

PROCEEDING BOOK

International Conference on Environmentally Friendly Civil Engineering Construction and Materials ***"Creating and Adapting Sustainable Technologies"***

13-14 November 2014 Manado - Indonesia

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Creating and Adapting Sustainable Technologies

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Northern part of Manado including the old city centre of Manado, The 45 market (Pasar 45). The pathway of this street was the place for birds which was made the pedestrian path was dirty by bird's waste.

Today this street is still the main access from Northern to the Southern part of Manado, but as an alternative particularly for private cars. While for public transport, the access is limited because most lanes have been moved to Boulevard Manado which is parallel to Samratulangi Street.

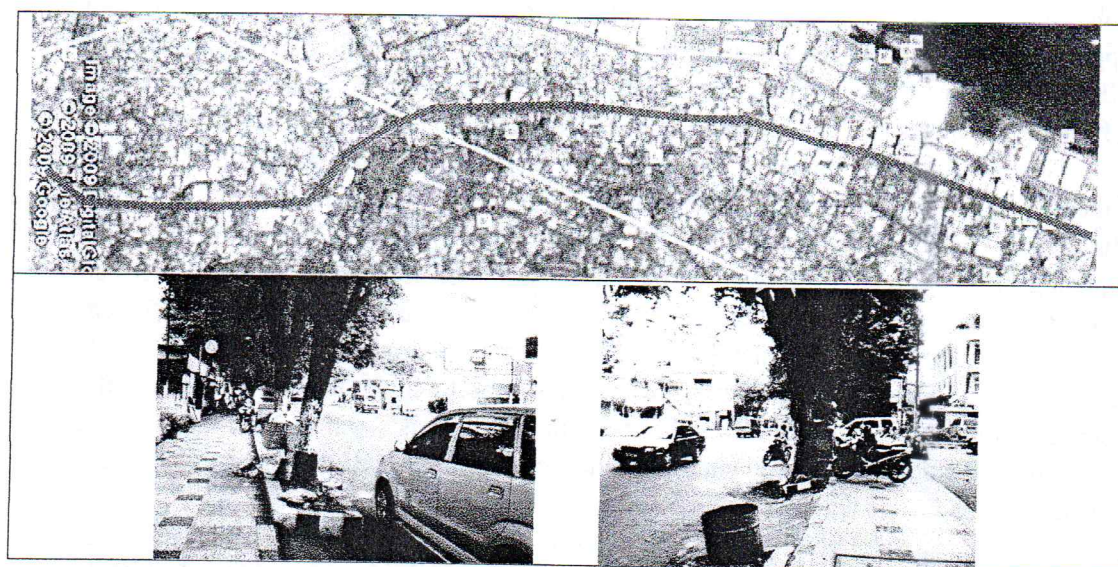


Figure 1. Samratulangi Street (source: Google map, Makalew 2010)

Samratulangi Street is approximately 12 metres wide and has 1 to 1.5 metres pedestrian pathway. Between the street and the pathway there is tree strips along. The trees heights are varied but mostly are adult trees between 6 to 10 metres height. These trees have been planting along 0.8 metres wide planting strips.

The street serves moving cars with high volume during the working day. This two line street has no median and during the busy day it makes 4 lanes cars. At this time the cars has to queue and the traffic jam along this street is also contributed from branch streets along Samratulangi Street.

The pedestrian pathway both side functioning not just for pedestrian but also for people who visit coffee cafe or shopping along the street. One of the cafes provides chairs in some part of the pathway but still provide space to allow pedestrian walking through the street. This place is full in the morning with people chatting while drink coffee. Moreover, advertising board for most small shops has been placed in the pedestrian pathways. The shops still provide space for pedestrian walking along the street. There is one small restaurant where the owner has placed its barbeque tool in its front area which is the pedestrian pathway. People still can walk while smelling barbeque fish or meat. The fire in the pedestrian way makes the area hot but interesting because of the colour.

The pedestrian pathway cover by trees in Samratulangi Street has been used for motorbike parking and rubbish bin. The motorbikes are parking in front of the building either parallel or across the pedestrian path. The rubbish bin is not enough for putting the rubbish because people throw rubbish to the planting strips which make the pedestrian and street dirty. The smell of the rubbish

has polluted the air and reduced the quality of air freshness. It is comfortable for people to walk along pedestrian pathways because the trees are covered well the pedestrian path. The radius of trees is between 4 to 7 metres wide. However, the problem for pedestrian is the uneven footpath. Some parts of the path are damaged including holes or uncovered drainage. Pedestrian can see the water under the path and the smell is not good.

The pathways are constructed with colourful material. The path is covered with the pattern of white and black small stones and red ceramics. They have texture which is good because is not slippery for pedestrian and is an interesting experience to walk. The pathways are also interesting with colourful pot planted yellow and blue. However, some pot planted has been put in the pathway and smaller the pedestrian access because their size is big about 0.6 metres wide.

The building along the street mostly has no setbacks particularly for old building. The facade of the building is the edge of pathways. Some new building has setback about 5 to 6 metres wide. This area has been used for car parking for visitors of the building. Other part of the street is the beginning of Samratulangi Street in the old city centre 'The 45 Market' to the T intersection with Toar Street. This section has higher building up to 6 storeys and wider street about 15 metres wide. The footpath is 1 to 1.5 metres wide. In the southern part of Samratulangi Street the size is similar to the middle part. With 10 metres wide and 1 metres wide footpath, the activities along this part is busier than the middle part. However the footpath condition is worst and the material is concrete and old paving stones. The pot planted is similar to other section of the street which is a large pot 0.6 wide and 1.5 metres height.

Sudirman Street starts from the zero point of Manado to the bridge of Miangas. The street is wider in the part of zero point to the intersection of Sudirman Street with traffic light with 14 metres wide. It is narrow to the Miangas Bridge with 10 metres wide. The street is lined with mostly 2 to 4 storeys of building while some higher building uses as hotels could reach 15 storeys building. The building uses along this street are mostly hotels and restaurants. The hotels are new and constructed during the era of the international events in Manado, the World Ocean Summit in 2009. The building setback is varied from no setback for old building to 6 metres setback for hotels.

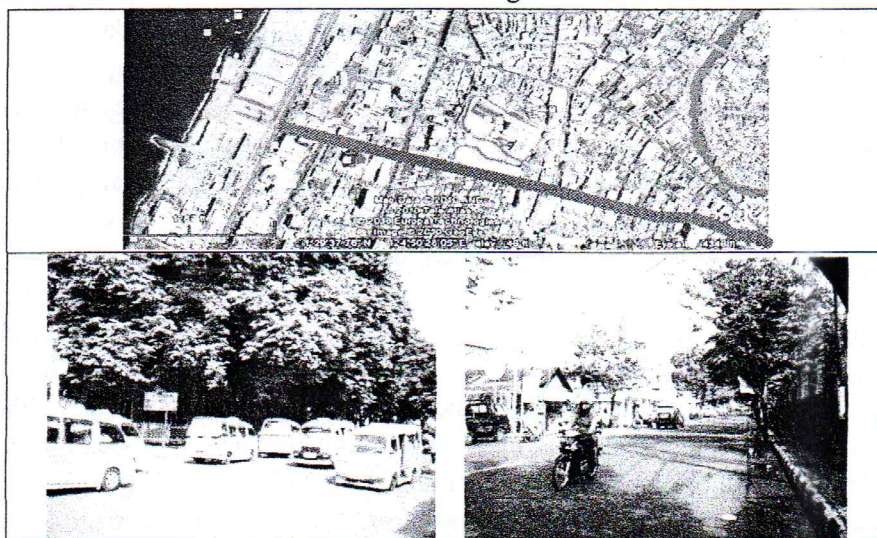


Figure 2. Sudirman Street (source: Google map, Makalew 2010)

The pedestrian pathway varies from 1.5 to 2 metres wide. The pathways is covered by vary material of concrete and paving stones. However, the footpath is uneven because they have to adjust the level of the street and the building front area. The different up to 1 metre height of setback has created uncomfortable footpath because they are not in the uniform level. Most footpaths are not flat but with 5 degree angle. Most part of the footpath is damaged with uneven paving stone and concrete and many holes along them. Some parts have poor drainage which make the footpath wet even though during sunny day. The smell of the liquid waste has polluted the footpath. Also, the rubbish bin has been placed in the footpath which makes the footpath dirty and smells of waste. There is no tree lined along the street. Most trees in this street are belong to the building along it including the old school. However because the radius of the tree branches is up to 6 metres, some pedestrian is covered by the trees shadow.

In the part of the street between intersection and Miangas Bridge, the footpath has been used for different purposes. There are parts for motorbike parking particularly in front of office. Some cafes provide chairs on the footpath. On the northern side of the street the footpath has been used for selling food including yellow rice, the most popular food of the community in this area. The seller has put table and chairs in the footpath with their goods. Along this part the trees lined and planted in the planting strips. The horse ride cabin or 'bendi' is also popular in this street.

Table 1. Street width and function

No	Aspect of street	Samratulangi Street	Sudirman Street
1.	Width	10 m – 12 m	10 m – 14 m
2.	Pedestrian pathway width Pedestrian pathway use	1 m – 1.5 m Car and motorcycle parking Bins and uncontrolled waste	1.5 m – 2 m Motorcycle parking Bins and uncontrolled waste
3.	Public activities	Pedestrian way Café activities Barbeque at front restaurant	Pedestrian way Café activities Selling yellow rice
4.	Street lane user	Cars and motorcycles Horse ride cabin in some part	Cars and motorcycles Horse ride cabin in some part

2.2. Possibility design using urban design approach

Methodology use in this research is based on urban design approaches. The first part is to identify and analyse each street by looking at physically street condition, people activities and preferences and non visual aspects of environment including smell, noise and safety. The process is to propose designated street in two and essentially three-dimensional design (see Gosling et al 1984). In urban design, considering a number of possibility designs can give opportunity to explore how street can work for people. Based on the analysis for each street, there are different character for the streets. Street for business area represent by Sudirman Street. Street for mix use area represent by Samratulangi Street. Some parts have different character with less influence to the whole area.

The possibilities which can be explored are maintaining the present character, no intervention, pedestrianization, beautification, piece by piece improvement and gentrification. (MUDD, 2004). Maintaining the present character is to protect the original character of the area (Makalew, 2004). No intervention is related to let the area growth according to the market need.

Pedestrianization is the street change into pedestrian access only and not allowed for cars. Beautification is to improve the streetscape, footpath and furniture by painting, change material and colour. Piece by piece improvement is including install new infrastructure such as fixing the street and footpath to encourage the area to improve their business area by renovation building facade or provide street furniture and other element to improve the area. Gentrification is to change the function of the street such as create river in street area and change it's the character.

The possibility design is a mixture of maintaining the present character, beautification and piece by piece improvement particularly for Samratulangi Street. For Sudirman Street no intervention option could be applied with certain control. The need of improvement the footpath and street furniture is also urgent for this area. In general the street should be constructed and maintain for easily movement. Street width should consider the the way pedestrian recognize each other which should be not wider than 12 metre although street width is traditionally a multiply of height of flanking building (Gutjahr, 2003).

2.3. Designable character of streets

Generally, the functions of the street in main area are can be described as follow. First, the street is designed for moving cars. Most place faced problems of traffic jam. Second, multy function pedestrian footpath have blocked the path by parking area. Third, the quality of footpath is bad as there are more uneven footpath where many holes as a result of bad construction and uncontrolled drainage. Fourth, there is less sense of public space in the main area although some part of the street has begun to be used as public space. Last, boulevard as more wide street is physical reality which is the images of broad tree lined, sidewalks, elegant building, attractive stores, corner shops, and crowds of people and the warm light of street lamps (Jacobs et al, 2002).

Table 2. Proposed Detailed Street Design

Street problems	Proposed Finish design
Crossing is not clear defining.	Provide pedestrian crossover which have similar level with the street for easily movement
Non permanent seats are provided by the community	Provide street furniture such as adequate seats with material that is protected from bad weather.
Mostly part of street have inadequate bed planted.	Install bed planted with enough space for tree roots to breath can protect tree from damaging street and tree can growth with adequate space.
Waste is placed on the footpath and bin available is inadequate.	Bins should be design to protect rubbish from bad smell and protect from easily falling to the footpath. Bins need to be covered with attractive design.
Bollards are non-permanent.	Bollards are to protect pedestrian from moving cars and limited access car to pedestrian footpath to achieve pedestrian safety.
Street sidewalks are damage and narrow.	Uneven footpath and bad drainage has to be fixed. Storm water system can be installing to manage the storm water in order to sustain the street.
Public space: sidewalks café Sidewalks café are not well organized.	Proposed Sidewalks cafe shared area with pedestrian. Land use planning need to be integrated to support the liveable of street.

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Facility of street should be provided to support the use of the street. According to Design Guideline for pedestrian facility in urban area by Department of Public Works (1995) consist Pedestrian pathway including footpath, crossing and other pedestrian footpath in public space and its supporting facility including traffic light and street signs. In addition to street facility, the example of crossing design and street furniture need to be included in street design. The facility for a great street can support people activities such as social and business activities which create a public space. The facilities for street design including seats, tree accessories, bins, bollard, street sidewalks (see Department of Public Works 1995) and space for public.

The design for street in two main streets in Manado: Samratulangi Street and Sudirman Street considering aspects in creating a great street. Although each street has its own character, overall these main street tend to be used for some leisure and need to have a better quality of construction and design. In order to achieve the use of street as public space, the design for all streets in general and each street in particular can be seen in the possibility designs Figure 3 and 4.

Sudirman Street

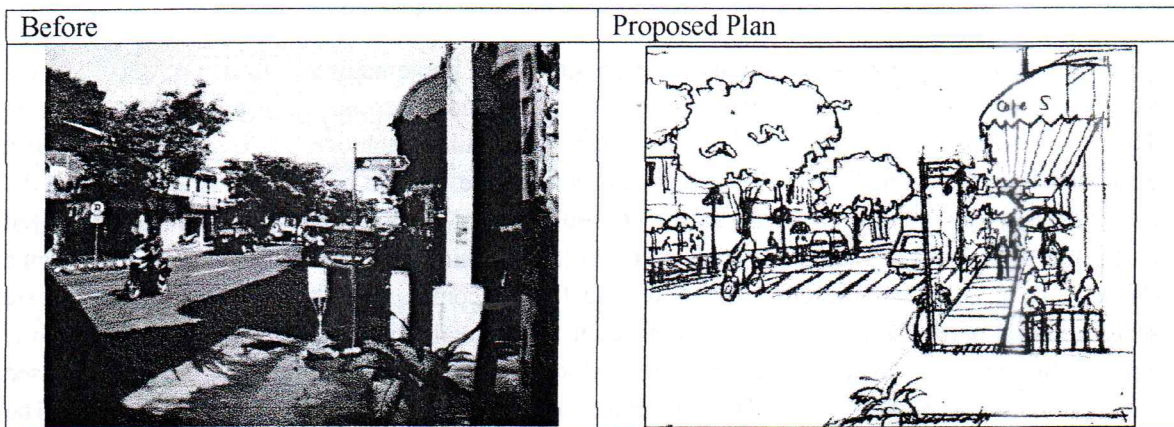


Figure 3. Proposed Design Sidewalk Area Sudirman Street

Samratulangi Street

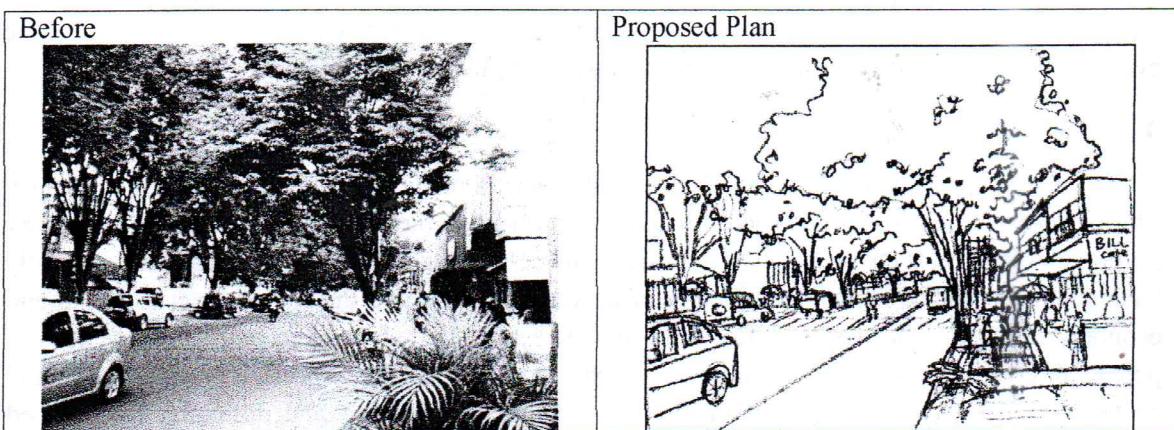


Figure 4. Proposed Design Sidewalk Area Sam Ratulangi Street

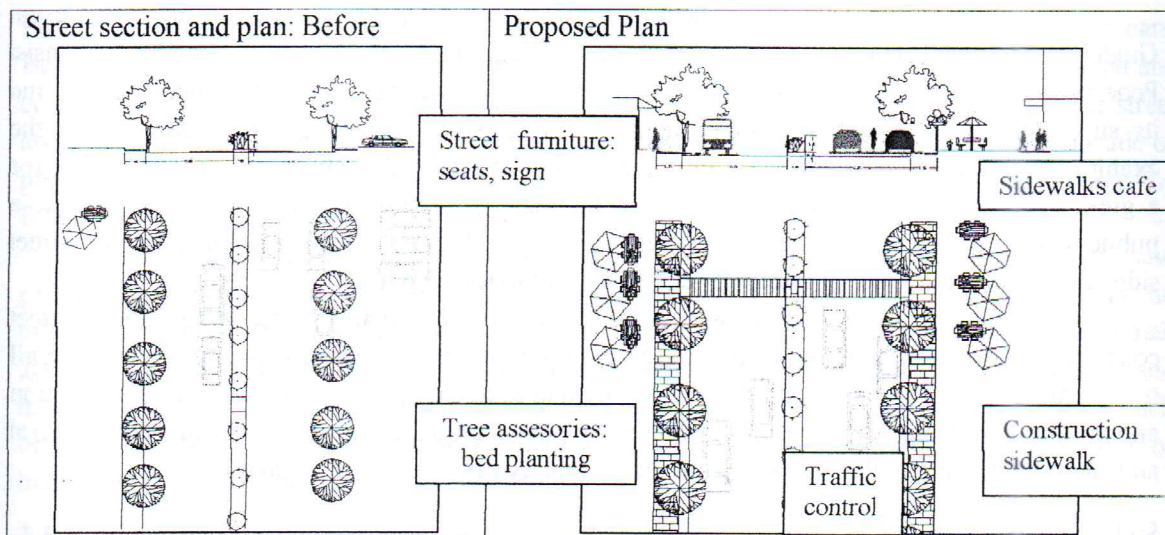


Figure 5. Street Section and Proposed Plan

As the design represent changing in each street, the implementation must be followed by a strictly guideline but easy to understand. However, implementation of street guideline is not easy. There are several reasons why good street design is difficult to achieve. First, street must fulfil a wide variety of functions for diverse groups at different time, second historically street design is the role of traffic for cars not for people in shared public space, third involve wide variety of engaged party, fourth the power to regulate the street and lastly timing and money are always a challenge (Hawkes et al, 2009). Therefore, there is a need for the community, the government and private sector to build partnership in order to achieve a city with great streets. The result of this research is a possibility design to create a functional street which is not depend on standard street section based on department of public works. The suggestion is only based on urban design approach. The possibility design need to be tested in the stimulation model or in part of the street for further research in order to be evaluated what are most suitable for every different character of the street. There is also need a depth analysis on the influence on local character in creating a general model of great street. Moreover, the standard street section based on department of public work could be evaluated how far the street space has consider space for public.

3. CONCLUSION

To sum up, the street in today urban life has been a public place for cars as well as people. The development of a city such as Manado has influenced the function of a street. This study finding that in general character of its four main streets, each street has its own character but mostly have similar problems including difficulty of pedestrian access and the use of street as social and economy activities. The proposed design for main streets in Manado is to accommodate the need of people in recent condition and for the future. Considering sustainable aspects, a green street should be supported by a good street urban design guideline. In planning and designing for detailed engineering plan, the government of the city of Manado has to include the street character in order to support the liveability of streets in Manado.

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