

Overcoming the disconnect between science and engineering

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Since 2013, this session has provided an open forum for addressing the risks of nuclear power plants. We have discussed various aspects of the safety and risks of nuclear power plants against frequent earthquakes, tsunamis, and volcanic eruptions in Japan. In sessions, "Difference between science and engineering" was repeatedly discussed, and in 2017 and 2018, the subtitle was clearly stated as "Think from both sides of science and engineering".

And about the design basis earthquake ground motion of the nuclear power plant, high-level radioactive waste, Scientists and engineers have raised issues and discussed about disposal.

However, even after the discussion, the dialogue between science and engineering did not deepen, but rather the communication gap tended to widen. As not a scientist, but one of the newspaper reporters who saw science from a social perspective, I would like to step in this discussion.

Why communication between science and engineering is necessary? It is not the purpose of communication to determine which is right or which has scientific and social legitimacy. Because science and engineering are different from each other, it is natural that they pass each other. In this regard, the speaker pointed out in the column of the Nihon Keizai Shimbun on October 29, 2012, entitled "Struggle between Science and Engineering".

The article said that science and engineering would differ from each other over the evaluation of the active fault just below the nuclear power plant. "The idea of science such as seismology, is to read messages emanating from nature strictly and there is no room for making compromises due to the circumstances of human society. it. Engineering has a tendency to find achievable solutions in the face of the realities it faces. " The article concluded that "Effort sincerely overcoming the disconnect between engineering and earth sciences" is essential to the continued use of nuclear energy.

If this session is an attempt for "dialogue", I would like to emphasize that dialogue is "exploration".

Exploring means leaving your current location and going to a new location. It is a "journey" where you travel with a small amount of household goods from private land and find a new shared place somewhere. In other words, a "dialogue" requires to abandon your belief and discard what you do not doubt. A dialogue would not be possible without the willingness to bend your opinion and accept the other person's opinion. You need to be prepared to abandon your knowledge in the field you specialize in. A dialogue between science and engineering cannot be established simply by claiming just the correctness of opinions while remaining in "the octopus traps of expertise". As a result, the decision is left to politics and public opinion, which have little relation to science or engineering. Is it possible to say that you are fulfilling the social responsibility of scientists?

Engineers think that a certain technology is necessary for society and mankind. In addition to their own beliefs, they are required by society or politics, and make every effort to realize the technology (social implementation). Solving social issues will be the mission of engineers.

But I want you to doubt the correctness of that belief for "dialogue". Is it really necessary? Does society really want it? Will society not go without it? The more strongly a person believes, the more he doubts what he has believed and needs to dissolve the belief once.

Ask scientists to consider whether there is room for compromise in "the scientific truth". Putting aside the question of whether there is a real social demand for nuclear use, scientists are required to think seriously about how far science can look down on the safety and risks of nuclear power on the assumption that there is a strong social demand. What are the acceptable risks?

The dialogue between engineering and science is different in dimension from interdisciplinary cooperation between biology and physics and joint research between mechanical engineering and river engineering.

That go beyond pure cooperation between academics and exchange of knowledge. This is because the dialogue between the two parties that seeks to approach each other always involves a social perspective and questions the social value of science and technology.

Academic societies are not just places for discussing science. In order to be “science in society, science for society” , for both scientists and engineers, once leaving each expertise might be the gateway to “dialogue” .

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