

[27]

SOME PHYSICS IN PURA MANGKUNEGARAN

Dr. rer. nat. Sparisoma Viridi, M.Si., S.Si.

Physics Department, Institut Teknologi Bandung (ITB)

viridi@itb.ac.id

Abstract:

Discovering physics concepts or just the implementation in our culture is very challenging since a community cannot survive for hundred years without the concepts. Whether it is implemented by design or by accident is another question. Approach through literature study is conducted to gather initial information. Interesting facts are obtained, which are described as follow.

Pura Mangkunegaran is the main palace of Mangkunegaran, which is a palace complex located in the city of Surakarta, Central Java, Indonesia. The Pura Mangkunegaran exhibits features of typical Javanese kratons, such as courtyard (Pemédan), hall (Pendapa), vestibule (Pringgitan), main house (Dalem), and private apartment (Keputrén). There are, at least, three natural physical aspects that you will experience while exploring Pura Mangkunegaran, but you might not aware of. They are natural sound reverberation, natural lighting, and natural ventilation. The last two are essential aspects of architectural design that can improve the health, comfort, and energy efficiency of buildings, while the first normally requires electronic equipments. At the time the complex was built in 1757 by Mangkunegaran I, the first Duke of Mangkunegaran, there was not any such technology available.

The Grand Hall has vast open space that affects its acoustic properties. Sound waves bounce of the walls, pillars, and ceiling, creating unique reverberation during ceremony and events. It might be that in the past architects and builders have intuitively considered sound propagation in such way to

produce reverberation, even if not in explicitly framed in physics terms. I would like to refer that as local wisdom of physics.

So, whether the implementations of physics concepts in Pura Mangkunegaran are by accident or by design is an interesting and important question. When it is by design, we must explore further the local wisdoms related to physics. There might be another wisdom that must be preserved and can still be used for today, since the Javanese has been survived for centuries. It means that they know the nature and are applying natural sciences concepts, including physics.

Even though we always think about modern science and technology when addressing sustainable development, we must remember that survived civilization as the Javanese that can still preserve their culture indicating that there are wisdoms, aside from abstract ones governing our behaviors, but also related to natural sciences where physics is part of them. Why there was not any information, as far I know, about lack of food at that time or stunting? How did they overcome the problems at that time? We should not learn history as history just for memorize our ancestor, but also learn how they can survive and how they deal with new and invasive, might be also intrusive, cultures and create harmony and make it as new assimilated culture, where the dominant culture is not with dominant number of people but also the trend of modern culture.