Great savings in property operation using BIM models

The OrthoGraph with connected building operation systems like IWMS (Integrated Workspace Management System), space management (CAFM = Computer Aided Facility Management System), maintenance management (CMMS = Computerized Maintenance Management System) etc. are capable of achieving significant savings throughout the entire lifecycle of a building, in numerous fields, from construction until eventual demolition. Over the course of the expected 30-50-year lifecycle of a building, in most cases these savings even exceed the total development cost.

Savings of 5-10% can be reached when settling accounts with subcontractors when you know the precise quantities, but this saving can be made several times over in the operation of the property when you have up-to-date data, supplemented with effective planning and communication regarding subcontractors and staff. The scale of this saving can be as much as 10-20% of the ongoing maintenance costs annually, which can accumulate to a huge saving over the entire lifetime of the building. The situation is the same in the case of rental, property utilization, precise data and documentation are not only necessary so that good decisions are made, their presence can even represent several percent in the property's value in the case of a sale.

The present document details the savings you can make in various fields with if the properties are operated using real OrthoGraph BIM models and a CAFM system built on it. Under every subject we detail the causes that have resulted in the savings, and discuss real daily problems and how to solve them. In many cases keeping the basis of the entire system, the BIM models up to date in many cases is done as a "side-product", in other words keeping the live data constantly up to date does not involve any extra work or expense. As a result communication between the maintenance personnel on site and those sitting in the office becomes instantaneous, and significantly simpler than keeping in contact by telephone and, of course, in person.

The mentioned functionality and integration can be achieved by using most IWMS, CAFM and CMMS systems with the same results mentioned in the document. The key of achieving the results is to base the operation on real-life data and making the information available not just in the office, but also on-site. Existing integration functionality is available with Archibus' IWMS system and can easily be extended to any kind of existing building operation or enterprise resource planning software system.

Significant savings can be expected in the following areas as a result of the use of the OrthoGraph together with a CAFM and CMMS system.

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New property construction, development phase

Settling accounts with subcontractors on the basis of precise data

Expected profit: 5-10% reduction in development cost
Expected cost: 0.1% of investment cost
Products used: Leica BLK360, OrthoGraph Enterprise

If use of the OrthoGraph and Leica BLK360 systems is started at the development stage, significant savings can be achieved already at that time in the knowledge of the precise, measured values. This is because, on the one hand, by using the surveyed models settling accounts with subcontractors can take place on the basis of precise data, and, on the other hand, the building models created can be used later on directly in the facility management system as source data.

Using the periodical laser measurements performed and repeated with the Leica BLK360 the various construction phases can be easily identified and the entire building documentation is available in a layered structure. Additionally this data may serve as documentary evidence when settling accounts with subcontractors.

Surveying and registering the built-in equipment

Expected profit: as much as 100-300% of the investment cost on guarantee maintenance and in numerous other ways in the course of the operation of the building
Expected cost: 0.025%
Products used: OrthoGraph Enterprise

All built in devices, building engineering elements and all equipment that may possibly be covered at a later stage, such as by false floors and ceilings, can be registered during construction. When equipment is recorded this does not only mean that dimensions and position are recorded, it includes other parameters too, such as serial number, guarantee period, capacity, type number and even a photograph of it.

This information is automatically available in the connected CAFM and CMMS system, already at the moment of occupation.

These same elements included in the building model can be linked to any other system, such as a building automation system.

Later on construction surveys can prevent many problems and expenses

Expected profit: a reduction of 0.5-1% of the annual operation cost over the course of the entire lifecycle of the building (accumulating to as much as 15-30% of the investment cost in the entire lifecycle)
Expected cost: 0% in the case of surveys performed during the development stage
Products used: Leica BLK360

It should be noted that as a consequence of the detailed documentation any reconstruction or repair work taking place in a later operation phase can be supported with the Leica BLK360 system with the ability to perform any subsequent measurement on the intelligent panorama photos made during the construction phase. In this way plumbing connections and electrical fittings can be located and accessed with minimum wall demolition. In the same way, damage can be prevented with them in the case of

damage caused when the under-floor heating systems are drilled through when installing a simple door frame, for example, in other words the safe work-positions are located using precise measurements made in the point cloud before any work in covered areas is carried out.

Several percent increase in value of property sales and valuations

Expected profit: 2% increase of sale value
Expected cost: 0%, if the model surveyed during the development is used, otherwise 0.025% of the investment cost (an even smaller part of the sale value), as long as a dedicated survey is carried out before occupation
Products used: Leica BLK360, OrthoGraph Enterprise

In the course of the sale of a property, the handover of the property also involves its detailed documentation. This represents value and a guarantee for the buyer, because the condition at handover is recorded. Today, if any implementation building documentation is available at all, it is usually non-reusable and typically deviates by as much as 5-10% from the actually realised situation. In the case of the use of the OrthoGraph system the emphasis is on surveying speed, the quality of the models produced, and on the ease of use of the results, in which OrthoGraph offers an unparalleled service currently unique on the market.

Leasing phase, communication and marketing tool

Expected profit: significantly swifter negotiations and decision-making by the lessee, less time vacant
Expected cost: 0%, if the model surveyed during the development is used
Products used: OrthoGraph Enterprise

OrthoGraph is not there to replace desktop design programs, instead it is able to provide them with a finished condition as a data source in numerous CAD formats.

When the lease negotiations are taking place in connection with any office, shop or industrial unit, precise onsite building models can be presented at these meetings in order to confirm furnishing concepts and floor plan changes. At this time both the lessor’s agent and the client have the opportunity to jointly interpret not only the floor plan easily, but also the desired furnishings with the help of the 3D model. The building model jointly established and agreed to can be shared immediately with the client in the form of a link that can be viewed later on simply, using a web browser, and the professional interior design plans can be drawn up in parallel with this.

Another important advantage of the use of OrthoGraph is that area data can be produced at any time, even during meetings with clients, including painted area data, door and window area data, in other words good cost estimates and utilization efficiency estimates can be made even during the negotiation phase.

Property survey at occupation

Expected profit: 100-300% of the investment cost in the cases of those items detailed below
Expected cost: 0.1% of the investment cost if the model surveyed in the course of the development is not available
Products used: OrthoGraph Enterprise

Surveying an existing building can bring about significant savings when the building was not surveyed during construction, i.e. precise floor plan information is not available. These models can provide precise data for the leasing, utilization and maintenance management of buildings, in addition the information is not only stored on paper in a warehouse, but is available immediately in the office during operations, and even on site. Access to data takes place directly at element level, in other words you don't have to search for anything, the maintenance instructions, videos, and even guarantee documentation can be linked to the surveyed and managed elements.

The total savings that can be achieved by using an up-to-date property model may exceed the total investment cost of a building, with 100-300% savings being achieved over the course of the typically at least 30-year lifecycle of building.

It is important to note that these savings do not only originate from the mere availability of the data, by using them lease, operation, cleaning and other property subcontractor contracts can be concluded with better conditions, and a smaller maintenance team will be able to provide a better quality service than without the data.

Extra services can also be offered to tenants using the graphic models, which result in an increase in income in addition to a higher level of service and greater customer satisfaction. Such may include, for example, in the place of/in addition to a basic-level telephone fault reporting service, a graphic 3D model can be used to report problems. With this the tenants and the staff do not only find it easier to report faults, the status of the reported fault can be traced directly, while the maintenance personnel are notified immediately, even including automated scheduling.

The precise possibilities and advantages are detailed below:

Precise calculation and handling of leased areas

Expected profit: the area determined in lease contracts is made available precisely, risk reduction
Expected cost: 0% if the floor plan of a previously surveyed building is available
Products used: OrthoGraph Enterprise, Space Management system

When leasing out property, or afterwards it is necessary to know the precise size of the area leased. The simple availability of this data does not only make concluding the contract faster, if the values are precise, they can be used later on to prevent disputes.

After the entire surveyed room structure has been loaded into the CAFM system's space management module, it also receives the calculated data, meaning the net, gross, leasable, cleaning areas, painting area and area covered by doors and windows. When carrying out these calculations the OrthoGraph system pays attention to the smallest of details, for example, it subtracts the area covered by columns from the leasable area, or the area covered by built in furniture from the cleaning area, of course, if set in this manner during the survey.

The surveyed and calculated data are updated in the case of each plan amendment. It is this up-to-date information that forms the basis of the area management module of the CAFM system.

For each single room most CAFM systems can record who the tenant is, what contract the tenant has, the lease ratio and time interval. As a result the monitoring of contracts, their planning and account settlement becomes significantly simpler.

By using the reports made by the analysis module of the CAFM system, you can find out about contracts that are soon to expire, so they can be extended in good time.

Precisely contracted cleaning expenses

Expected profit: 2-5% reduction in cleaning costs over the course of the entire lifecycle of the building
Expected cost: 0% if the floor plan of a previously surveyed building is available
Products used: OrthoGraph Enterprise, CAFM, CMMS

The OrthoGraph system does not only calculate the area of rooms, it can also determine the area covered by doors and windows and by objects placed on the floor. This means that if the survey is performed at the appropriate standard, the application will automatically calculate the precise areas that need cleaning, from which the areas of built in furniture, cupboards, columns, larger machines or the areas agreed to can be deducted, even automatically.

The complete cleaning plan can be drawn up and scheduled in the maintenance management module. It can be used to set the different scheduling of the individual room categories, to issue work sheets for work being done, and to check completion of the finished work and to settle accounts.

With precise data, a detailed cleaning plan, and with precise area information not only on the tenant, building section or entire building level, instead, with global data comprehensive subcontractor contracts can be concluded with better conditions.

Accounting for renovation work on the basis of real data

Expected profit: 5-10% reduction of the costs of renovation work from work estimation and settlement
Expected cost: 0% % if the floor plan of a previously surveyed building is available
Products used: OrthoGraph Enterprise, CMMS, Leica BLK360

Planning renovation work demands precise floor plans. There is a real difference between cabinets just about fitting in and just about not fitting in a given space, and it also does make a real difference that quotes and payment for work take place on the basis of the right information. If old building documentation is available, as a result of construction differences and changes made in the meantime, its data can characteristically deviate by as much as 5-10% from the real building dimensions and arrangement.

In many cases, when requesting quotes it is necessary to know the dimensions of the painted surfaces, of the wall surfaces and even of the doors and windows. The OrthoGraph system is able to supply this data immediately.

During remodeling work the electrical and other building engineering systems become accessible. It is worthwhile surveying these during any remodeling work using the Leica BLK360 laser scanner, because then every element will be measurable in the course of any later reconstruction or repair work. By using

the system a water connection, for example, can be installed with minimal wall demolition, because in the laser point cloud everything can be measured and located at a precision of greater than 1 cm. Due to this the amount of demolition and repair work can also be significantly reduced.

If only the OrthoGraph component is available, it too can be used to measure the areas and surfaces when work is being handed over, which does not only form the basis of the settlement for the work, also up to date building documentation is also drawn up as a result, and so operation can continue on the basis of precise data.

By using the maintenance module all reconstruction work can be planned and scheduled, and the entire work process can be handled by using the worksheets based on measured data supplied by the OrthoGraph BIM model.

Graphic asset inventory

Expected profit: saving of the entire stocktaking fee, but you still have a constantly up to data inventory in order to comply with the legal prescriptions
Expected cost: On one occasion the production of a complete graphic inventory, then keeping it up to date with the help of the maintenance personnel
Products used: OrthoGraph Enterprise, CAFM, Accounting system

In most large companies stocktaking is periodically compulsory. With the use of the OrthoGraph system the stocktaking can be carried out on one occasion in full, graphically, in about the same amount of time required to carry out a normal, non-graphic inventory.

The completed asset inventory handles the elements linked to specific rooms as a consequence of their fixed graphic positions. This means that the asset information can be reused in numerous ways, monitoring moves means simple floor plan movements, which the maintenance personnel / move coordinators can also carry out. Due to the fact that the OrthoGraph system can handle barcodes (or even NFC chips), actually finding assets is performed simply, by using a mobile application on site. In this way personnel can monitor movements significantly faster, with less investment of energy, so that the inventories are always up to date.

The assets are not only allocated position, type and a barcode, but any information that may be required at a later date for the operation of facilities. The installation dates of the assets can be set, as can the guarantee period, manufacturer data, attached documentation and even photos and videos to assist maintenance. By the deep level of integration this information is accessible in both the OrthoGraph, and in the CAFM/inventory system, in other words users can access them and check them anywhere.

The CAFM system receives the movements from the OrthoGraph system automatically. So the movement of inventory assets can be immediately linked to the cost centers on the basis of the business branches, department or tenants coupled to the rooms. The inventory sheets can be queried from OrthoGraph from only one room level Excel file, from the CAFM system according to any breakdown, in this way legal obligations can be complied with at any time at the click of a button.

Due to the fact that the data and position of the assets are available in the BIM model, this information can be used in numerous ways to support day-to-day operations, for example, assets can be located very

quickly when handling faults, and maintenance data and documentation are available and can be updated on site.

Maintenance management

Expected profit: 10-20% saving of maintenance costs over the entire lifetime of buildings
Expected cost: Performance of a graphic inventory on one occasion, monitoring of larger moves and remodeling work
Products used: OrthoGraph Enterprise, CMMS, Leica BLK360

This functional part most probably results in the greatest savings, which, in addition to ensuring a reduction of costs, also involves an improvement in the quality of the property operation service. This is partly a result of the lower maintenance personnel demand, the comprehensible maintenance processes, prompt communication, the significantly shortened travelling and element-locating time, and the up-to-date building documentation created as a "side product". With the implementation of suitably scheduled and planned maintenance work the number of unexpected breakdowns and outages can be reduced, which can be further improved by connecting the building automation and production line analysis systems to the operation of the CMMS system. Through this, in addition to the fewer downtimes, the maintenance cycles can be extended to correspond to the actual use, meaning that the filter in a fan coil unit only has to be replaced if made necessary due to the amount of use.

It is important to note that the planned downtimes can even result in even more savings in many cases, such as lower back-office service costs. Unexpected downtimes occurring on the manufacturing, production side of enterprises can cause outages of main activity, due to this well-planned and implemented facility management indirectly results in even greater savings than merely a reduction of the daily operation overheads.

The greatest advantages of the OrthoGraph-CAFM/CMMS system pair can be found in the following areas of maintenance work:

Building documentation that can be used for measurements at any time

Expected profit: 5-10% cost reduction, but in the case of an emergency this documentation could save lives or act as evidence
Expected cost: 0% if scanned building documentation is already available in the course of any construction or remodeling work
Products used: Leica BLK360

It is best if there is the opportunity to survey all building engineering elements, cabling, ducting and all other data to be concealed in the course of the construction or refurbishment of buildings. This has to be performed with the Leica BLK360 laser scanner, which records a momentary precise and measurable status image of the site.

The documentation created in this way can be used effectively for the planning of later reconstruction or extension work and for minimizing the costs involved. If the requirement, for example, is to create the water supply connection for a new shower unit, by using the measurable panorama views recorded by the Leica BLK360 during the construction or reconstruction, the water pipes and connections available in the wall can be located at precision under 1 cm. It is then sufficient to dismantle just that few square centimeters where the water connection needs to be installed. This does not only reduce construction

costs but also a great deal of working time, because the locations can be handed back more quickly and put to work.

Rarely there are times when in the case of an unexpected fault, damage or emergency it would be good to find out precisely how the given room, building section or engineering block looked. Faults may occur in gas, water or electric lines when their environment has to be checked for the presence of other systems that could represent a significant risk of damage before repair work is started. In situations like these the Leica BLK360 system may be used in order to minimize damage and injury, or, in the worst case, to provide evidence of the given situation before the event. In all cases by using the Leica BLK360 application the data can be retrieved immediately and inspected even on site.

Effective finding and repairing of burst pipes and thermal bridges

Expected profit: 50% cost reduction
Expected cost: the price of one or two laser scans
Products used: Leica BLK360

The Leica BLK360 system also has its own thermal camera. This means that in addition to panorama images and point clouds, fully corresponding horizontal thermal camera panorama images are also available.

It is in the most rare of cases that the damp patch occurs precisely at the location of a burst pipe. Using a thermal camera image and then the point cloud the coldest or warmest point, i.e. the source of the fault, can be located with good precision.

This same solution can also show the locations of thermal bridges and bad insulation, in other words it can be easily seen where the building's heat loss can be reduced, which in turn will result in a saving of energy and an improvement in comfort too.

Building and asset documentation available anywhere at any time

Expected profit: an annual reduction in costs of 10-20% with fewer personnel working continuously in property operation, at a high quality level with lower risk than in any other case
Expected cost: 0% if scanned building documentation made during the construction or reconstruction work is available
Products used: OrthoGraph, Leica BLK360, ArchiFM

When maintenance work is being carried out it is at the place where the work is being done that there is the most need for knowledge of the features of the equipment to be maintained and its documentation. Savings can be made if you know if a given device is under guarantee or not, or if you can watch a video on how to take it apart and repair it, or if you can read through the detailed maintenance description whenever you want. In many cases even finding the device that needs maintaining represents a problem.

Finding and identifying devices quickly

When issuing maintenance work, the simplest way of providing the instructions is by using web links to the devices appearing in the BIM models. In this way the given element can be displayed immediately in the floor plan in 2D or 3D view using a simple web browser, and if you touch the given link on a mobile device the OrthoGraph immediately opens the BIM model and all of the related documentation.

The OrthoGraph system helps you find the equipment that needs repairing with barcode or NFC chip technology. On the one hand, the user is able to generally or precisely localise the given device with the 2D or 3D graphic floor plan, then by reading the barcode the OrthoGraph system will confirm whether you have found the right device or not.

Maintenance history and documentation at hand

After you have found the right device, OrthoGraph gives you full BIM model access, so you can even view the attached photographs (if any were taken, such as of a fan-coil before a suspended ceiling is installed), check out the corresponding features, but what is perhaps the most important is that the CAFM/CMMS system can be called up instantaneously for the given element.

The ArchiFM system maintenance module allows you immediate access to guarantee information, installation information, any attached documentation or even the maintenance history for the given device. Using the history it is easy to discover if a frequent fault is being caused by bad dimensioning, for example, and that it would be more economic to replace the element than to repair it again and again.

Planned down-time instead of a fault, with minimal repair times

As a result of the attached videos or sound recordings the maintenance personnel gain fast access to repair information, which is easier to interpret than just following the maintenance instructions to the end. They can precisely see the fitting or greasing points and how to approach them safely. In addition, if a video or sound recording is made when a system is installed or when operating correctly and is attached to the given device, then later on, in the course of a simple inspection they can detect that a fault is approaching on the basis of the sound alone, in other words it can be repaired in the scope of planned maintenance instead of an unexpected shut-down. The planned maintenance and downtimes do not only mean a reduction in the repair costs of the device, but the productive activities can also be protected from unexpected outages, resulting in even greater savings.

Optimised instructions, effective communication

Shorter travelling times and more effective communication between the maintenance personnel and the staff issuing the work also result in a significant saving. The precise tasks can be sent easily to the mobile devices carried by the maintenance staff, and, the other way around, the devices to be maintained on site can be easily referenced for approval. With this the need to travel between the site and headquarters disappears completely, as the documentation is available on site immediately. This does not only make it possible to employ fewer maintenance personnel, but as a consequence of the availability of electronic documentation, staff changes would not affect the quality or efficiency of the operation of the property.

This more effective level of communication does not only mean a lower demand for personnel, but also an increase in the quality of the service.

Job shopping

An incidental result of the solution is that, if required, the job shopping process can also be introduced, in other words maintenance personnel who become freed up can apply to do the task closest to them or that is the most interesting, which means that they are solved not only faster but in more efficiently allocated way, and all this can be completely automated.

Leica BLK360 point cloud in planning and work accounting

The documentation available in the Leica BLK360 system can result in significant savings in finding the engineering element involved, quickly determining dimensions and surfaces, and identifying burst pipes and thermal bridges even on site, the advantages of which are detailed in the previous points.

Graphic fault reporting interface

Expected profit: greater customer satisfaction, quick and precise reaction to problems, minimal down times
Expected cost: 0% if an up-to-date building model is available in connection with the operation of the property
Products used: OrthoGraph, CMMS/Ticketing system

The main advantages of the OrthoGraph BIM models are multiple utilizations and the simplicity of keeping them up to date. If the Orthograph model of a building is available and it is used in daily operation and maintenance whenever possible, a graphic fault reporting interface is provided as a side product of this for the tenants and employees using the property. This means that anyone who sees or hears a fault can use a simple web browser to call up the 2D or 3D model of the building, and then by clicking on any element in it you can automatically call up the breakdown reporting interface. A fault ticket is automatically generated after the seen or heard problem has been entered, which ticket then starts its life immediately through the maintenance system.

The fault tickets are handled by the maintenance management system, which means the handling of the entire process with priority levels and even with the use of approval levels. The persons reporting the faults can check their current status, and even receive information on this via automatic e-mail notification. In addition, if system implementation has been suitably carried out, even completely automated job shopping can be achieved, i.e. the expected reaction times to fault reports can be reduced significantly. This does not only result in lower costs, but also in greater customer satisfaction without increasing the number of maintenance personnel.

Because the fault tickets get into the helpdesk system via the 2D/3D building model, the number of fault dispatcher personnel can be reduced, or the position may even be terminated altogether.

The same interface can be built into any other building-related service, such as the meeting room reservation system, the cleaning demand system or even for access to the building automation system.

It is important to note that these administered buildings are not displayed in the system in static condition that has to be periodically updated after remodeling work and function changes, instead the one and common actual BIM model is always automatically displayed, in other words the system has no administration costs whatsoever.

Planned maintenance instead of faults

Expected profit: 5-10% with the combination and efficient scheduling of tasks, greater customer satisfaction, and minimized down times
Expected cost: 0% if an up-to-date building model is available in connection with the operation of the property
Products used: OrthoGraph, CMMS

Many CADM systems have professional breakdown maintenance modules. This means that the handling of fault tickets is entirely process management based, and takes place so that it is integrated into the planned maintenance workflow.

Through planned maintenance the operation of buildings and equipment can be planned and monitored, so by performing inspections faults and unexpected outages can be avoided.

As all maintenance activities and processes appear at a uniform place, in many cases these can be combined and efficiently scheduled, i.e. tasks related to a fault and then to planned maintenance following one another can be avoided, instead all necessary work can be carried out at the same time.

In the course of the issue of maintenance work the approval steps and roles, persons responsible and the designation of the maintenance personnel performing the work can be adjusted to correspond with the company's operation regulations.

Work can be issued to the maintenance staff using printed worksheets, but this can also be carried out entirely digitally using mobile devices.

Because all maintenance work is recorded via a process and system, the settling of accounts with subcontractors takes place in a uniform, precise manner. This is reinforced by the system of the Leica BLK360, which makes it possible to settle accounts on the basis of real data.

Condition-dependent maintenance work

Expected profit: 5-20% on the planned maintenance only, but this may be significantly exceeded if the minimising of unexpected down times in production areas is also taken into consideration
Expected cost: 0% if the maintenance tasks performed on the basis of measured data have been connected to external CAFM systems

If the buildings and equipment have an automated management system, their performance, consumption can be measured, and if there is a more serious resonance analysis system installed, then the data arriving from these can be used as the basis of maintenance work. This means that in AC units it may be sufficient to schedule filter replacement on the basis of actual use, which will reduce both labour and materials costs.

A similar or even greater saving can be achieved in the case that, for example, the condition of the production machinery or of auxiliary equipment can be monitored. With a suitable analysis system the obsolescence of these, their predicted faults can be measured and thereby planned, in other words their maintenance can be scheduled before they become faulty. This results in the minimum of unplanned down time. This does not only result in a saving of costs due to better scheduling but also due to the expected smaller volume of maintenance work.

The regular maintenance and opening of equipment does not only increase their operation lifetime, the different types of work performed generally involve risk factors. These fault probabilities are usually characterised with the bathtub curve, which means that the probability of new inputted faults rises when equipment is opened. With condition-dependent maintenance, the number of these "openings" can be minimised, and so the number of inputted faults can also be minimised.

The possibility of concluding comprehensive contracts

Expected profit: 10-20% reduction in costs with the conclusion of comprehensive contracts with better conditions
Expected cost: 0% if scanned building documentation was made in the course of construction or remodeling work, otherwise 0.1% of the investment cost
Products used: OrthoGraph, one external CAFM software

As the OrthoGraph survey data provides a precise picture of the property portfolio, these data can be handled in a unified way in separate CAFM systems, used for drawing up reports, and so it becomes possible to conclude comprehensive operation contracts. This means that mainly in the case of a portfolio containing large buildings or a large number of buildings, instead of having many hundreds of subcontractor contracts, comprehensive, more economical subcontract contracts can be concluded. The scheduling and monitoring of these can be performed easily in CAFM/CMMS systems, and so at the moment the contract is concluded the amounts of work and the expectations (e.g. SLA) contained in these operation contracts are clear.

Subsequently the actual work performed, its quality and performance according to the contract can be followed by CAFM systems and so settling accounts with subcontractors can be carried out within a precise framework.

The precise building documentation is the basis of the building operation, the maintenance specialists themselves can carry out most of the updating required (e.g. equipment replacement, moves and minor remodeling work monitoring), or in the case of more extensive remodeling work this can be carried out by an external surveying company. Whoever keeps the BIM models up to date, it can be performed in a much simpler way than any other solution available today.

An up-to-date BIM model is a tool that creates value constantly. Not just because of its controlled operation, but due to the many ways of reutilizing the data, which are detailed above. This value is at the same time a long-term guarantee for the efficient operation of the building; therefor its ownership has to be taken care of. With its help knowledge of the operated property portfolio is not required from the maintenance personnel, so the owner of the BIM model is able to operate the property portfolio in the most effective manner.

Guarantee work instead of paid work

Expected profit: 0-3% cost reduction if guarantee periods are applied in all cases
Expected cost: 0% if up-to-date data are available in the CAFM-integrated OrthoGraph system
Products used: OrthoGraph, one external CAFM software

As every building change, and all equipment maintenance and replacements are recorded in the CAFM-integrated OrthoGraph-Leica BLK360 systems, if faults occur, the external CAFM/CMMS system is able to automatically schedule their repair depending on whether the given device requires guarantee or post-guarantee repair. This also means that in the case of any repair work or device replacement, the device's new guarantee period, if it changes, must be recorded through the OrthoGraph system on site.

Precise, up-to-date documentation can result in significant savings if it is possible to access guarantee information immediately. This information is not only available in the office, but even on site for the maintenance personnel too.

Building demolition support

Expected profit: precise quantities before demolition is started, continuous documentation during demolition
Expected cost: 0% if the OrthoGraph BIM model is available during building operation, 0.1% of the original investment cost if a new survey is required
Products used: OrthoGraph, Leica BLK360, one external CAFM software

Our systems also collaborate in the final phase of the lifecycle of buildings, in their demolition. The available or newly surveyed OrthoGraph BIM models give clear and precise quantities for the amounts of waste created, at a high level of precision, greater than 99%. It is even possible to give precise quantities in the case of properties that are difficult to access due to the BIM models created through the fast surveying processes, and as a result of the Leica BLK360 laser scanner the statuses before demolition and the demolition phases can be precisely documented as well.

The CAFM systems' maintenance system can be used for scheduling and issuing demolition work rand for monitoring the processes as wells. By using the systems in a unified way precise demolition planning and documentation can also be realised.

Reports and analyses in all dimensions

Expected profit: KPI that are constantly available and based on real data, comparison and other detailed analyses
Expected cost: 0%, if the CAFM systems and the OrthoGraph systems are used appropriately
Products used: OrthoGraph, one external CAFM software

With the constant daily use of the external CAFM and OrthoGraph systems not only does the access and handling of the data become simple, but as a "side product" the BIM models forming the basis of the entire system are constantly available with fresh, up-to-date data. This huge database becomes really valuable if it is used to constantly monitor the efficiency of property operation. With the appropriate analyses the processes can be evaluated in good time, often in advance, KPIs can be queried from the CAFM system's analysis module, which through a few indexes or using a dashboard are able to provide an immediate picture of the efficiency of the operation.

Comparative analyses make it possible to compare the use data of a given building in terms of both time and space, or compare the same data from similar buildings. These comparisons can immediately point out where the area in focus can be made better, more efficient and economical.

These same data can be used as the basis of property utilization decisions. Using them it soon becomes apartment which buildings are worthwhile leasing out, selling or reconstructing in order to achieve better economic indicators.

Another advantage of the reports, and of the functionality of the external CAFM system dashboard, is the help provided in daily level operation. The system can immediately provide a list of those contracts that are, for example, close to expiring, and of those tenants that are worse payers than the others. This information results in better negotiation positions, and better property utilization in many cases.

Conclusion

It can be seen that the OrthoGraph – Leica BLK360 – CAFM systems result in significant savings in every phase of the lifecycle of buildings. The cost of their introduction and use is insignificant when compared to the savings that can be made. The scale of the savings can be planned well in advance in most cases, so it can be clearly seen how much time is required for the desired system launch or investment to be returned. Characteristically the balance is already positive after a few weeks or months, whatever lifecycle phase the building happens to be in.