

# Environmental Risk Assessment and Countermeasure Technology for Land Use of Waste Disposal Site

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## 1. Background

Waste landfill sites are expected to create new land space after its closure. However, they have been used only as park or recreational areas, since the waste material continues to have the potential of environmental pollution (landfill gas, leachate) even after the landfill sites are closed, and their physical properties are unknown due to their heterogeneity and variation. In 2004, Japanese legislation on waste disposal regulated that waste landfill site after its closure is registered to the database should be well controlled in its land use according to several criteria to achieve the compatibilities between promoting the further utilization and controlling the risks induced by the land use. The technical committee published the guideline on the framework on the registration procedure of the closed landfill and the criteria to be followed in their land use. However, further researches are required to establish the risk assessment method on the land use, and promote the advanced use of them, such as the construction of heavy structures. In this research, by reviewing the literatures and previous researches, risks induced by the land use of waste landfill sites are summarized, including the methods for their evaluation and effective reduction. Furthermore, the framework to estimate and control the risks induced is proposed.

## 2. Environmental Risk Assessment

When developing measures against chemical pollution, it is necessary to perform a targeted assessment of the environmental risks that the chemicals may produce on human health or the ecosystem. Environmental risk assessment is performed according to four methods. First, researchers assess whether the chemical compound being assessed causes any damage to humans or living organisms, and if so what kind of harmful effect it has. Second, researchers investigate what degree of effect is caused following exposure to specific amounts of the chemical compound, in order to quantify the strength of the harmful effect. As a chemical compound causes different harmful

effects in different species, it is necessary to assess the effect in various organisms. While the most targeted method of assessing the impact on humans would be to analyze actual cases where human health has been damaged, the key objective is to prevent damage to human health before it occurs, so the impact on humans is only assessed after animal experiments. Third, researchers calculate the degree of exposure to the chemical in humans and organisms. The most common method involves estimates based on measurements of environmental concentrations. If the research is to look at preventing damage to human health before any pollution has occurred, researchers assess the degree of exposure using forecasts from mathematical models. Finally, the results of the strength of the harmful effect and the degree of exposure are combined and an environmental risk assessment is made.

## 3. Application of Environmental Risk Assessment into contaminated site

Figure 1 presents the contaminated area with Dioxins in Fuji-city, Shizuoka where is the construction site of New Tomei Expressway. In this paper, I applied an approach for Environment Risk Assessment to this site.

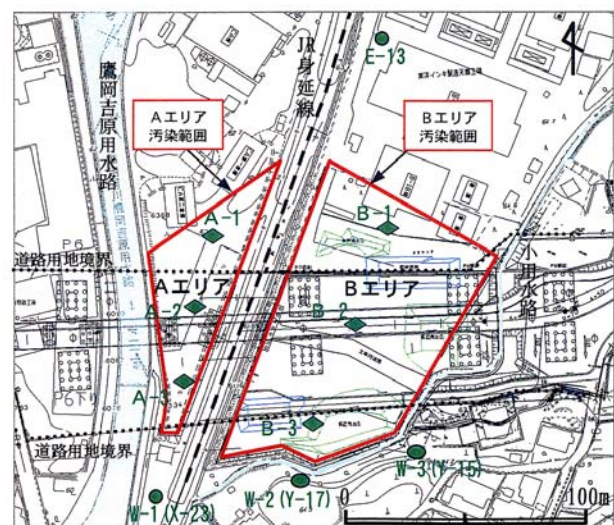


Fig.1 The extent of contamination with Dioxins