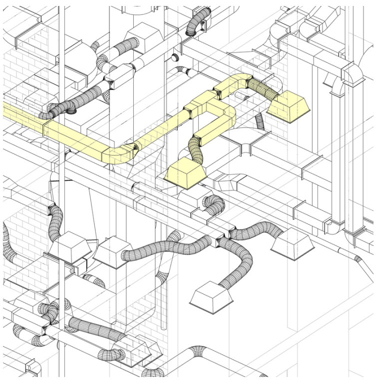


Fig. 5. Last service more than 1 year ago, less than 2 years ago. The inspection date is set for September 15, 2023

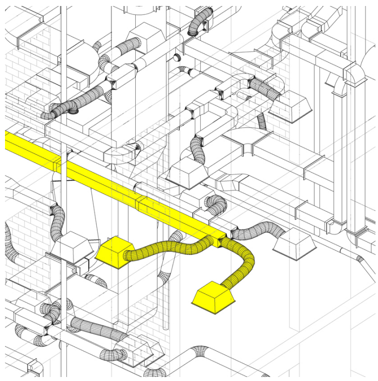


Fig. 6. The last service more than 2 years ago. The inspection date is set for September 15, 2023

Color-coding accessories in the ventilation system in the BIM model with respect to the warranty date is another example of an innovative approach to building management [15]. The warranty periods for the installation components depicted in the charts (2 years, 1 year, 90 days) have been agreed upon with the technical department and marked with different colors (Figs. 7–10). Thanks to this feature, facility managers can continuously monitor which elements are still under warranty and which ones require closer attention due to the approaching end of the warranty period or its expiration.

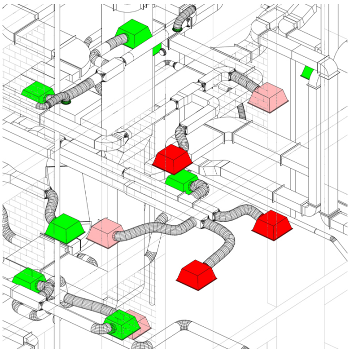


Fig. 7. Warranties valid (green), expired (red), approaching expiry, less than 90 days (light red). Inspection date: September 15, 2023

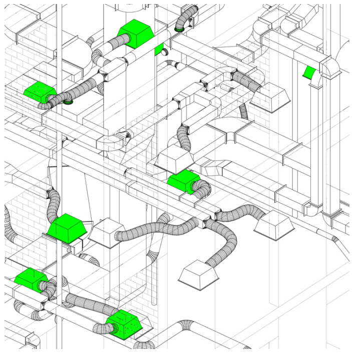


Fig. 8. Warranty valid

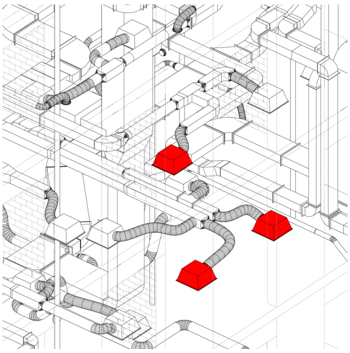


Fig. 9. Warranty expired

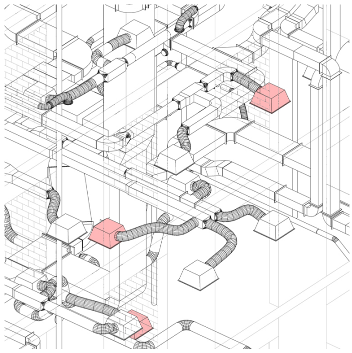


Fig. 10. Warranties valid less than 90 days

Color-coding elements in red serves as a clear signal that the warranty period has already expired. This is important not only in the context of potential breakdowns but also from a budget planning perspective for maintenance. Elements colored in green, on the other hand, indicate that they are still under warranty, which is valuable information for diagnosing any issues. The light shade of red for elements with warranties expiring within the next 90 days serves as an alarm feature, allowing managers to proactively react – whether by scheduling an inspection or replacing the element with a new one (Figs. 11–14). Inputting warranty dates into the program's parameters allows for the automation of this process and integration with other building management systems. Consequently, information is kept up-to-date and easily accessible to different users. This significantly streamlines management, and when combined with other BIM model features such as monitoring the technical condition and planning inspections, it becomes a comprehensive tool for effective building maintenance [16].

Importing data from Excel to Revit and vice versa is an example of flexible and efficient data management within the BIM model context. This is especially useful when different teams within an organization have varying levels of proficiency with technical tools.

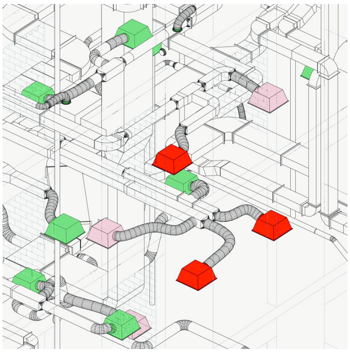


Fig. 11. Before extending the warranty period. View of elements with a created view filter.

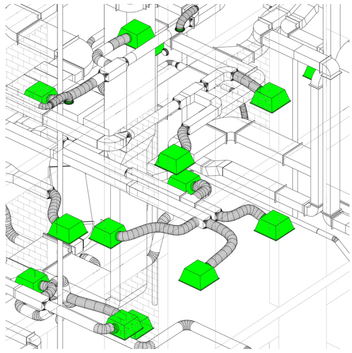
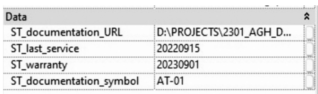
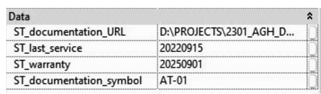


Fig. 12. After extending the warranty period. View of elements with a created view filter



Data	
ST_documentation_URL	D:\PROJECTS\2301_AGH_D...
ST_last_service	20220915
ST_warranty	20230901
ST_documentation_symbol	AT-01

Fig. 13. Custom project parameters for filtering elements. Before the change

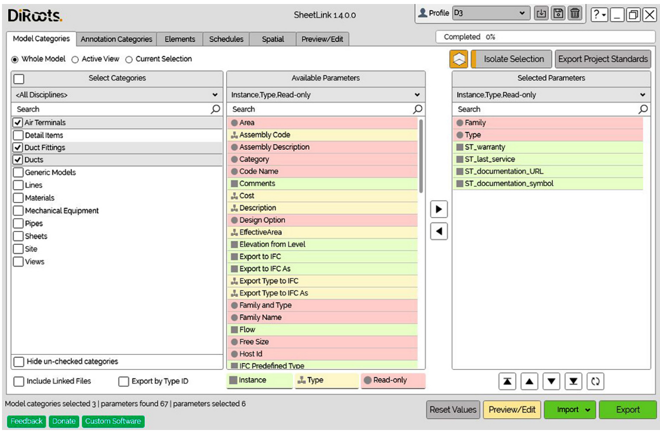


Data	
ST_documentation_URL	D:\PROJECTS\2301_AGH_D...
ST_last_service	20220915
ST_warranty	20250901
ST_documentation_symbol	AT-01

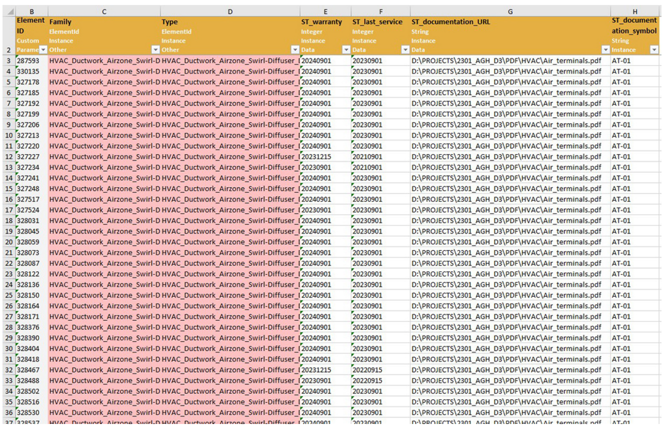
Fig. 14. Custom project parameters for filtering elements. After the change

In the case of Revit, which is a highly specialized tool, the ability to make changes in a more universal and widely known tool like Excel is a significant convenience. Technical personnel can focus on data analysis and interpretation without the burden of editing in a tool they may have limited familiarity with. Parameters set in Revit can be easily exported to Excel, where administrative staff can make changes related to new dates, planned inspections, and services. After the changes are made, the Excel spreadsheet is reimported into Revit, automatically updating the parameters of the BIM model. After importing the modified data from Excel into Revit, the model views are automatically updated according to the new parameters. As a result, model elements can be dynamically filtered and colored based on various criteria, such as upcoming inspection dates or warranty status. This functionality not only facilitates the identification of priority elements requiring attention but also significantly streamlines the management and monitoring of the entire facility. It is crucial that the person making changes in Excel utilizes the model at the browser level, for example, BIM360. They do not need to possess skills in Revit or have a program license. In the presented example, components are displayed in various colors based on the assigned warranty parameter, and depending on the valid warranty period (intervals agreed upon with the AGH technical department), they are visible in different colors on the model. Simultaneously, a user with access to the Excel file completes information about the warranty extension by modifying the data in the document. The Excel file is linked to the model, which is automatically updated with the added information using the DiRoots plugin. This ensures that after making changes, the model is updated with new information, allowing the user to observe whether all warranty inspections have been conducted, including those that are already expired (previously displayed in red) (Fig. 15).

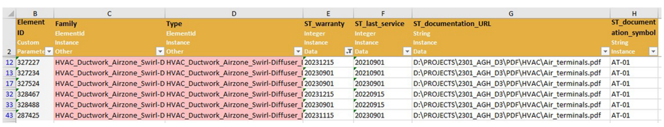
1. Exporting data using DiRoots

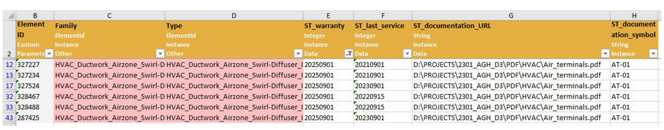


2. List elements in Excel



3. Filtered items based on the approaching end of the warranty period





4. Changes in the ST_warranty column for the given elements after extending the warranty period

Fig. 15. Importing data into Revit using DiRoots. Replacing the ST_warranty parameter for the specified elements in Revit. Automatically refreshing the view

The process of exchanging data between Excel and the BIM model significantly enhances project management efficiency and allows better coordination between different departments of facility management [17]. It also provides the ability to quickly respond to changes and adjust maintenance plans in real-time. Furthermore, it eliminates the technical barrier for individuals who are not familiar with advanced BIM tools but are responsible for managing infrastructure and planning.

5. BIM model in property management

Building Information Modeling (BIM) is not just a design tool but also an advanced platform for property management. Within a single integrated system, it allows for the storage of a wide range of information that streamlines various aspects of building management:

- Swift access to warranties and guarantees: Building elements and their warranties are color-coded for easy identification and prioritization of tasks.
- Advanced technical inspections: Information about past and upcoming inspections is readily available.
- Documentation in one place: Both current and archival documentation is easily accessible and protected from damage.
- Access flexibility: The model can be accessed from various devices with different permission levels.
- Budget planning and control: Information about costs and planned work is entered and monitored in real-time.
- Consumption and performance analysis: Monitoring resource consumption and device performance helps with cost planning and optimization.
- Safety and HSE (Health, Safety, and Environment): The model allows for simulations and analyses, such as evacuation scenarios, and stores all safety-related information.
- Automation and rapid data exchange: Integration with other systems like Excel or Revit enables easy data updates and exchange among different users.
- Scenarios and optimization: The ability to create different scenarios allows for analyzing the impact of various decisions on ongoing operations, including cost-related aspects.
- Reports and controls: It simplifies management and control through automatic report generation and the ability to attach photographic documentation.
- Communication and collaboration: Integrated communication tools and customizable permissions facilitate collaboration among different stakeholder groups.

BIM provides a comprehensive, integrated tool for efficient property management, covering basic information about warranties and inspections and extending to advanced analyses and scenarios.

6. Summary

Managing building facilities is a complex process, but leveraging Building Information Modeling (BIM) can significantly simplify and enhance this process. The enriched model, complemented with diverse data provided by stakeholders of the facility, becomes an invaluable tool for various aspects of property management. It enables the collection and effective management of all information related to the building, ranging from plans and drawings to technical data, documents, and photographs.

Using the model in conjunction with a spreadsheet for real-time data exchange facilitates controlling multiple versions of documents, allows for comparing different versions from various periods, and tracks any changes. This is particularly useful in the context of regular technical inspections and maintenance activities. Parameters such as warranty dates and technical condition are included in the model, enabling more efficient planning of these actions.

BIM enables cost management, from invoice control to expense planning and prioritization of different renovation works. It also allows for easily adding information in the form of photos, descriptions, and the location of observed defects using mobile devices like cell phones. This, in turn, streamlines communication between various stakeholders, enabling quick information exchange and action coordination. Finally, generating reports and analyses is facilitated by various filters that can be applied in the model.

The above examples are just some of the many benefits of advanced facility management using BIM, increasingly expanded and referred to as the ’digital twin”.

Currently, the development of various Common Data Environment (CDE) platforms for managing both documentation and the facility itself is rapidly advancing. There is also a growing number of offers for facility management not only during the design and construction phases but also in the operational phase. The authors are currently testing more comprehensive management software offered by manufacturers. However, the main challenge is its cost, which is currently challenging to convince property owners to adopt. The undeniable benefits of such solutions encounter significant resistance, with primary arguments against the use of platforms being the costs of purchase and/or subscription, lack of trust in new, untested solutions, concerns about complicated and difficult operation, etc.

The simple solution proposed by the authors, using an Excel spreadsheet, aims to streamline some of the repetitive and tedious tasks associated with continuous equipment checks in operational buildings. The presented solution is currently being tested on the university campus by technical sector employees for selected, modeled properties. These tests primarily aim to encourage users (building administrators) to use such solutions, ultimately convincing university authorities to invest in professional management tools. The function discussed in the article aims to demonstrate the simplicity of a tool that improves the management of selected building components.

This solution is intended to encourage property managers to adopt new solutions, showcase their potential, and simultaneously demonstrate ease of use. This, in the future, will enable a smooth transition to property management using a professional and fully functional CDE platform.

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Pilotażowe wdrożenie cyfrowego modelu budynku do zarządzania w fazie eksploatacji

Słowa kluczowe: cyfrowy bliźniak, faza eksploatacji, modelowanie informacji o budynku (BIM), utrzymanie i użytkowanie, wymiana danych, zarządzanie nieruchomością

Streszczenie:

Faza operacyjna stanowi najdłuższy etap w cyklu życia budynków. Podczas eksploatacji obiektów zachodzi konieczność wykonywania różnych działań, których celem jest systematyczne gromadzenie informacji dotyczących stanu technicznego i funkcjonalnego budynku. Zazwyczaj te działania są planowane i koordynowane przez właściciela lub zarządcę nieruchomości. Dotychczas te obowiązki wiązały się z dużym nakładem pracy, co wiązało się z koniecznością tworzenia dużej ilości dokumentacji,

zarówno w formie papierowej, jak i elektronicznej, w postaci protokołów, notatek i dokumentacji fotograficznej. Dlatego też warto rozważyć rozwiązania, które mogą usprawnić i zredukować liczbę działań potrzebnych do zapewnienia długoterminowej i efektywnej eksploatacji nieruchomości. Na rynku dostępne są różnego rodzaju narzędzia, od bardziej zaawansowanych po te prostsze, które mogą znacząco usprawnić zarządzanie nieruchomościami budynkowymi na lata. Ważne jest, aby te narzędzia były łatwe w obsłudze i nie wymagały zaawansowanej wiedzy technicznej, dzięki czemu mogą być wykorzystywane przez szerokie grono użytkowników.

Technologia BIM umożliwia wymianę danych pomiędzy wieloma interesariuszami na każdym etapie cyklu życia budynku. Wsparcie działań związanych z eksploatacją może obejmować:

– Zachowanie sprawności instalacji: Poprzez nadzór nad instalacjami dostosowanymi do różnych potrzeb użytkowników.
– Planowanie i organizację przeglądów i serwisów: Skoordynowane planowanie regularnych kontroli i konserwacji.
– Planowanie i projektowanie prac remontowych: Identyfikacja i priorytetyzacja prac remontowych, modernizacyjnych lub zmian w użytkowaniu budynku.
– Organizacja demontażu: Dla obiektów tymczasowych lub wycofywanych z użytku.

Informacje gromadzone podczas tworzenia modelu BIM powinny być dostępne w jednej wspólnej bazie danych, do której zarządzający budynkiem ma dostęp zarówno do przeglądania, jak i edycji podczas codziennych działań eksploatacyjnych. To pozwala na ciągłą wymianę danych o budynku w jednym, cyfrowym repozytorium, dostępnym dla wszystkich zainteresowanych stron.

Budynek, dla którego stworzono cyfrowy modelu budynku w programie Revit jest obiektem użyteczności publicznej znajdującym się na terenie kampusu Akademii Górniczo-Hutniczej w Krakowie. Autorzy proponują wykorzystać znany i łatwy w obsłudze Excel do bieżącej koordynacji przeglądów technicznych w modelu. W przypadku Revit, który jest narzędziem wysoko specjalistycznym, możliwość wprowadzenia zmian w bardziej uniwersalnym i powszechnie znanym narzędziu stanowić będzie duże udogodnienie. Osoby z sektora technicznego mogą skupić się na analizie i interpretacji danych, nie będąc obarczone koniecznością edycji w narzędziu, które mogą znać w ograniczonym zakresie. Parametry ustawione w Revit mogą być łatwo eksportowane do Excela, gdzie pracownicy administracji mogą wprowadzić zmiany dotyczące nowych dat, planowanych przeglądów i serwisów. Dzięki temu, elementy modelu mogą być dynamicznie filtrowane i kolorowane w zależności od różnych kryteriów, takich jak zbliżające się daty przeglądu czy status gwarancji. Ta funkcjonalność nie tylko ułatwia identyfikację priorytetowych elementów wymagających uwagi, ale także znacząco usprawnia zarządzanie i monitorowanie stanu całego obiektu.

Wykorzystanie modelu w połączeniu z arkuszem kalkulacyjnym do wymiany bieżącej informacji ułatwia kontrolowanie wielu wersji dokumentów, umożliwia porównywanie różnych wersji z różnych okresów i śledzenie ewentualnych zmian. Jest to szczególnie przydatne w kontekście regularnych przeglądów technicznych i działań konserwacyjnych. Parametry, takie jak daty gwarancji i stan techniczny, są zawarte w modelu, co pozwala na bardziej efektywne planowanie tych działań. Model BIM pozwala na zarządzanie kosztami, od kontroli faktur po planowanie wydatków i priorytetyzację różnych prac remontowych. Można w nim także łatwo dodawać informacje w postaci zdjęć, opisów i lokalizacji zaobserwowanych usterek za pomocą urządzeń mobilnych, takich jak telefony komórkowe.

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