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Application of Facility Management Information Tools for Registration of Brownfields

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Abstract: The recording of brownfields is a very important aspect of each prospering and developing municipality. Brownfields may hinder the development of municipalities; their technical condition or degree of contamination can present a hazard for the surroundings or their appearance may disturb the municipality's aesthetics. It is important to have a comprehensive overview of all brownfields and the related good quality records of such areas. However, in general there is no standard to order or recommend municipalities to perform such recording and the current status of these recordings is insufficient. Facility management is a field involved in the management of property, where good quality recording ensures the efficiency of all activities. This field uses information tools to create and maintain data in time for future use throughout the whole life cycle. Information tools can be used for all types of properties, including brownfields. Clear and uniform records guaranteed by the environment of facility management information tools provide a solution to this issue.

Key words: Brownfield, CAFM, database, facility management, hazard, activities

INTRODUCTION

For each municipality or town the issue of brownfields is a very weighty issue which needs to be solved in a timely and effective manner. These properties (brownfields) may pose certain, often insurmountable, barriers for the development of municipalities and towns and, at the same time, they can become hazardous to their surroundings, especially with respect to various social, cultural and environmental features which many of them pose. These issues are often related to poor records. Some are not recorded at all while others are recorded poorly, insufficiently or in such a way that their mutual comparison or related works are useless. All together this forms a unit of very inefficient management.

The assurance of efficient regeneration or conservation against further degradation of these areas is contingent upon proper records including information about their condition, i.e., degree of contamination, age, size, extent of damage, classification, technical condition and other important features and relations. Standardized and uniform records which contain all the important information present a significant initial starting point (element) for comparison of brownfields between each other and subsequent evaluation for further procedures. Only high-quality data with good representation value can be used to set regeneration plans or mitigation measures. Also, when arranging database items, the different needs and different viewpoints of the investor, municipality or other involved parties using the provided data must not be omitted. Facility management is a field focusing on the efficient management of all types of properties utilizing information tools such as databases for maintaining and subsequently working with data.

These software tools are designed primarily for efficient and economic operation throughout the life cycle of the monitored properties (properties of interest). Passportization, i.e., recording managed properties in greater detail, is one of the most important tasks (Ceselsky, 2011). Only a high-quality database of up-to-date data leads to further efficient work. Facility management is a field which uses software solutions for very clear working with data about properties. The sophistication and functionality of these software tools offers a broad spectrum of options on how to further utilize, analyse and evaluate the data. Due to these

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benefits, compared to commonly available and typically used software and accesses, the records systems can be made more efficient in the future.

MATERIALS AND METHODS

Current approach to brownfields records: Brownfields can be defined as locations which are currently wholly or partly unused and are burdened by the consequences of formed exploitation; they are dilapidated, compromising the aesthetics of the surroundings, they may endanger the health of the inhabitants or present negative impacts on the environment and therefore it is necessary to regenerate them. The brownfields themselves hold great potential for subsequent development. However, they may become one of the main factors of stagnation of such development. Brownfields are part of almost every municipality; therefore, their registration should be thoroughly processed so that it becomes the cornerstone for development of their potential. Everything depends on the approach of the respective municipalities and their attitude to this issue as Czechinvest mentions.

Currently, there is no regulation or recommendation for the registration of brownfields which would guarantee uniformity and quality across all municipalities. This leads to an extensive, low-quality and stagnating development of municipalities due to the existence and underestimation of problems related to brownfields. There are several websites which associate individual brownfields and register their condition. They have standardized regulations for entering data and a uniform data structure. These can be a good tool for general registration, comparison and overview. The problem can lie in the inability to quickly modify data, enter or add other necessary data or relation to other functions of desktop software for evaluation and analysis. Generally, the nature of registration across municipalities can be divided into three groups:

- Municipalities with sufficient and good quality registration
- Municipalities with insufficient and poor quality registration
- Municipalities with an absence of any registration

These differing approaches lead not only to the deceleration of municipality development but they can also cause other problems related to brownfields in general. Based on the condition of brownfields registration in the Czech Republic, databases can be divided into two basic groups: Publicly accessible databases on the websites of respective organizations collecting substantial information about the individual locations (e.g. Get more) and sometimes with the possibility of viewing more detailed information after registration (e.g. CzechInvest). Databases processed by the municipalities themselves. These are typically not published in full extent. The level of this registration is usually high, containing more accurate and detailed information. The advantage during processing is good knowledge of the environment and history of the individual locations.

Facility management and its benefits for processing data about the properties of interest: Facility Management ("FM") is a field and theory which is used primarily in the commercial sphere for more efficient and economic management of properties and operation of buildings. FM itself is not a field which executes supporting activities related to the management and operation but it is a management activity which controls all activities important for making operations more efficient, managing a team of people involved in administration of buildings and supervising the quality of execution. Furthermore, it evaluates and analyses areas in which costs can be reduced and seeks the ideal solutions to specific situations (Strup, 2014).

Some foreign sources state that correct implementation of facility management can save up to 30 % of operating costs. These high results can be achieved in the long term, however, good quality FM services can achieve savings of 5-15 % already in the first year. These costs lie especially in higher quality registration of managed properties, finding duplicate items, absence of individual services and thorough supervision and control (Strup, 2014). Compared to the formerly used "3P" (Personnel, Places, Processes) definition of Facility Management, today the more widespread "5P" definition is used which puts the person into the spotlight and adds the Planet and Prosperity aspects. With respect to registration and regeneration of brownfields, the two new components are intensely applied in this approach; Planet ecological frugality to nature and the surroundings and Prosperity economic efficiency and economy of the utilization of brownfields. The mutual relationship of all five components is illustrated at Fig. 1. From the available resources from National Database of Brownfields and get more by Regional Development Agency Ostrava, a.s., related to registration of brownfields, whether directly or indirectly, it is possible to state that the selected method of registration, content, structure, descriptive or numerical data, etc., often do not lead to obtainment (or provision)

Fig. 1: "5P" facility management definition

of information for their further utilization or analysis and their disunion does not allow mutual cooperation and comparison. It is exactly these insufficiencies that are enabled to be resolved by facility management tools.

Significance of quality registration of data during property management: Good quality registration of data on the managed property is a basic prerequisite for the efficiency and economy of related activities. The level of quality of registration is a very important component for any management of properties. Registration should be uniform, comprehensive, clear, high-quality and standardized. By maintaining several basic rules of registration the maximum potential of data utilization can be achieved. The uniformity and standardization enables simple comparison and control; comprehensiveness and clarity is the prerequisite for time efficiency. The level of registration quality prevents the making of mistakes by decisions caused by a lack of information and the related poor evaluation and negative impacts. This leads to extra costs related to remedying of such mistakes. During the registration of contaminated locations or dilapidated parts of properties it is very important to register the degree of contamination, type of contamination, extent of damage and deterioration or whether any intervention is necessary.

Sources of data are also an important component. Sources should be primarily verified and up to date.

Sources can be of various forms-from drawings in electronic format or digitized paper documentation, through contact with persons, to various general registers (Vyskocil and Frantisek, 2011).

Data administration and processing: Processing of data is a very individual matter. The respective areas of property management often require a different approach and their utilization. Facility management during administration of a larger number of properties utilizes some information tools. These tools are a very important part of FM and their introduction makes a great contribution to the subsequent cost savings, efficient development and utilization of the potential of properties. The systems form a comprehensive database of managed properties. During the management of properties and assets in general, several types of data are used. These include static, dynamic and output data. Static data is registration data (or passportization data) about the managed properties, i.e., data about buildings, areas, equipment, etc. Dynamic data requires static data for its registration. Dynamic data means an overview of processes and activities. This data changes in time. Output and information data is provided by reports (outputs) and is typically used for analytical analysis and planning (Vyskocil and Frantisek, 2011).

Currently, static data is used exclusively for processing databases about brownfields, i.e., text

description of the current condition of properties and numerical data (area, number of buildings, built-up percentage, etc.). Therefore, only a processed and managed database of high quality can provide for thorough analyses and proposals for change, new utilization or regeneration of respective brownfields.

RESULTS AND DISCUSSION

Possible utilization of facility management information tools for the registration of brownfields: In general, facility management works with a large volume of information about the managed properties and their utilization but also with people working directly in the buildings or who maintain them. Such large volumes of data must be processed by high-quality software. Today, many managers and owners of buildings still work with data only in printed form without good computer registration which is highly inefficient and uneconomical in the long-term, sometimes even dangerous. Of course, the human factor is still necessary in this field, nevertheless, without the help of computer software no progress and cost savings can be achieved. It is a very individual question as to how powerful and sophisticated tools to select for managing properties. In many cases a normal table editor such as Microsoft Excel will suffice for creating a database about the managed building, its spaces, general information and potentially simple registration of services related to the property's management. Such a tool can be sufficient for managing one or several smaller buildings. However, if numerous larger buildings are managed, it is evident that a high-quality powerful tool is required for total management. For this purpose the so-called CAFM systems were created, i.e. Computer Aided Facility Management which is designed for managers not only as a concise information database about all the buildings and details related thereto but also for planning, checking, grouping of services and contracts or orders related thereto, clear reports or outputs for analysis of processes and much more. Compared to Microsoft Excel, these systems are directly adapted for the registration of assets, having a clearly defined structure and standardized regulations for entering information to the system which is the basis for comparison and simple retrieval of the necessary data.

The main advantage of CAFM systems is the possible interconnection with CAD (2007) or GIS environments. Therefore, one can achieve even greater oversight, quick retrieval between the database text section and maps or drawings, as well as their interconnection during data editing. At this point, it should be mentioned that all serious companies involved in distribution of CAFM systems for facility management modify the system according to the customer's requirements to make it fit the expectations and intentions of the customer. This is very important because each municipality has its specific requirements and the character of brownfields is quite often very different. However, during application it is necessary to maintain at least the basic structure of registered data to enable mutual cooperation between municipalities or at higher administrative levels.

CAFM systems: Computer Aided Facility Management systems are systems intended to facilitate the work of facility management in managing properties. These systems are designed primarily to manage supporting processes for FM, their registration and potential planning and evaluation. CAFM systems are being continuously perfected to cater for the modern and new requirements of customers. It could be stated that, due to the development of systems around the world, only systems which provide a static, dynamic and output data section can be called true CAFM systems. These are such systems which cover all the known areas of supporting process activities (Vyskocil and Frantisek, 2011) as also mentined on IT support for facility management. There are modules which are solely focused on contaminated properties and register important information related to such contamination and properties in general. These modules serve as a tool for planning regeneration and subsequent renewal of their utilization. Individual CAFM systems are interconnected and registration of properties can be simply created by adopting and connecting the data. Also, data from other modules can be used, including utility networks, important buildings in the vicinity, persons and documents connected to the building, etc. These modules would be significant for brownfields. An overview of modules in the process of brownfield registration is available at Fig. 2.

Web applications: Compared to classical desktop systems web applications are used for simple management related to asset management. They are typically used as support software focusing only on one module from the whole spectrum of functional CAFM systems and provide for flexible access from any place with a simple internet connection. This provides quick reaction, possible modifications and changes in access to data from any computer. They are generally less demanding of software and operation, clearer due to fewer components and their sophistication is not so high. They are typically used for registration purposes (or passportization) with simpler functions. They also provide the necessary reports (outputs).

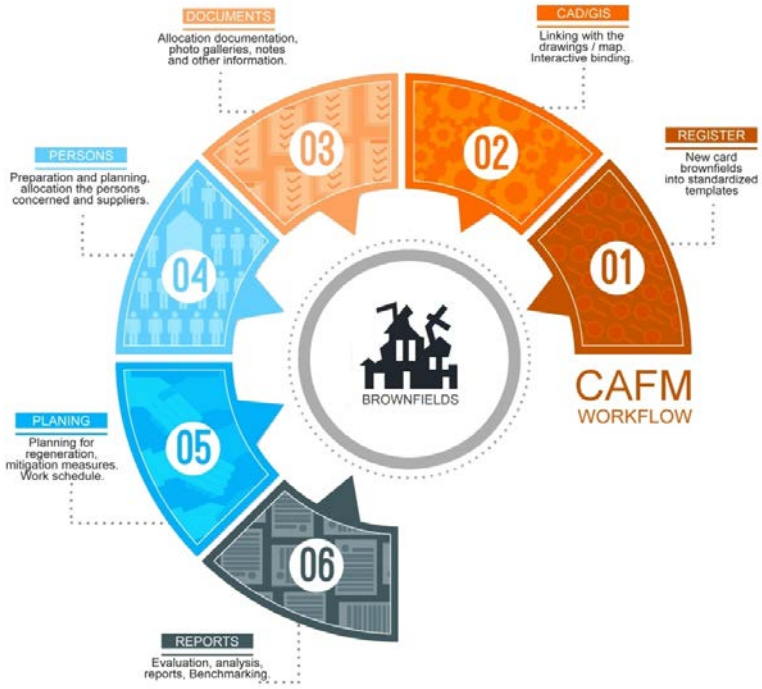

Fig. 2: CAFM systems and their features in relation to brownfields

They can be used as a unified database for entering and viewing data by numerous users (municipalities in this case) and thereby compare and evaluate data against each other in a larger extent. Just like in desktop systems, single users can set rights and accesses (entering data, data modification, read-only, etc.). In the Moravian-Silesian Region there is a large number of municipalities with 500-3000 residents, municipalities with a larger number of residents are scarce, therefore, the significance of small municipalities must not be omitted. For these municipalities it is difficult to process the registration of brownfields, thus it becomes a type of burden for them. However, these municipalities are a significant link during processing of extensive databases, especially in terms of simplification of onsite investigation. The above-mentioned web application holds the key to facilitating more efficient and easier processing of databases for these smaller municipalities.

Interconnection of CAFM with municipal databases: In light of the above description of these information tools for facility management we can state that they create concise registration databases of properties in municipalities. The registration in these systems is very transparent and user-friendly. CAFM systems are based on registration of assets; however, their main component is a whole host of related modules which are designed for efficient management and operation. These systems are designed for the entire life cycle of buildings and if brownfield regeneration without need for demolition follows onto the renewed utilization of these properties, the created databases can be used for subsequent facility management. This can be appreciated especially if the property remains in the municipality's ownership. If the property is privatized after regeneration, the registration of property data and history can represent added value during sale. Even demolition can be part of the management process through the information tools for planning and subsequent utilization of the newly-created land.

If we choose a more powerful desktop tool for registration we can make use of possible interconnection of the database with CAD and GIS environments. Using such connection we can easily search for registered brownfields on maps, analyse their locations in relation to municipalities and other registered data and evaluate the subsequent regeneration. In the case of less damaged buildings which are not intended for demolition, if we have at least some drawings we can interconnect with CAFM and subsequently analyse and plan, for example, partial use of the property. Vitkovice in Ostrava can serve as a specific example of the diversification of utilization of brownfields through their level of damage and large scale area, where the application of interconnection with CAD or GIS is highly suitable. This area is a very extensive complex of buildings-brownfields. Some of this area is

used for various purposes, including educational trails, etc. but a large portion has already become hazardous to its surroundings and their management must consider this criterion. These systems provide for efficient and simple changes and modifications in the registration database. According to information from Mr. Stukner .

Another section focuses on documents and contracts related to the buildings or land. Powerful tools also include management of documentation. If we perform activities related to maintenance, repairs or regeneration we can allocate supplier contracts. This is used primarily for simple retrieval of parties guilty of breaches and making subsequent claims. Documents can be "attached" at various system layers to individual items so that retrieval is simple and quick. Another component enables filtering and searching in the entire database based on selected criteria. This provides for even greater clarity and data processing efficiency. A unified and standardized database which guarantees that the same element on another object is registered in the same level, prevents "loss" of information during processing of large volumes of data and provides for its quick accessibility without the need for tedious retrieval.

CONCLUSION

The facility management information tools are intended primarily for management and operation of properties during their common operation and functioning. Nevertheless, it must be said that in relation to the problems and nature of brownfields, they are intended for the entire life cycle of the property, including demolition or regeneration. Not only these two stages but also the nature of respective brownfields, such as desolation or contamination, can be included in these information tools and subsequently used. The individual examples of management or registration may differ across municipalities or they may be unified and recommended, if this issue is handled similarly. Data exchange and experience during work with information tools can save municipalities time and improve the quality of their use. The present day is inclined towards unification and cooperation. Many unified databases are being created, Clouds, hardcopy documents are being digitized which all leads to accelerated and more efficient work. Comprehensive management of municipalities is contingent upon high-quality registration of brownfields, unified data and the option of working with them in time. All this is guaranteed by FM information tools. Unified and standardized registration is a suitable base for comparison of brownfields between each other and their subsequent evaluation in terms of regeneration, analyses and overview of problems which the respective brownfields are facing.

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