

# Spatial System Station NIS Yogyakarta-Bantul Railway

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**Abstract.** Station is an architectural heritage that has local potential value. NIS Station Yogyakarta-Bantul railway is one of the first generation stations in Indonesia. It was established in 1985. Since some station buildings began to collapse, the purpose of this research is to know the architecture of the buildings seen from spatial space and station functions that were still in operation. Therefore, this research formulated spatial system of station building, which is found based on old station building typology that exists in Indonesia. The research method used qualitative rationalistic. The aim of this research is to know the different spatial systems of stations on the Yogyakarta-Bantul railway while operated until 1976. Therefore the study depended on the type of old station building found. There were 3 types of old stations that form spatial characters in each of Yogyakarta-Bantul railway stations. Three spatial types are is *haltegebouw* type at Dongkelan Station, *stasiongebouw* with small type station at Winongo Station, Bantul Station, and Palbapang Station, and *stasiongebouw* with medium type station at Ngabean Station. The spatial system of building stations on Yogyakarta-Bantul railway had their roles by themselves because they were influenced by setting area where the stations located.

**Keywords:** Architecture, Station, Spatial, Yogyakarta.

## 1. Introduction

The station is a building that serves as a railway stop. The railway is often called by Indonesian people “*sepur*”. *Sepur* is adopted from the Dutch “*spoor*” in which according to etymology means footprints or trail of wheels abandoned. In other words “*spoor*” is the path that has been made to pass [1]. The first station building in Indonesia was established in 1864 in Tanggung District. It was inaugurated in 1867. The number of stations in Indonesia was 1516 in 1955 and lagged 571 in 2000, down 62% in 45 years [2]. Yogyakarta to Sewugalur railway is one of the first generation train lines with 1435 mm rail width. Until now, there are 5 stations still standing from the Yogyakarta-Sewugalur railway. The five remaining stations are in operation to connect Yogyakarta to Bantul. Otherwise the railway that connected Bantul and Sewugalur (Kulonprogo) had disappeared after the Japanese occupation. The operational period of the Yogyakarta-Bantul railway reached 1976 and then closed due to road access.

Understanding of the spatial system of station building architecture is one of the efforts to maintain the sustainability and conservation of the local potential. It that has been instrumental in the establishment of the identity of the city. Building spatial system is one of the important aspects of architectural component of the building. In architecture there are 3 elements as the main formers in the theory of Vitruvius. They are in the form of *utilitas*, *venustas*, and *firmitas* [3]. This study specifically discussed



the spatial building that is part of the *utilitas* theory by Vitruvius. This study focused on the spatial aspects of spatial function and the governance of interconnected spaces.

### 1.1. Spatial System

Architecture is created from form and space. Space in a building determines a function and circulation to facilitate human activity. The spatial function is also explained in one of the basic architectural theories by Vitruvius that architecture is made up of *utilitas* (function), *venustas* (beauty), and *firmitas* (strength). The emphasized *utilitas* is a good space arrangement, based on function, inter-space relationships, and building technology (lighting, airing, etc.).

“...convenience, when the arrangement of the apartments is faultless and presents no hindrance to use, and when each class of building is assigned to its suitable and appropriate exposure....”  
[3]

Habraken described spatial system that is related to the floor plan that includes the form of layout, organization space, orientation and hierarchy of space [4]. *Utilitas* include needs, functions and floor plans. Architecture has a function that is to not only shade and accommodate human beings with all activities and all the necessary furniture in the activity, but also give the atmosphere, image, and direct the thoughts and feelings and behavior of the users [5]. Ching states that space is a component that accommodates all kinds of functions according to its purpose embodied in a certain form that can be seen and felt. Space can be distinguished on the organization of form and space, spatial relationships, spatial organization, hierarchy space, and circulation [6]. But a space is influenced by the function inside in which this function is a component that contains all human needs, especially activities that must be accommodated [6]. Components of this function have several factors, such as cultural, socioeconomic, customs, and behaviour [6]. This affects the shape of the building plan, the more complex. While the emphasis on *utilitas* is to set a good space based on the function of inter-space relations and technology [5]. Spatial functions as a container of human activity both physically and psychologically [7]. It also causes spatial pattern to be seen as the relationship between architecture, environment and culture where the spatial is located [7]. Supstandar describes spatial system as a system or a way of setting space which is able to meet the requirements to accommodate the needs of users [8]. The position of interior study is part of architectural science, as a result of the development of technology, science and art as a whole. According to that interior setting must walk together, parallel, with the exterior. So, in the other words spatial system cannot be separated from exterior design in architecture. The results of several theories regarding spatial system will be the objects of research, including the building settings, building mass orientation, building configuration, arrangement and orientation space, relationships and organization space, hierarchy of space, and the pattern of circulation space.

### 1.2. Station Building

The station building is taken as an object of study because it has a unique characteristic compared to other modes of transit space [9]. Station is a place where passengers can ride railway transportation. The station's architecture in Java, generally can be divided into the type of *haltegebouw* and *stationgebouw* (see Figure 1) [10]. *Haltegebouw* is a small station which has only one or two spaces. The building size is small and simple in terms of design and facilities for passengers as well as for the execution of its main railway service. *Stationgebouw* is a station that has more complete facilities than *haltegebouw*. This station consists of several spaces for passenger and train service. *Stationgebouw* types are divided into small type, medium type, and big type (main station) [10]. According to Ikaputra, the old stations in Indonesia are influenced by the indish style.

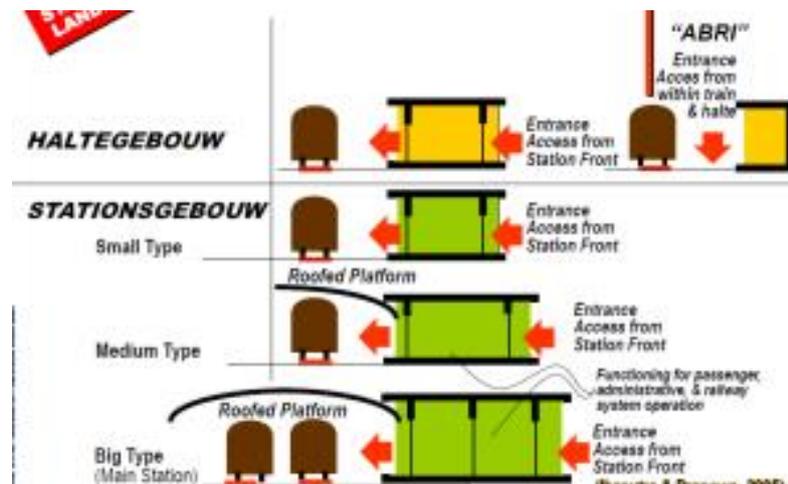


Figure 1. Typology of Station Building [10].

Broadly speaking, the existing room in the station is divided into two groups, first for the activities of passenger services as public space and second for the technical space of railway operation. When compared between the two groups, the public space in the station shows more diversity. The technical space of railway operation has the same standards for all stations. The difference is only the dimensions due to the number of emplacement [9].

According Sulistyani [9], spaces that existed in the stations of the three companies NIS-SS-SJS in the period 1864-1930 were:

- *Vestibule (hall)*  
The front room of the station that accommodates activities such as waiting for tickets, and transit passengers. Hall has a door which is the main access to the station building. This space is used to purchase tickets. *Vestibule (hall)* does not require any furniture because the activities of the visitors are only transit for a short time.
- *Kaartjijis (counter)*  
Place or space to buy or book train travel tickets. *Kaartjijis (counter)* places together with hall to accommodate the queue of people who buy tickets.
- *Watchkamer*  
Space that is functioned to await the arrival of the train.
- *Domes toilet*  
The toilets, where each station has a different standart.
- *Buffet*  
The dining room, where each station has a different standart.
- *Baggage/Magajizn*  
The store room, where each station has a different standart.

## 2. Methods

This research used qualitative research method with rationalistic paradigm approach. The analysis of descriptive research results created an overview and exposure as well as explored the existence of physical changes in the style of buildings on the station building in Yogyakarta-Bantul railway.

### 2.1. Data Collection Method

Data collection methods included primary data collection through surveys, observations, interviews and secondary data of various related information in the form of writings, newspapers, books, and literature studies. From the survey results 5 remaining stations were found (Figure 2) from the Yogyakarta-Sewugalur railway and became the Yogyakarta-Bantul railway. Ngabean Station (1), Dongkelan Station (2), Winongo Station (3), Bantul Station (4) and Palbapang Station (5).



**Figure 2.** Five Remaining Stations on Yogyakarta-Sewugalur Railway Currently, (1) Ngabean Station, (2) Dongkelan Station, (3) Winongo Station), (4) Bantul Station, (4) Palbapang Station

### 2.2. Data Analysis Method

Data analysis in this research with descriptive method described and gave description about character of building style at each station. Exposure was done by analyzing the history and context of the environment that occurred at the station and the picture of the building was done by modeling the building so the physical character of the station building was known. Then it would be linked to the colonial style that affected the physical character of the building. Furthermore, the overlay of the analysis served as a basis for knowing the physical character changes that occurred at stations on the Yogyakarta-Bantul railway.

## 3. Discussion

### 3.1. Building Setting

The observation of the building's structure on the station architecture in the Yogyakarta railway is seen in the type of station building. It is based on the form of the station that aims to see the activity space of passengers. The setting of this building is also intended to see the orientation of the building so it can see the trend of station for user activity.

**Table 1.** Building Setting Analysis

DESCRIPTION	HALTEGEBOUW TYPOLOGY	STATIUNGEBOUW TYPOLOGY				
		SMALL TYPE STATION				MEDIUM TYPE STATION
		DONGKELAN STATION	WINONGO STATION	BANTUL STATION	PALBAPANG STATION	NGABEAN STATION
Regional Setting	Location in town	■	□	■	□	■
	Direct access to sugar factory	□	■	■	■	□
	Direct acces to main road	■	□	■	■	■
Building Setting	Parallel station shapes	■	■	■	■	■
	Orientation facing railway	■	■	■	■	■

	Single Mass Building Station	■	■	■	■	■
	There is a House Service Complex	□	■	■	■	■
Station Role	As the distribution of industrial products	□	■	■	■	■

■ : found

□ : not found

Judging from the setting (Table 1), Yogyakarta-Bantul stations are parallel type based on the shape setting. The five stations have railway lines on one side only. In this stations the activity of passengers who ride train are only done on one side only. From the observation it is found that the orientation of the building does not depend on a particular direction so that the orientation of the building can face any direction. The orientation of the building is more influenced to face the train motion. In this case the train moves from Yogyakarta to Bantul and instead causes a longitudinal path north of the south, thus making the building facing the direction of the train motion. Priority orientation of the building facing the direction of the train motion is because with the building that extends along the railway lines cause the spaces to be more efficient and optimal. Building stations that accommodate both in terms of rail and passengers resulted in the building of Yogyakarta-Bantul stations that have two orientations facing the railway line and facing in the direction of coming passengers. The ease of achievement as an orientation direction is influenced by the functional needs and rational thinking of Europeans who do not base on mental spiritual and religious mythology, but rather on logical thinking [11]. The role of spatial efficiency and the role of spatial building function become the main priority in determining the setting and orientation of the building.

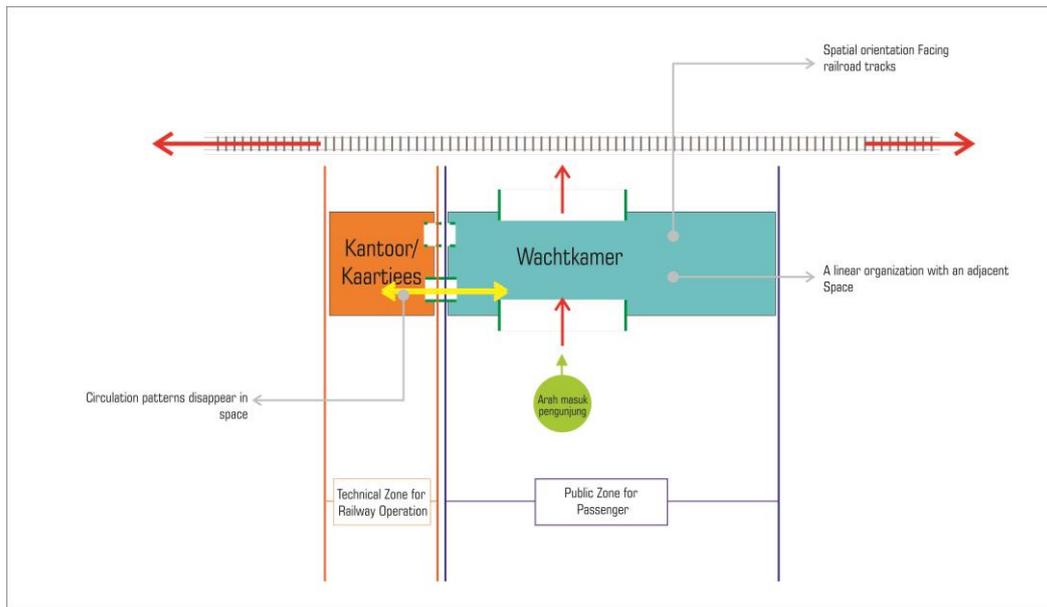
The stations on the Yogyakarta-Bantul railway have single building masses and their extensions are extended along the direction of the train motion. In the surrounding of the station emplacement, there is official residence of station's workers.

From the setting of this building there is a typical character of the station building found on the station that is the type of *stationgebouw* on the Yogyakarta-Bantul railway. The location of this line station did not depend on the access of the main road or its location in the center of the city but the approaches of the sugar factory to transport the production. In addition, the station on this track was the type of emplacement of goods and passengers. Its important role was the transportation of the sugar factory industry connected the industry from the sugar factories in Bantul to the area of Yogyakarta. This important role was evident from the station of urgency station that was not to pick up passengers but the proximity of access to sugar factory.

### 3.2. Building Spatial System

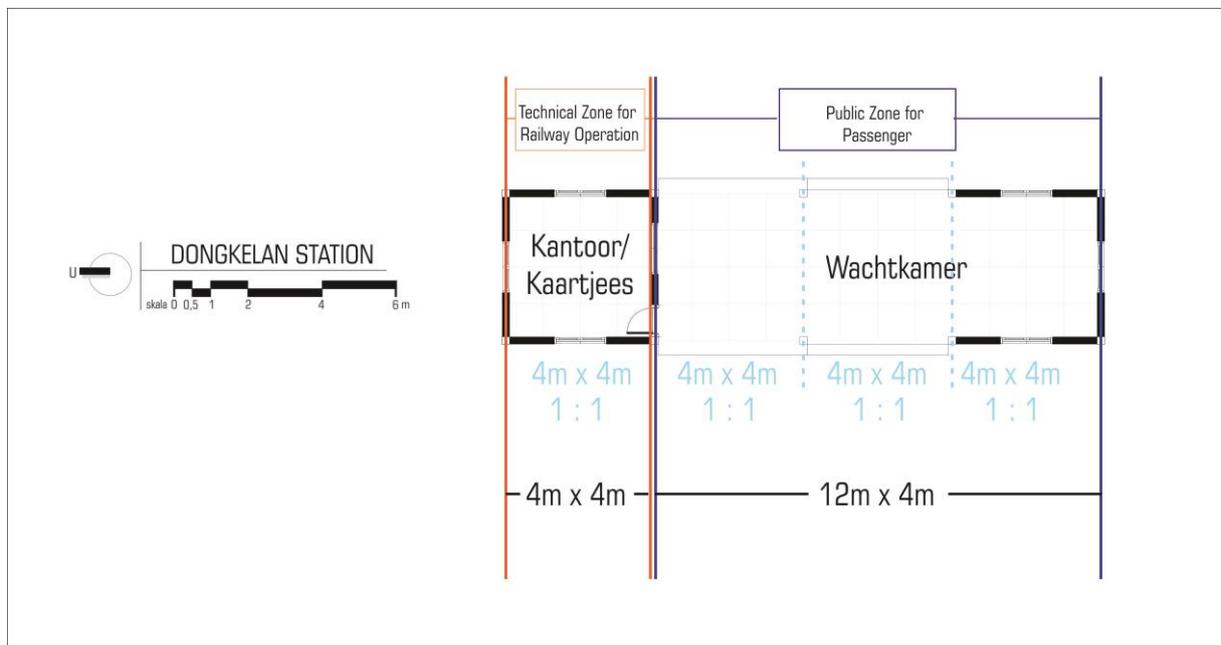
#### 3.2.1. Dongkelan station is a *haltegebouw* type.

Type *haltegebouw* obtained in this study has the orientation of the building facing the railroad. Simple room completeness of *kantoor/kaartjes* and *wachtkamer* are arranged in linear with circulation patterns that disappear in space (Figure 3).



**Figure 3.** Type *Haltegebouw* on Yogyakarta-Bantul Railway

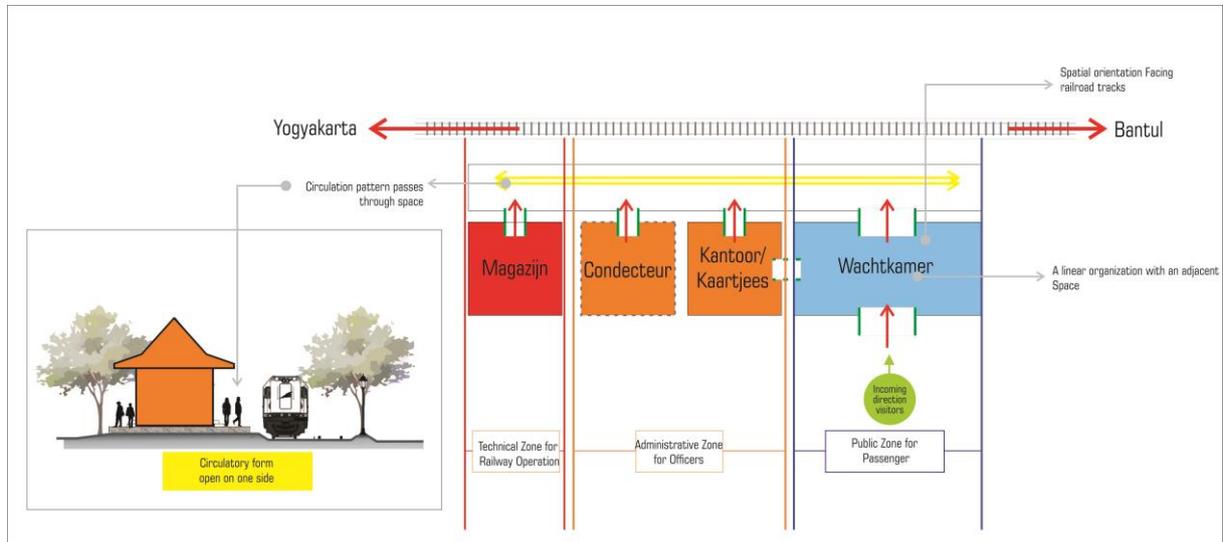
The *haltegebouw* type that is found on Dongkelan Station has a *wachtkamer* with 12m x 4m, and a *kantoor/kartjees* with 4m x 4m (Figure 4). The *wachtkamer* area is 3 times bigger than the *kantoor/kartjees* room in order to keep the room comfortable with the many activities inside, such as the arrival of passengers both from train and from outside, wait for train arrival, and train ticket purchase. The spatial proportions of Dongkelan Station were found to be a 1: 1 (Figure 4). The ratio was thought to be influenced by the proportion of renaissance by the Dutch community established at the time and had not changed the building style from the beginning.



**Figure 4.** Type *Haltegebouw* on Yogyakarta-Bantul Railway

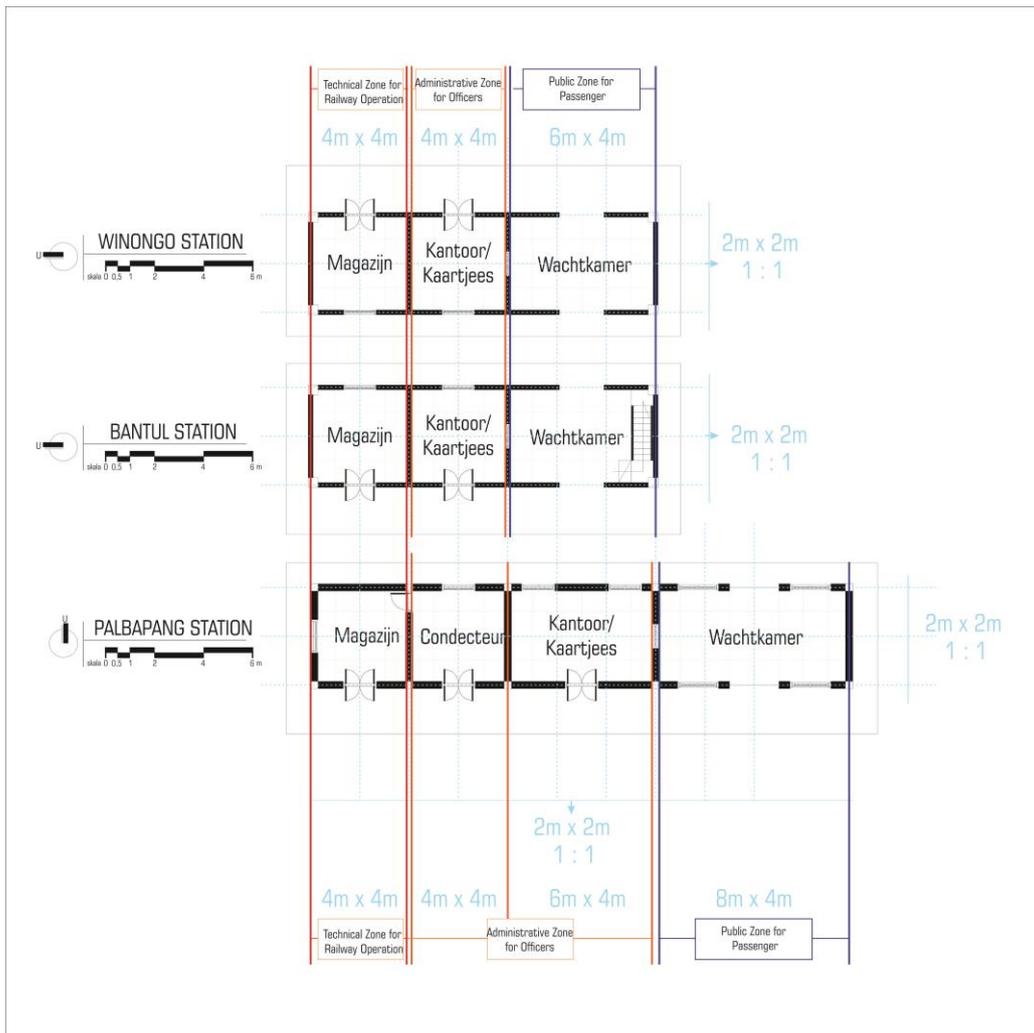
3.2.2. *Winongo Station, Bantul Station, and Palbapang Station are small type stastiongebouw.* Winongo Station, Bantul Station, and Palbapang Station are small type of *stastiongebouw*. *Stastiongebouw* type obtained in this study has the orientation of the building facing the railroad.

Completeness of space in the form of *wachtkamer*, *kantoor/kaarjtjees*, *condecteur*, and *magajizn* is arranged in linear with circulation patterns that pass through space. The shape of the circulation is open on one side (Figure 5).



**Figure 5.** Stationgebouw Small Type on Yogyakarta-Bantul Railway

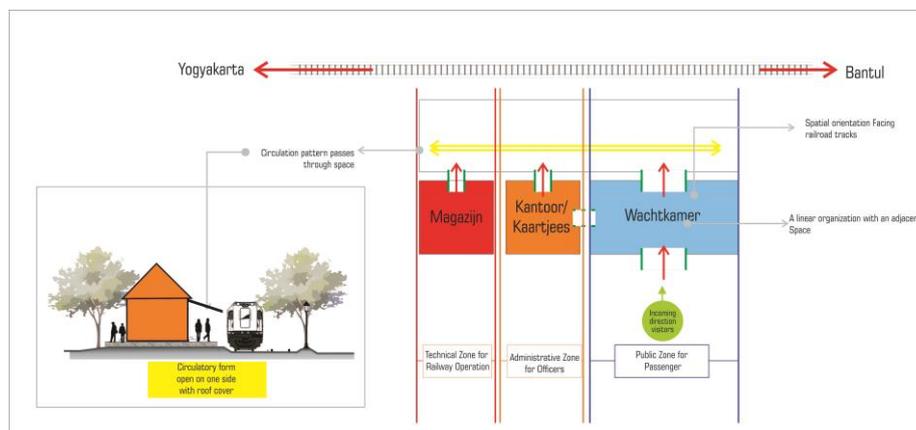
The *stasjongebouw* types found on Winongo Station, Bantul Station, and Palbapang Station have *wachtkamer* with 6m x 4m, *kantoor/kartjees* with 8m x 4m, and 4m x 4m (Figure 6). The *wachtkamer* area is 2 times bigger than the *kantoor / kartjees* space in order to keep the room comfortable with many activities inside, such as the arrival of passengers from both train and outside, wait for train arrival, and train ticket purchase. The result of this stations analysis has the same modular, which is formed from module 2m x 2m then developed according to space requirement at different station. This modular proportion was used because in these three buildings allegedly had undergone changes from their original building to meet the needs of the station compared to the previous one. Modular proportions is thought to replace the previous proportion because it is more easily applied and developed its shape in meeting the needs of space functions.



**Figure 6.** Stationgebouw Small Type on Yogyakarta-Bantul Railway

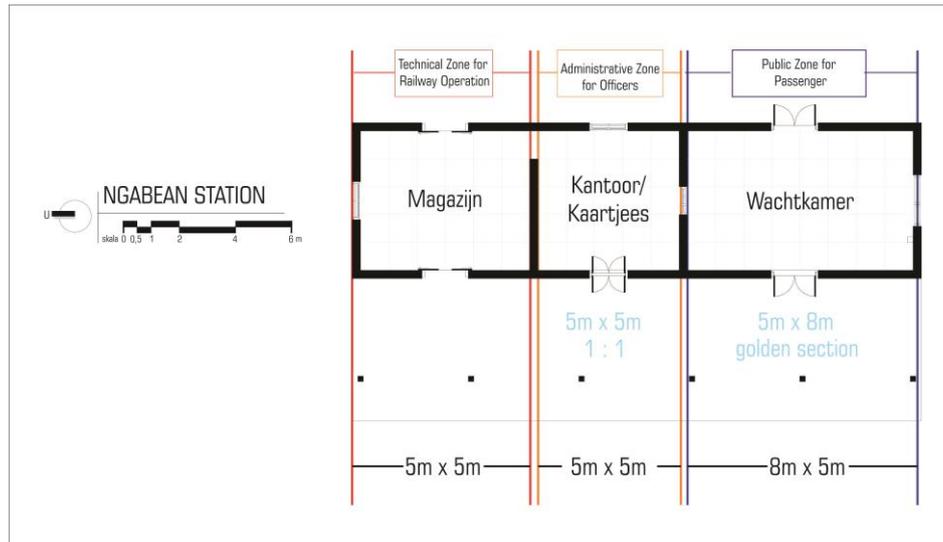
3.2.3. Ngabean Station is a type of stationgebouw medium type.

Type *stastiongebouw* obtained in this study has the orientation of the building facing the railroad. Completeness of space in the form of *wachtkamer*, *kantoor/kaartjees*, and *magajizn* is arranged in linear with circulation patterns that pass through space. Open circulation forms with roof cover (Figure 7).



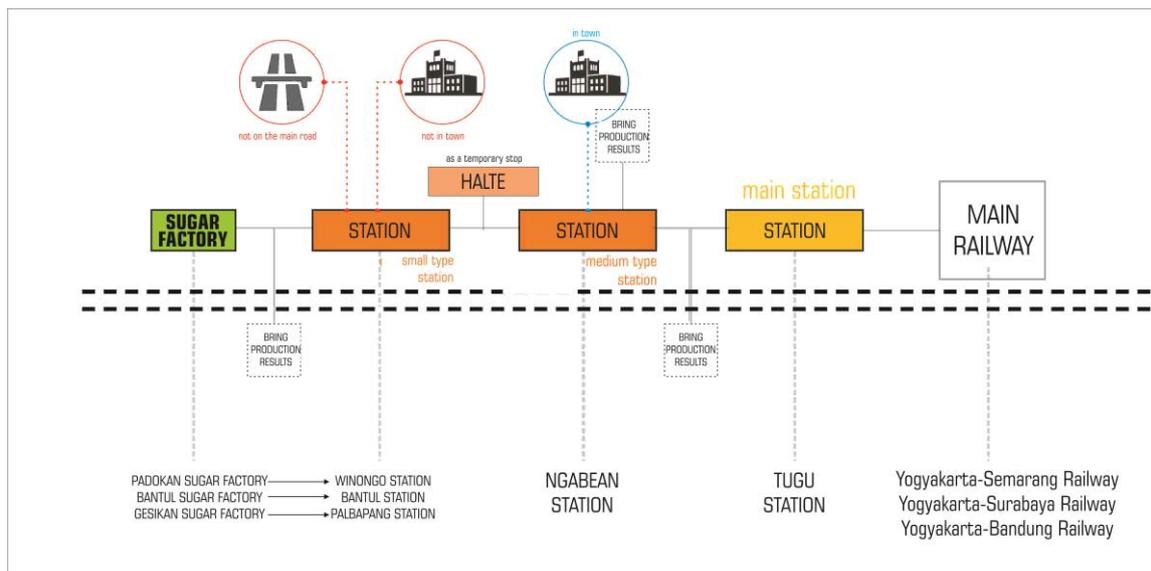
**Figure 7.** Stationgebouw Medium Type on Yogyakarta-Bantul Railway

The *stasjongebouw* type found on Ngabean Station has a *wachtkamer* with 8m x 5m and a *kantoor/kartjees* 5m x 5m (Figure 8). The *wachtkamer* area is 2 times bigger than the *kantoor/kartjees* space in order to keep the room comfortable with many activities inside such as the arrival of passengers from both train and outside, wait for train arrival, and train ticket purchase. Spatial Proportion of Ngabean Station is obtained 1: 1 ratio and the proportion of golden section is thought to be influenced by the proportion of renaissance by the Dutch society established at that time and has not changed the building style from the beginning of establishment.



**Figure 8.** Stasjongebouw Medium Type on Yogyakarta-Bantul Railway

Based on the spatial system discussion above, Yogyakarta-Bantul station has uniqueness with its building setting. The stations established on this line prove the role of the stations as the transportation of the factory industry so the stations depended on the setting of the sugar factory area. Small type of *stasjongebouw* accommodated sugar factory to transport produce so that the station was close to or directly adjacent to the location of the sugar factory. Because of this role, small type station did not have to be close to the highway or in the middle of the city. The train that had carriage from the factory then transported to *stasjongebouw* medium type. The role of the medium type stations was to distribute the produce both within the city of Yogyakarta and outside Yogyakarta region. Because of that the station is located in the middle of the city and close to the main station. From that the carriage can be transmitted to other main railway. Furthermore, the *haltegebouw* type on this path has no role as a station. It only serves as a temporary halt, or for the train to pull over to give other train chances to follow (Figure 9).



**Figure 9.** Setting Yogyakarta-Bantul Railway

#### 4. Conclusion

Based on the typology of the building of the indish station, the stations on the Yogyakarta-Bantul railway are divided into 3 different typologies. Yogyakarta-Bantul railway stations are divided into *haltegebouw* type, small type of *stationgebouw*, and medium type of *stationgebouw*. The *haltegebouw* type on this railway is found on Dongkelan Station. In this type of station building consists of a simple arrangement of space that is only a *wachtkamer* and *kantoor/kaartjjs*. Then, the *stationgebouw* type has more complex arrangement that is *wachtkamer*, *kantoor/kaartjjs*, and *magazijn*. Small type station of *stationgebouw* on this railway is found on Winongo Station, Bantul Station, and Palbapang Station. Next medium type station of *stationgebouw* on this railway is found on Station Ngabean. The difference in the medium type with the type below is that there is a wide building terrace with a roofed platform. The medium type of building stations had a lot of passengers and its location was in the middle of the city so that the activity was busier cause the station building was bigger than the type under it despite their almost same space arrangement. Typology of the buildings of the stations on the Yogyakarta-Bantul railway has their own roles because it is influenced by the setting of the territory.

The spatial characteristics of the Yogyakarta-Bantul railway stations are unique to their setting context. The stations established on this line proved that the role of the station as the transportation of the factory industry so that it depended on the setting of the sugar factory area. Furthermore, the *haltegebouw* type on this path had no role as a station as it only served as a temporary halt, or for the train to pull over to give other train chances to follow.

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