NIPPON KOEI

Nippon Koei Co., Ltd.

Geohazard Management





Overview of Nippon Koei Geohazard Management

- Nippon Koei has a specialized team under <u>"International Geohazard</u> Management Department" to deal with the geohazards.
- The department has been in the forefront of geohazard management with proven technologies for over 50 years.
- Coverage includes landslides, earthquakes, tsunamis, volcanoes, and floods.
- Major clients: Japan International Cooperation Agency (JICA), World Bank (WB), Asian Development Bank (ADB), Inter-American Development Bank (IDB) as well as other local governments and private companies.
- Depending on project financial and contractual arrangement, we conduct all or a combination of the services shown.

Landslide Management

Landslide Management is one of our department's core fields. Services include:



Project Formulation

Preliminary Investigation

- Roadway landslides
- Reservoir rim landslides
- Landslide dams
- Hydropower and water canal slope failures
- Pipeline and other lifeline infrastructure hillslope instabilities
- Filling and cutting slope instabilities
- Emergency response and early warning system development
- Geohazard or natural hazard management planning
- Preparation of various guidelines and manuals for landslide management
- Technical assistance and technology transfer to government officers

Above: Landslide often causes considerable damage to road networks, leading to significant repair costs, access difficulties for emergency services, and disruption to road users and local communities.



Above: We can predict the extent of damage in the event of a landslide disaster and the effectiveness of countermeasure works by numerical analysis.



Fig. Survey of torrents with debris flow hazard for Developing debris flow countermeasure plan

Volcano Management



Sand retarding area for volcanic debris at Sakurajima in Japan, designed by Nippon Koei



- Volcanic hazard and risk assessment, volcanic risk mapping.
- Emergency disaster prevention Sabo plan and volcanic Sabo plan ("Sabo works" involve erosion and sediment control.).
- Evacuation plan and drill for government or community base.
- Volcanic mudflow investigation, simulation and mitigation planning.
- Design of structural countermeasures such as Sabo dam, training dike, etc.

Earthquake and Tsunami Management

- Seismic diagnosis, inspection and monitoring
- Ground shaking and fault rupture investigation and evaluation
- Earthquake and tsunami disaster risk maps
- Earthquake-induced landslides and liquefaction assessment
- Earthquake- induced tsunami simulation and assessment
- Seismic reinforcement design
- Earthquake tsunami damage or estimation management risk and planning
- Urban rehabilitation and reconstruction plan after earthquake
- Preparation of guidelines and manuals for earthquake risk management plan



Site observation by experts



Simulation of tsunami inundation for formulating tsunami risk management plan



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We can quickly and automatically extract landslide or collapse topography by using AI technology. In volcano areas, AI helps to quickly extract the unstable terrain immediately after the eruption.



Extraction of landslide topography using Al **Extracted landslides by an expert**



Major International Experiences





Virtual office for disaster management using MR (Mixed Reality) technology Essential tool for making rapid decision-making under emergency situations



3D Simulation for Rockfall To estimate the runout and deposition of rockfalls, and thereby examine the necessity of rockfall countermeasures

Numerical simulation for 3D stress-displacement analysis during slope excavation.



VR (virtual reality) Disaster Education System

important that people İS living in the disaster area understand what has happened. We construct a disaster simulation system to reproduce the situation of disaster occurrence by virtual reality technology (VR). This provides high system а realistic and presence simulation by tsunami, tidal wave and overflow simulation.

Rock drilling by Safety management **Ground anchor** wire operation works system







Department of Climate Change Adaptation and Strategic Risk Management for Strengthening of Public Infrastructure in El Salvador





Comprehensive plan to ensure safety of Mancatian Bridge against riverbed degradation, prepared by Nippon Koei

Major Work Example 3: **Pinatubo Volcanic Hazard Urgent Mitigation in** Philippines

deformation.

For the supplemental information, please scan the QR code or visit this link: Nippon Koei Co., Ltd. - 7th Asia-Pacific Climate Change Adaptation Forum (asiapacificadapt.net)

