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(54) **Operation of information systems in particular for undergoing mining**

(57) An information system provides remote measuring and supervision of machines, operating processes, and operating conditions as well as the automatic or partially automatic processing and representation of the data in control rooms and/or sub-control rooms. The data or parts thereof to be relayed are returned to the underground workings *via* remote transmission devices and are recorded, stored, and displayed there by mobile receiver sets. The receiver sets may also be equipped for relaying data and information to control rooms. The information is transmitted *via* radio or cables. In mining, supervisory staff below ground may in particular follow the development over time of important operations from a large area of the underground workings as well as evaluate and supplement information. Additional stationary projection or display boards may supplement the information.

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SPECIFICATION

Operation of information systems, in particular for underground mining

The invention relates to an information system, in particular for underground mining, and a method of operating such a system.

The development of mines in deep mining is increasingly leading to more extensive and branched-out pits. As a result of rationalization many operations are performed automatically or partially automatically and thus the number of persons employed has descreased considerably. However, the remaining supervisory and maintenance staff require more information more rapidly. The known information systems are based on the remote supervision of data in one or more control rooms which are occupied by supervisory staff. For this purpose telephone or radio lines are used to relay messages and instructions to mobile key members of staff in the underground workings. The exact relaying of extensive reports on conditions to these key members of staff is not possible in this way but is often necessary for making rapid decisions.

The present invention provides a method of operating an information system, in particular for the undergound pit mining of underground mines, with remote measuring and supervision of machines, operating processes and operating conditions as well as the automatic or partially automatic processing and representation of the data in control rooms and/or sub-control rooms, in which the data or parts thereof intended to be relayed are returned to the underground workings *via* remote transmission means known *per se* and are recorded; stored and displayed there by mobile receiver sets.

The data may be transmitted continuously or on call. Preferably, a transmitter/receiver set is used. The data stored in the receiver set are preferably also repeatedly displayed on call, individually or in groups. By the use of an additional device the staff in the supervising control rooms may also manually input additional data and instructions into the information system.

The invention also provides an information system including a portable, intrinsically safe data receiver set with storage means and alphanumerical display devices for the received data. Preferably, it is also possible for the receiver set to perform mathematical operations.

The information system preferably includes a device for relaying data.

The receiver system is preferably equipped with a telephone device.

Stationary projection or display boards may be erected at optional or preferred locations of the underground workings and, if necessary, are supplied constantly with general data *via* lines.

In a preferred information system, measuring and operating data collected in the control rooms or the sub-control rooms are automatically evaluated in a known manner and to the extent to which they are of interest to the underground supervisory staff are returned to the underground workings by wireless or preferably be means of carrier lines *via* a remote control device which is known *per se*. Depending on the purpose, all or some of these data are recorded, stored, and displayed either continuously or on call from the mobile staff on carried, portable receiver sets, preferably transmitter/receiver sets. In addition, the information system should preferably be equipped in such a way that supplementary data and instructions may also be input by the staff in the supervision control rooms and, conversely, that data of this type may be relayed to the control room *via* the transmitter/receiver set.

Owing to the restricted possibilities of portable receiver sets as regards space, these sets are less suited to the simultaneous representation of relatively large complexes of data but, on the contrary, they are suitable for closely following the progress over time or with respect to methods of individual operations. It is therefore advisable for the information system to be additionally supplemented with larger projection or display boards which are erected at preferred locations of the underground workings and are constantly supplied with general data from the control rooms preferably *via* lines.

Thus with the invention it is possible for the first time for underground supervising and controlling staff themselves to obtain a general idea of the state and progess of processes which take place in a spacious section of the underground workings; this also includes the monitoring of measuring data and the control of the effects of steps taken on measuring data of this type.

CLAIMS

1. A method of operating an information system providing remote monitoring and control of machines, operating processes, and operating conditions and automatic or partially automatic processing and representation of data in control rooms and/or sub-control rooms, in which method some or all of the data are returned to working locations by remote transmission means and are recorded, stored, and displayed there by mobile receiver sets.

2. A method as claimed in claim 1, in which the data are transmitted continuously or on call.

3. A method as claimed in claim 1 or 2, in which at least one of the receiver sets is a transmitter/receiver.

4. A method as claimed in any preceding claim, in which the data stored in a receiver set are repeatedly displayed on call, either individually or in groups.

5. A method as claimed in any preceding claim, including manually inputting additional data and instructions in the control or sub-control rooms.

6. A method as claimed in any preceding claim, in which the information system is a mining information system and the working locations are underground.

7. An information system providing remote monitoring and control of machines, operating processes, and operating conditions and automatic or partially automatic processing and representation of data in control rooms and/or sub-control rooms, the

system including a portable data receiver set with storage means and alphanumerical display means, for receiving data from the control or sub-control rooms.

8. A system as claimed in claim 7, in which the receiver set is adapted to perform mathematical operations.

9. A system as claimed in claim 7 or 8, in which the receiver set includes means for relaying data.

10. A system as claimed in any of claims 7 to 9, in which the receiver set is equipped with a telephone.

11. A system as claimed in any of claims 7 to 10, further comprising stationary projection or display boards erected at working locations, and means for supplying general data to the boards.

12. A system as claimed in any of claims 7 to 11, being a mining information system.

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