# Analysis of Application Prospect of BIM Technology in Telecommunication Line Engineering

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## Abstract

**BIM is called "building information model". It is based on the relevant information data of construction project, and establishes the three-dimensional building model, and realizes the real information of the building through digital information simulation. Telecommunication line project is an important part of telecommunication engineering, divided into open wire telecommunication Line, direct burial cable, pipeline line. This paper summarizes the current situation of these three projects through the method of literature investigation, and finds out the existing problems. According to the point of agreement and the previous three types of engineering problems, this paper from the different stages of the project, how to apply BIM technology in the communication line project, and what advantages and disadvantages. Finally, this paper discusses the application prospect and future development of BIM technology in communication line engineering.**

## Keywords

**Telecommunication line project, BIM, application.**

## 1. Introduction

BIM technology is a three-dimensional modeling technology proposed by the construction field in the past few years to simulate the real information of buildings through digital information simulation. Through the related software, all the information from design to construction and completion can be simulated. Due to the intuitiveness, portability and information relevance of BIM technology, BIM technology has not only won the favor in the civil engineering field, but also has made great progress in the field of electric power, bridges and urban integrated pipe corridors.

China's BIM technical standard "Unified Standard for the Application of Building Engineering Information Models" was officially implemented in July 2017, and BIM standards at all levels were formulated based on the basic criteria of the standard. At present, the national standards for communication lines in China mainly include: "Communication Line Engineering Design Specification" YD5102-2010, "GB 51171-2016 Communication Line Engineering Acceptance Specification", and "Communication Line Construction Specifications". On this basis, local and enterprises have developed some of their own norms and standards. At the same time, communication software companies such as Jiexun and Superman have also developed specifications on their own enterprises based on national and local standards, so communication In line engineering, there are detailed and clear specifications from design to construction to acceptance. However, in the field of communication lines, advanced technologies in other fields can be further cited to improve efficiency. Thus, this article will discuss the application prospects of BIM technology in communication line engineering, and what problems exist.

## 2. Current status and problems of telecommunication line

Communication line engineering is classified according to its structure, and it is divided into open wire telecommunication line, communication cable engineering, communication optical cable engineering and communication submarine cables engineering. [1] Among them, the overhead line is mainly used in rural and remote urban areas where the number of calls does not exceed 200 to 300,

and the number is scarce. Therefore, at present, it is mainly divided into overhead lines, direct buried cables, pipeline lines, and communication submarine cables. However, the number of communication submarine cables is scarce and monopolized by foreign companies. Therefore, this paper mainly discusses open wire telecommunication line, direct burial cable and pipeline route.

### 2.1 Current status and problems of open wire telecommunication line

The open wire telecommunication line mainly refers to a communication line that is erected on the ground and is used to fix the communication optical cable on the pole standing on the ground with an insulator to transmit signals[2]. It is relatively mature in China and is a common communication line project. At present, overhead lines are mainly used in indoor telephone lines, vast rural local network telephone lines and some long-distance communication lines, which have been replaced by pipeline lines in modern cities. And because of the advantages of simple construction and maintenance, it is slowly replacing the overhead line in the marginal area.

However, the open wire telecommunication line is damaged by external forces, is not safe enough and not beautiful enough[3], and is easily affected by the environment, which causes the communication quality to be affected. The maintenance cost is high in the later stage. Once the problem occurs, the communication quality is devastating.

### 2.2 Current status and problems of direct burial cable

Direct burial cable refers to the way in which telecommunication optical cables are directly buried in the soil. The direct buried cable project refers to a communication line formed by embedding a communication optical cable in the soil. Direct burial cable is used in short-term lines, and will only be used in areas where pipelines and poles are difficult to construct and there are no other facilities available, such as parks and scenic spots [4]. Long-distance communication lines are mostly in the form of direct buried cables, and direct buried cable engineering can also be adapted to special environments such as underwater.

However, due to the need to perform earthwork excavation and, the amount of direct buried cables is large. In addition, since the cable is directly eroded in the underground, the service life of the direct buried cable is short, and the long-distance direct buried route must also consider the influence of topography and other human factors, so the amount of engineering is huge. Construction management is also complicated and the investment is large.

### 2.3 Current status and problems of pipeline route

The communication pipeline project refers to the special construction of pipelines for the construction of communication lines, and the placement of communication optical cables in the pipelines, so as to avoid the communication lines that are built on both sides of the street to ensure the beautiful appearance of the urban area. Pipeline line engineering refers to the construction of communication optical cable in the already constructed communication pipeline, and the operation and maintenance of the project. Communication pipelines have been widely used in urban towns, and with the development of technology, communication pipelines are gradually replacing large-section direct buried cables. Moreover, as an important part of the integrated pipe corridor, communication pipeline engineering also has broad prospects.

Pipeline route is mainly used in towns and urban areas, as well as the laying of optical cables between important nodes in front and before the bureau, as well as the difficulty in erecting poles and direct burial. However, the initial investment in pipeline engineering is very high, and the material costs are relatively high and the statistics are complicated, the construction process is complicated, and more discussion is needed on the construction organization design. The method of pipeline line construction is complicated, and it is not easy to find the design conflict in the design. However, the construction workers are also prone to errors during construction, resulting in rework and other results.

## 3. Application analysis of BIM in telecommunication line

Telecommunication line can be divided into five stages: planning, reconnaissance and design, construction and supervision, operation and maintenance and reconstruction and demolition. The specific methods of applying BIM technology in each stage are different, so we are analyzed the applying from these five stages.

### 3.1 Application of BIM in planning

The planning stage is mainly based on research and analysis reports on project types, site selection, surrounding environment analysis, geographical environment analysis, traffic analysis, economics, and social benefits. The main application of BIM at this stage is to combine the remote sensing technology such as GIS, substitute the situation of the proposed project into the relevant model data, study its feasibility, and analyze its social benefits. In addition, the use of BIM technology can simulate the actual operation stage, further analyze the impact of the project, and whether it is feasible.

Using BIM technology, a model of the approximate communication line is established and placed in a relevant digital network (such as a digital traffic network) to verify whether the plan is reasonable so that better decisions can be made.

### 3.2 Application of BIM in reconnaissance and design

The application of BIM technology in the reconnaissance stage is mainly to import the data obtained in the actual work into the BIM software, and use the software to analyze the data and display it intuitively, thus providing a basis for the survey.

The design phase is a key stage of BIM technology application. The ideas and specific methods of BIM are mainly used in this phase, and the application of BIM technology in the design phase can directly affect the BIM technology application in the later stage. Therefore, for telecommunication line enginerring, the application of BIM technology in design is reflected in the following aspects:

3.2.1 Establish a 3D design model with BIM technology

Whether it is open wire telecommunication line, direct burial cable, or pipeline route engineering, 3D modeling is a process that must be passed and is the basis of other work.

At present, the main BIM software includes Autodesk's Revit, Bentley architecture, structureand equipment series, ArchiCAD/AllPLAN/VectorWorks, Digital Project, and domestic Guanglianda and Luban[5].In the communication line engineering, the software currently designed is Autocad or related software based on Autocad (for example, into the Czech software), so the software selected in the communication line engineering design should be compatible with Autocad, such as Revit, Luban, etc.

Due to the relevance of BIM, in the design process, the main work is the design of components and placement according to communication line engineering standards. It is also possible to generate 3D models by importing relevant 2D drawings.

3.2.2 Perfect design with collision check

In telecommunication line engineering, especially in pipeline route engineering, the lines in the pipeline line are more complicated, at the same time, the simple two-dimensional drawings are more abstract. After establishing the 3D model, we can check the technology through collision and find out the unreasonable places in the design and improve the design.

In addition, in the direct burial cable, it is also possible to find out where the ground members and the environment conflict and do not meet the standards by collision check, and then improve them.

3.2.3 Collaborative Design

The research focus of current BIM technology has gradually shifted from the development of single application software to the development and research of integrated parallel platform based on BIM technology. The integrated parallel platform realizes the sharing and transformation of the modeling

model through BIM technology, and brings together the work of architectural design, structural design and engineering cost, and greatly improves the technical content of collaborative design.

For telecommunication line engineering design, collaborative design can well manage design and increase work efficiency. Taking Revit software as an example, the design leader can assign different parts to different people through LAN, and then share them through file sharing. Then, the design group synthesize, proofread, check progress, and finally complete the design.

3.2.4 Counting engineering quantity

For telecommunication line engineering, the statistics of engineering quantities, especially the statistics of materials, are extremely cumbersome. By using BIM software for design, the software can automatically count the number of related materials through the designed BIM model, and can customize the required fields in the statistical table, and even import quotas to make quotes.

For example, in Revit software, after creating a 3D model and component family, the material can be automatically counted through the "Details" option in the software and can be exported. By importing the relevant quota, we can count the amount of work.

〈窗明细表〉

| A | B | C | D | E | F | G | H |
|---|---|---|---|---|---|---|---|
| 设计编号 | 洞口尺寸 | | 参照图集 | 樘数 | | 备注 | 类型 |
| | 高度 | 宽度 | | 总数 | 标高 | | |
| C0929 | 2900 | 900 | | 3 | F1 | | 单扇六格窗 |
| C1219 | 1900 | 1200 | | 4 | F2 | | 单扇四格窗 |
| C1229 | 2900 | 1200 | | 32 | F1 | | 单扇六格窗 |
| C1229 | 2900 | 1200 | | 32 | F2 | | 单扇六格窗 |
| C1229 | 2900 | 1200 | | 36 | F3 | | 单扇六格窗 |
| C1515 | 1500 | 1500 | | 1 | F1 | | 双开推拉窗 |
| C1515 | 1500 | 1500 | | 2 | F2 | | 双开推拉窗 |
| C1515 | 1500 | 1500 | | 2 | F3 | | 双开推拉窗 |
| C4821 | 2100 | 4800 | | 2 | F1 | | 食堂四格窗 |
| C4828 | 2800 | 4800 | | 3 | F1 | | 食堂六格窗 |

Fig. 1 Automatically count the amount of material with Revit

3.2.5 Green performance analysis

Green performance analysis refers to the performance analysis based on BIM technology in the field of building environment, typical of outdoor wind environment simulation and sunshine analysis.

For telecommunication line engineering, relevant environmental analysis is an important part, especially for open wire telecommunication line and direct burial cable. After creating a 3D model, designers can import environmental data into the model for environmental simulation and dynamic analysis. For example, when using Revit software for overhead pole design, you need to divide the load zone. You can use the geolocation function of Revit to import relevant data into the software or obtain relevant data of the construction site through GPS and other technologies to divide the load zone.

### 3.3 Application of BIM in construction and supervision

With the development of BIM technology, the application of BIM technology in the construction phase includes site management, construction plan simulation, construction drawing review, in-depth design, schedule management, cost management, and quality management. Among them, schedule management, cost management, quality management, and construction scheme simulation are also applied in supervision.

3.3.1 Site management

With BIM technology, the equipment, materials and other elements in the construction site can be expressed in the form of a three-dimensional model, so that it can be more intuitive and convenient when planning the site at each stage, and comprehensively consider the site transformation at each stage to avoid repeated and unreasonable layout.

Similarly, communication line engineering constructors can use BIM software to build their own families and arrange the venues. Moreover, since the construction surface of the communication line project is smaller than the civil engineering project, the construction party can plan and convert the

in-field layout in advance in the construction stage to find the optimal layout plan, improve the site use efficiency, and reduce the secondary layout cost.

Fig. 2 Construction simulation by Guanglianda

3.3.2 Construction plan simulation

The construction process of the communication line engineering is complicated and has distinct features. However, by further developing the BIM software, it is also possible to simulate the construction scheme and perform dynamic simulation. Moreover, the construction personnel can also use the "roaming" function of the software to verify the feasibility and optimization of the entire construction process and site layout.

For example, for earthwork excavation in direct buried cable engineering, the construction simulation function of BIM software (such as Luban) can be used to simulate the construction process of earthwork excavation.

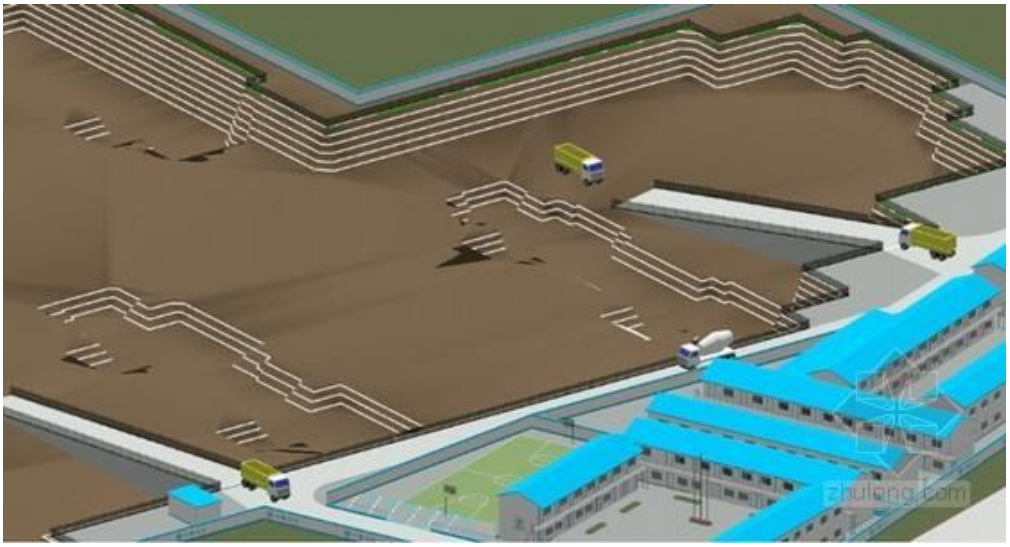

Fig. 3 Simulation of earthwork excavation construction process

In addition, for the supervisory party, using the simulation of the construction plan, on the one hand, the construction plan can be better reviewed and evaluated, and the deficiencies can be found as soon as possible; on the other hand, the quality and progress can be added to the simulation of the construction plan. , pre-existing information such as cost, and better supervision.

3.2.3 Construction drawing review and deepening design

Due to the application of BIM technology, telecommunication line engineering can be displayed in three-dimensional or even dynamic manner. Therefore, the construction party, the owner and the supervisor can conduct better review, especially when the reconnaissance is inaccurate. The designer can also deepen the design by revisiting the site and comments from relevant parties.

3.2.4Progress management, cost management and quality management

BIM technology applied in schedule management is based on the construction schedule to define the construction time and date and task type for each selected element in the scene, and generates a 4D information model with construction order information for progress management.

In the cost management of BIM technology, the project cost management can be carried out according to the engineering quantity statistics list in the design stage. In addition, since the cable part of the telecommunication line engineering is often reserved according to actual needs, the BIM technology can be used for good statistics, thereby better cost control.

BIM technology In quality management, BIM realizes quality management mainly through links, which can be integrated into BIM platform in various forms such as photos, contract texts and web pages. Similarly, communication line engineering can also integrate relevant standard protocols into the BIM platform. In addition, for the supervisor, by observing the three-dimensional model and the simulation of the construction process, the problem can be inferred and prepared in advance for timely response.

### 3.4 Application of BIM in operation and maintenance

For communication line engineering, operation and maintenance is an important task. BIM technology can simulate the operation and maintenance of communication line engineering before completion, so as to find out the problems. In addition, when the BIM technology is applied in the operation and maintenance phase, the BIM software needs to be integrated and developed on the relevant platform. For example, the operation and maintenance phase of the Luban software is integrated on the Luban BIM platform.

After the completion of the communication line project, the virtual simulation technology of the BIM platform can be used to simulate and analyze the emergency plans in various disaster situations, so that the various situations that may occur in the above emergencies can be truly reflected, and detailed data. Using these data, relevant units can adjust the optimal response plan, reduce security risks, provide guidance for future emergencies, and prepare for possible failures.

For pipeline lines and direct buried cable projects, the intuitiveness of BIM technology allows you to quickly locate fault locations and perform construction simulations to find the best maintenance strategy and reduce expenses. And in the field construction, BIM 3D model can be intuitively referenced to the field staff.

### 3.5 Application of BIM in reconstruction and demolition

In the demolition of the telecommunication line project, on the basis of the original modeling, the original process is reversed, and the construction process of the demolition stage can be obtained, and the amount of the engineering can be counted. At the same time, in the demolition, BIM software can also be used to simulate a specific construction plan to select a more appropriate demolition method.

For telecommunication line engineering, there are often more modifications than demolition applications. In the case of a BIM 3D model, the part to be modified can be quickly designed according to the original model, and collision inspection and construction simulation can be performed. Moreover, the part of the transformation can be checked by techniques such as collision inspection to check the compatibility with the original project, so that the design and construction can be better.

## 4. Advantage and disadvantage of BIM in telecommunication line

### 4.1 Advantage of BIM in telecommunication line

Due to the visual and analog nature of BIM technology, the biggest advantage of BIM technology in communication line engineering is that it can directly reflect the effects required by the design, so it

can reduce errors and improve the design, and better to the scene. And construction staff can understand design more direct. In addition, BIM technology can simulate the construction environment, which can better manage the project and lay the foundation for the future life cycle management.

4.1.1 Advantages of BIM in open wire telecommunication line

The biggest difference between the pipeline line engineering and open wire telecommunication line is that the main project in the open wire telecommunication line is directly exposed to the environment and is susceptible to environmental factors such as wind speed and terrain. Therefore, in the design stage, designers often need to simulate the natural environment through complex calculations, so that they can better select materials such as routing and poles, and provide guidance for the cable drawing method in the subsequent construction process.

BIM software can simulate a natural environment similar to the actual situation by providing relevant information, which can greatly save the cost of artificial materials. At the same time, it can also intuitively reflect the influence of these natural factors on the overhead poles, so that it can be better to improve the design, selection of poles and other materials and construction methods.

In the open wire telecommunication line, the construction drawing is often modified according to actual needs during the construction preparation stage, and the modification of the traditional technology requires modification of the two-dimensional drawing, which is time-consuming and labor-intensive. Because of the relevance of BIM technology, as long as one of them is modified, it can be well reflected in other views.

4.1.2 Advantages of BIM in direct burial cable

The BIM technology is applied in the direct burial project, which can well represent the form of the communication optical cable in the underground. This can not only facilitate the designer to check the irrational part of the design, but also improve the design and facilitate the construction and completion of the construction. The acceptance personnel understand the construction details and finished products and reduce unnecessary errors.

In addition to the laying of cables in the direct buried line project, as well as the specific work of excavating earthwork and installing ground equipment, these work can be simulated by BIM technology, which can better optimize the process and save costs. BIM technology can also automatically count the required materials, labor, etc., which greatly facilitates the selection of engineering quantities and cost.

In addition, since the direct buried line is placed underground, there is great inconvenience in later maintenance. BIM technology can simulate the relevant environment, quickly find the location of the fault, and simulate a feasible solution to the construction plan, so as to solve the problem purposefully, which greatly saves cost and time.

4.1.3 Advantages of BIM in pipeline route

The pipeline line engineering is similar to the direct buried line project, which is located underground, but the pipeline line engineering is in the communication pipeline. Therefore, the pipeline route is more complicated, especially in the two-dimensional design drawing, it is difficult to visually express the line in the pipeline. Through the three-dimensional modeling in BIM technology, the specific form of the pipeline line can be visually displayed to better understand the construction and design.

Similar to the direct buried line project, the pipeline line project is underground and difficult to maintain at a later stage, but BIM technology can also be used to find the fault location and construction process.

In addition, in the urban integrated pipe gallery, the BIM technology is applied to the pipeline route engineering. On the one hand, the communication pipeline line and the branches of other lines can be visually observed, so that the design and construction can be better; on the other hand, it can pass through the BIM. The statistical function quickly obtains a bill of quantities for better and faster budgeting.

### 4.2 Disadvantage of BIM in telecommunication line

Because the carrier of BIM technology is software data, it is difficult to carry in the actual construction process, and it is difficult to play its role in construction engineering. In addition, there are many professional equipment and construction processes in communication line engineering, and it takes more time to deal with this part of the problem.

4.2.1 Disadvantages of BIM in open wire telecommunication line

First of all, there are a large number of components in t open wire telecommunication line. It takes a lot of time to display all of these components, but if it does not show the accuracy of the bill of quantities, this will greatly increase the design stage. The amount of work.

Secondly, in the choice of cable installation angle, it still needs to rely on related software and other operations. BIM technology has little meaning in these fields.

Finally, in the actual construction process, many open wire telecommunication line works are carried out in the field. At this time, 2D drawings are often more portable and usable, and BIM technology cannot be carried out during the construction process.

4.2.2 Disadvantages of BIM in direct burial cable

The application of BIM technology in long-distance line engineering will be more difficult. The most direct manifestation is that the workload of 3D modeling in the design stage is enormous.

In addition, in the later operation and maintenance phase, BIM technology can find the fault location through the simulation environment, but the specific fault still needs to be carried out through traditional test methods. Under such circumstances, BIM technology appears pale and weak in operation and maintenance.

In the construction of direct buried cable project, due to the different soil quality, the buried depth of the cable will be very different, and depending on the surrounding environment, the way of embedding and the placement of the stakes and billboards are different. The reconnaissance stage requires more accurate, otherwise it will have a great impact on the later stages. However, BIM technology is currently lacking in the reconnaissance stage, which is a shortcoming in the application of BIM technology in direct buried cable engineering.

4.2.3 Disadvantages of BIM in pipeline route

Due to the characteristics of pipeline lines, when BIM technology is used in pipelines, if pipeline engineering is not using BIM technology or the software used is incompatible, this will seriously affect the construction period and results, and even It is better to not use BIM technology.

In addition, pipeline line engineering construction techniques are complex. When using BIM technology to simulate the construction process, these complex constructions often require specialized software plug-ins. This often leads to increased costs and requires more time for personnel training. Moreover, these complicated construction processes are crucial for the preparation of project cost and on-site construction management.

The large section is directly buried with the trend of being replaced by the pipeline. Similar to the direct buried pipeline, in the case of large passages, the application of BIM technology becomes more difficult. The most direct manifestation is the continuous increase of modeling workload in the design phase.

## 5. Application prospect of BIM in telecommunication line

Because in the planning stage, the telecommunication line project mainly focuses on the benefit analysis and feasibility, many work coincides with the reconnaissance stage; while the work in the demolition stage is highly similar to the construction stage, therefore, the following will be analyses from reconnaissance and design, construction and supervision, operation and maintenance and reconstruction.

### 5.1 Application prospect of BIM in reconnaissance and design

5.1.1Application prospect of BIM in reconnaissance

For communication line engineering, especially for overhead poles and direct buried cables, reconnaissance is a very important task, directly related to the feasibility of the project. In the reconnaissance stage, with the development of remote sensing technology and geophysical technology, relevant geographic information can be directly linked to the BIM software in the future, so that the reconnaissance work can be better completed. The Building Information Modeling (BIM) domain and the Geographic Information System (GIS) domain share each other's information needs. Information from GIS can facilitate BIM applications such as site selection and on-site material layout, while BIM models can help generate detailed models in GIS and enable better utility management.

At the same time, in the site reconnaissance, you can also use radio frequency scanning and other technologies to directly import geographic information into the BIM work platform to better carry out the work. In addition, the future reconnaissance stage can also be combined with the big data platform to establish a database of relevant geographic information, so that these data can be directly used in the future exploration stage, which is faster and more convenience.

5.1.2Application prospect of BIM in design

BIM technology is applied in the engineering design stage of communication lines. The most important way is to build 3D models for analysis. However, there are many components in communication line engineering, and it is necessary to design independently and establish new families and templates. In this regard, it can be based on existing specifications of communication engineering. In the establishment of the corresponding BIM standards and component family standards, at the same time, the current BIM software should be redeveloped or developed BIM software dedicated to communication lines.

In addition, with the development of 3D printing technology, the results of the design phase can be printed. By using the existing 3D model electronic files, real-time and fast printing of the corresponding scale of the real 3D model, in the entire concept design and construction process, in the shortest time, present more details, save more costs, and faster Finalize the design and construction plan.

### 5.2 Application prospect of BIM in construction and supervision

5.2.1Application prospect of BIM in consrtuction

Because in the telecommunication line engineering, the construction process is very professional, for example, the cable in the overhead pole road, the cable in the pipeline line continues. In this regard, relevant departments and industry organizations and companies can learn from similar construction processes in other industries, such as integrated wiring in civil engineering, and establish uniform standards and processes. In this way, the construction process can be simulated in detail to verify the rationality of the construction organization design and to find a more efficient organization.

After the secondary development of the existing BIM software platform, 5D and 6D technologies are used to incorporate cost and quality into the BIM software platform, which can intuitively manage the project, find the best management solution, and predict the future. Change and make preparations.

In the construction process, the Internet of Things technology can also be used to transmit the construction site data to the BIM platform in real time. On the one hand, the construction process can be monitored in real time, and on the other hand, the future direction of the project can be derived based on these data.

For the pipeline line, with the deepening of BIM in the urban integrated pipe corridor, the pipeline route project will gradually be integrated into the BIM of the urban integrated pipe gallery and become a part of the urban integrated pipe corridor.

5.2.2Application prospect of BIM in supervision

For the supervisory party, on the one hand, BIM technology can be used for the convenience of construction, construction management, and BIM platform can be used for progress, quality and cost management; on the other hand, because the BIM model can be extended to the whole life cycle, supervisor can provide advice throughout the life cycle to the owner.

### 5.3 Application prospect of BIM in operation and maintenance

5.3.1Application prospect of BIM in operation

For the telecommunication line engineering, the operation phase is a very important stage. For this reason, the existing BIM software platform can be redeveloped or a BIM software for communication engineering can be developed, and the communication line engineering can be put into use. After the simulation, the problems that may occur during the operation are discovered in advance.

After actually entering the operation phase, BIM technology can also be combined with sensing technology, FIM system and IBMS technology to feed the information transmitted in the line to the BIM software in real time, analyze the operation in the line in real time, and predict the possible occurrence.

In particular, for pipeline lines, future pipelines will be more commonly used in integrated pipe corridors, so the operational phase will be carried out along with other routes in the pipe corridor. To this end, the integration of the BIM platform and the Internet of Things technology can be used to monitor the operation of the entire pipe gallery while taking into account the pipeline route.

With the continuous development of smart cities, network construction is becoming more and more important. Therefore, the requirements for communication line engineering are gradually increasing. Therefore, the future communication line project can be combined with the Internet of Things and cloud computing facilities in smart cities to unified operation and management. And the related building management system (BMS) has been continuously developed. The integration of knowledge management system can enhance the processing and sharing of building maintenance information during the building life cycle, which is crucial for sustainable development after construction.[6], all of this need to good management to telecommunication line.

5.3.2Application prospect of BIM in maintenance

For communication line engineering, especially for direct burial cable and pipeline line, maintenance is more difficult. After the BIM technology is applied, the data of the BIM software in the operation phase can be used to predict the stage of possible failure, so that the preliminary plan can be prepared in advance; in addition, in the specific project of maintenance, the established model can increase to analysis, find the fault area and quickly provide a reasonable construction plan.

In addition, in smart cities, communication line engineering can also locate the locations that need to be maintained through the urban Internet of Things and cloud computing libraries, and can also monitor the data transmitted in real time to reduce labor.

### 5.4 Application prospect of BIM in reconstruction

In the transformation stage of telecommunication line engineering, the geographical environment of the reconstructed part can be detected by using the sensing technology and geophysical technology to speed up the surveying. At the same time, the design of the transformation part can be put into a database, and then the transformation part is directly imported into the database, so that it is convenient to find some parts that are unreasonable and difficult to be compatible with the design, so as to better handle it.

In addition, in the smart city and integrated pipe corridor, the transformation of the communication line can also be carried out by introducing the design and construction of the modified part into the original model, and observing the influence of the modified part on the surrounding line or environment, so as to better carry out the reconstruction.

## 6. Conclusion

As a popular technology, BIM technology can be extended to the field of communication line engineering in addition to its extensive application in civil engineering, power and pipeline. Although BIM technology has some shortcomings in communication line engineering, it is used in communication line engineering. The development prospects of the planning, reconnaissance and design, construction and supervision, operation and maintenance and reconstruction and demolition phases are broad and cross-cutting, and it is worth exploring.

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