

## Geological Underground Mapping for DIN 4149 (new): Abstract

Redefining the German national building code for earthquake resistance of structures DIN 4149 (new) includes for the first time geological underground effects to classify seismic hazard in the Federal Republic of Germany. With financial support of the Deutsches Institut für Bautechnik (Berlin) the Office for geology, raw materials and mining of Baden-Württemberg has developed a new mapping strategy to demonstrate particular risks that are due to geology (within zone 0 of the maps of GRÜNTAL et al. 1998). The studied area covers parts of the federal states of Baden-Württemberg, Bavaria, Hesse, Northern Rhineland-Westphalia, Rhineland-Palatinate, Saxony, Saxony-Anhalt and Thuringia. Results have been coordinated with the state agencies for Geology for the respective areas.

According to prerequisites, the map was finished on a scale of 1:2,5 Mio in azimuthal equal-area projection of Lambert with projection centre at 10°E and 51°N. This map is completed by a report containing a detailed bibliography of the literature as well as a list of representative drillholes all over the area studied. Further included are an explanatory note about representative locations, a comparison of response spectra of these locations with the proposal of normative spectra of SCHWARZ & BRÜSTLE (1999) as well as a detailed description of the mapping strategy in defined areas of different geological underground classes.

The map presented shows three seismically relevant and discernable geological underground classes for the area studied :

A ("solid rock"):

areas without unconsolidated sediments or areas with a thin cover of mostly Quaternary sediments, underlain by solid rock with shear-wave velocities greater than 800 m/s.

B ("shallow basins, transition zones"):

up to 100 m unconsolidated Quaternary sediments underlain by solid rock with shear-wave velocities greater than 800 m/s.

or

up to 500 m Tertiary sediments with gradually increasing shear-wave velocities.

C ("deep sediment basins"):

more than 100 m of unconsolidated Quaternary sediments over solid rock with shear-wave velocities greater than 800 m/s

or

more than 500 m of Tertiary sediments.

The subsoil conditions down to a depth of 20 m are not considered in this report.

The map of geological underground classes in the Federal Republic of Germany has been established upon an examination and comparison of different geological maps and cross-sections as well as after evaluation of selected drillholes and geophysical measurements. The assignment to a specific geological underground class is possible due to similar geological conditions within an area of dimension not less than 20 km. These minimal dimensions are required by the pre-defined map scale. The classification of the geological underground is accomplished using stratigraphic profiles of selected drillholes. The existence of geophysical measurements allowed at some locations to complete the stratigraphic profiles with seismic results (measured, estimated or guessed shearwave velocities). Three representative response spectra have been calculated for an earthquake of magnitude 6 and have been compared with the proposal of Schwarz & Brüstle (1999).

In combination with the probabilistic map of seismic hazard (GRÜNTAL et al. 1998) it is now possible to quantify the regional seismic hazard within the Federal Republic of Germany in combination with geological underground effects.

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Freiburg, January 31, 2000