

Remote Status Monitoring of Broadband Seismometer Based on the Mobile Internet

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Abstract—Application fields of broadband seismometer determine that the settlements of the most instruments locate in remote areas in the wild. Especially as the broadband seismometers of scientific exploration networks and mobility observatory arrays are often unattended, and the field inspections of instruments require a lot of manpower and material costs. To solve these problems, we proposed and designed a remote condition monitoring method of broadband seismometer which bases on the mobile Internet. By SMS (Short Messaging Service) and e-mail in two ways, we have achieved remote status monitoring of broadband seismometer. It provided a solution for monitoring of broadband seismometer which located in remote areas in the wild.

Keywords—broadband seismometer; mobile internet; remote Monitoring

I. INTRODUCTION

With the development of seismological observation technology, broadband seismometer has a wider frequency range, lower noise, greater dynamic range and other characteristics, that makes it have a greater advantage in obtaining information on the deep structure of the Earth, researching the mechanism of the earthquake and so on. It has more and more widely used in the national earthquake monitoring network, regional earthquake monitoring network, scientific exploration networks, mobility observatory arrays, and other fields. Application fields of broadband seismometer determine that the settlements of the most instruments locate in remote areas in the wild. Especially as the broadband seismometers of scientific exploration networks and mobility observatory arrays are often unattended, and the field inspections of instruments require a lot of manpower and material costs. It has become an urgent problem to be solved to how to achieve low-cost remote status monitoring of broadband seismometer. In this paper, we propose a remote status monitoring method of broadband seismometer based on the mobile Internet.

II. THEORY AND METHOD

To be able to use the mobile Internet, mobile communication module was built into the broadband seismometer. By the mobile Internet, we achieved remote status monitoring of broadband seismometer. So far, we have realized a total of two status monitoring methods, SMS (Short Messaging Service) and e-mail.

A. SMS Monitoring Method

Broadband seismometer received status monitoring order sent by the mobile terminal through the mobile communication module, and returned the status information of instrument to the mobile terminal after parsing status monitoring order (Fig.1).

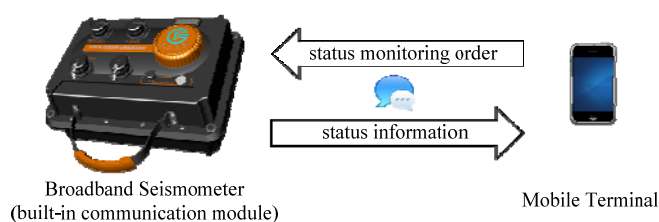


Fig. 1. Schematic diagram of SMS monitoring method.

B. E-mail Monitoring Method

Broadband seismometer connected to the mobile Internet through the mobile communication module, the status information of instrument was sent in the form of e-mail regularly to the monitoring terminal (Fig.2).

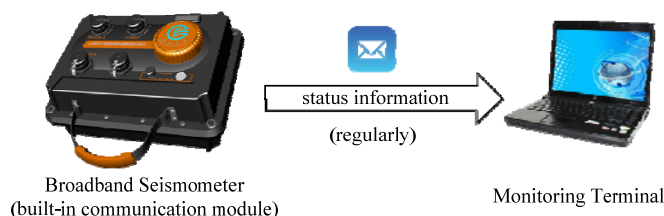


Fig. 2. Schematic diagram of e-mail monitoring method.

III. EXAMPLES

Combined with the project of "Deep Structure Probe of South China" belonged to the Institute of Geology, Chinese Academy of Geological Sciences, We selected 10 stations in south China (Jiangxi, Anhui, Zhejiang) to carry out comparative experiment (ongoing). We used self-developed broadband seismometer with remote status monitoring function, they used Q330S+ produced by Kinometrics. They need to conduct site inspections to know the status information of instrument, it required a lot of manpower and material costs.

We could know the status information of instrument by SMS (Fig.3) and e-mail (Fig.4), it was convenient and low-cost.

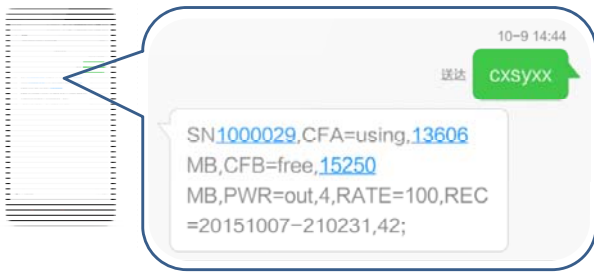


Fig. 3. Remote status monitoring interface by SMS.



Fig. 4. Remote status monitoring interface by e-mail.

IV. CONCLUSIONS

We designed two methods for remote status monitoring of broadband seismometer based on the mobile Internet, SMS and e-mail. In practical applications, by using our self-developed broadband seismometer with remote status monitoring function, we could real-timely get status information of instruments located in remote areas in the wild. At the same time, it was stable and convenient. It greatly reduced manpower and material costs of remote status monitoring of broadband seismometer. It provided a good solution for remote status monitoring of broadband seismometer.

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