ABSTRACT

Pillars, which protect mine workings that are important for mine's operations are, in their essence, unexcavated parts of mined coal seams surrounded by goafs. Their main task is to protect the workings located in them, however, in certain situations, caused among other things by the exploitation history, these structures may have an adverse effect on them. To date, the Polish mining industry has developed rules for the dimensioning of pillars for the protection of corridor mine workings, rationalizing their manufacture from the point of view of the static effects of mining. They do not take into account dynamic phenomena, in particular seismic and rockburst hazards. With the increase in the depth of exploitation and the degree of advancement of the deposit's extraction, the role of these hazards increases. From the point of view of the occurrence of seismic and rockburst hazards in a mine, pillars, especially pillars formed in multiple seams, are unique places. Experience shows that there is often a high level of seismic activity in their vicinity and inside their contours, as well as theoccurrence of coal bumps of seam and roof character. Conducted literature survey of the issues of design of protective pillars, assessment and prognosis of seismic and rockburst hazards occurring in them, as well as the possibility of counteracting them, allowed me to formulate the thesis of the work and define its objectives.

The assumptions of the thesis assume that in complex pillar structures protecting primary, long-maintained corridor workings, a "redundant" seismic and rockburst hazard condition can and often does occur in relation to other mining situations. For typical mining conditions, the existing state of knowledge and the ability to analyze the impact of most of thefactors destabilizing the surroundings of the workings make it possible to assess and predict the conditions of their maintenance. Under the conditions of the "pillar structure", this requires special treatment of the pillar-making process and the systematic, preferably anticipatory application of effective methods of prevention of these hazards. The purpose of the planned and performed analyses, studies, measurements and experiments presented in this work is to demonstrate that: the current state of knowledge, level of sophistication of analytical and measurement tools, and the technical state, make it possible to rationally and effectively plan the manufacture of pillars to protect workings and carry out seismic hazard reduction activities in an efficient manner. To accomplish this task, it is necessary to identify and develop a number of specific issues, which are the topics of the individual chapters of this dissertation. The dissertation shows that:

- basic geological and mining information held by mines,
- observational, measurement and analytical methods routinely used in practice, and
- scientific and research tools at their disposal,

are sufficient for their solution.

It is obvious that for individual cases of pillars located in different geological, mining and hazard conditions, the scope of issues considered and the sets of tools used may be/should be different. Nevertheless, it is possible to formulate general basic rules of conduct for the manufacture of a "new" pillar and, separately, rules for the selection of methods to reduce seismic and rockburst hazards in existing pillars. Their proposals are given in the paper as its main result, confirming the thesis and meeting the stated objectives.