

## Visualization of needs of a local community and interaction of engineers with local needs

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### Interaction between local needs and technology

This paper intends to clarify the way infrastructural engineers should interact with the problems of a local community and local infrastructure.

Infrastructure is constructed for the sake of the local community. From this perspective, it is necessary to appropriately ascertain and meet the local needs. Figure 1 shows a conceptual drawing of the process of analyzing local needs into technology. It is convenient to conceive three levels of needs and two phases connecting these needs.

At the level of ascertaining what the community desires (the needs of the community), the wish of a community is generally characterized by its vagueness. Even when asked, they usually cannot express their needs in concrete terms. At the very least it is comprehended as their needs that they want engineers to provide comfortable and useful social infrastructure.

The level of the needs for the right infrastructure to be built is a level to express the vague wish of the

community, such as safety/security and comfort, in the form of performance requirements for the infrastructure.

The level of the needs for the right technology to be used is a level where the above-mentioned needs are analyzed to select infrastructural technology, dealing with specific techniques and systems.

### Human resources to connect the needs of each level and proneness to self-satisfied technology

What is important in this process is that technical development that is satisfactory for both the community and civil engineers involved is possible when all these needs are organically connected, instead of being isolated from one another.

Figure 2 shows a case where the community wants a number of overpasses while the desired number is questioned from the aspect of the right infrastructure, causing conflict. This is an example in which the needs of the community are not connected well with the infrastructure.

Communication between the community and engineers is essential when matching the needs of the community and the needs for the infrastructure. As stated above, however, the community can only express their needs vaguely. For this reason, the needs of the community are generally embodied by engineers (the owner, supervisor, etc.).

Communication between engineers concerned is essential in Phase 2, where the needs for the right infrastructure are connected with the needs for the right technology. At this phase, the performance requirements of the structures are considered, and the way technology should be to meet the requirements is presented. Engineers may often consider technology within the limitations of their thinking, without

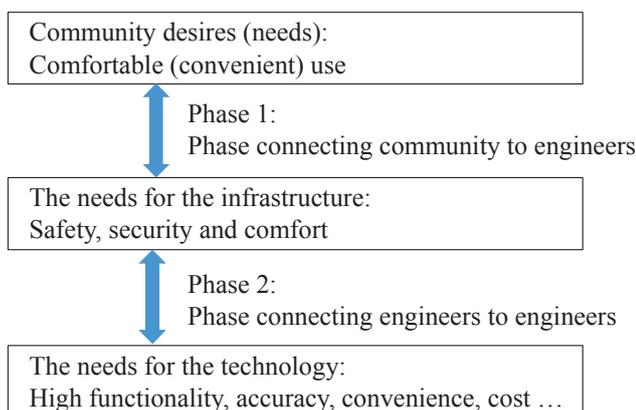


Fig. 1 Phases connecting community needs to technology



**Fig. 2** Example of a number of overpasses built on community needs

providing the exactly required technical development. In other words, technical development is prone to be based on the engineers' self-satisfaction.

Back when new construction prevailed, the technology to build structures was materialized in the form of structures in most cases. It was therefore easy for users to realize the benefit of technology, encouraging technical development. However, in the current environment where maintenance prevails over new

construction, users are less likely to directly receive (recognize) the benefit of new technology. This may have led to the current tendency toward technical development in the infrastructural field often seen to be based on engineers' self-satisfaction.

With devastating natural disasters occurring in recent years, aerial photography using drones to ascertain the state of damage has been spreading at a remarkable pace. This is a result of technology being connected to the desire of the community to know the current state. Drainage pavement is another example of accelerated dissemination due to the fact that users can directly experience the effect of new technology.

### **Importance of human resource development of engineers**

Accordingly, technical development useful for the world can be achieved by appropriately connecting the desire of a community, the right infrastructure to be built, and the right technology to be used. In view of the fact that it is engineers who make this connection as stated above, it is understood that fostering the growth of engineers is crucial. Not only professional skills in a specific field but also knowledge of surrounding fields and communication skills are particularly required. The Maintenance Expert (ME) Training Courses of Gifu University are therefore considered to play a significant role in this regard.