

Soviet seismology

Tajikistan earthquake reveals flaw

LAST month's earthquake in the Soviet republic of Tajikistan caused unnecessary damage, according to the local correspondent of *Izvestiya*, V. Surkov. The planning authorities of the Tajik SSR, he says, have for a long time "resisted" the classification of Leninabad *oblast'*, in the north of the republic, as liable to suffer earthquakes of force 8 on the Soviet 12-point scale. Not only had buildings been built to specifications suitable only for less seismic zones, he claims, but Leninabad city itself does not have a single seismic station.

Tajikistan is the most seismically active region of all the Soviet Union's 2 million km² of earthquake-prone terrain. The industrialization and development of the region has therefore called for considerable circumspection on the part of the geologists, and seismic risk maps for centres of population have been in existence for a number of years.



The latest forecast for Leninabad *oblast'*, which dates from 1982, increased the predicted maximum shocks from force 7 to force 8. The republic authorities, however, Surkov said, were reluctant to act on the new figures, and neither strengthened existing buildings nor modified the specifications for new ones. As a result, in the earthquake of 14 October, the towns of Kairakkum and Gafurov suffered heavy material damage.

Surkov's dispatch, from Leninabad *oblast'*, contradicts the impression given by earlier reports from the TASS correspondent, Aleksandr Nemirovskii, who filed from the Tajik capital of Dushanbe. According to Nemirovskii, "residential quake-proof houses built in recent years withstood the force-8 shock". This may be technically true — Surkov implies that some 10 per cent of housing was at least repairable — and Nemirovskii did go on to say that some people who had lived in old houses had had to be given shelter in tents, but the extent of the devastation, and the allegations of official negligence, come only from Surkov.

It is possible that even if the buildings had all been up to recommended standards, they might not have survived, since the shock in fact exceeded force 8. This means, Surkov notes, that future buildings in the area ought to be constructed to resist at least force 9. But some Soviet civil engineers seem doubtful about high-rise

construction in seismic areas, and after the Gazli earthquake of March 1984 it was decided to replace devastated apartment blocks with one-storey dwellings.

More significant, perhaps, is Surkov's claim that Leninabad *oblast'*, which accounts for one third of the population of Tajikistan, has insufficient seismic monitoring stations. Earthquake prediction is a major concern of Soviet geology. Recommended methods range from sampling the helium content of geothermal waters to observing the behaviour of local fauna.

The most reliable early-warning sys-

tem, however, if populations are to be evacuated and emergency services alerted, is the continuous monitoring of microtremors, which are then processed by computer to establish forecasts of the expected epicentre and strength of imminent earthquakes.

In Leninabad *oblast'*, there were not only too few monitoring stations but the communications links to the Central Asian Seismic Forecasting Centre in Dushanbe did not operate. The earthquake itself, moreover, damaged telephone lines to the devastated areas, so that emergency rescue services, while fully aware that their help was urgently needed, had no idea where to send it.

Vera Rich

Japan in chaos

Radical attacks halt railways

Tokyo

As in other advanced nations, the functioning of Japan's giant cities is very much dependent on fast urban transport systems and the sophisticated electronic communications that control them. Just how vital these communications systems are was shown when left-wing radicals, protesting at plans to privatize the national railway network, last week cut trackside cables in Tokyo and Osaka. Eleven million commuters were stranded and for half a day many businesses ceased to function.

Almost exactly a year ago, a small fire knocked out computer links and brought Japan's banking system to a halt (see *Nature* 312, 393; 1984). At that time, there was an outcry over the vulnerability of the emerging back-up systems. But it seems that ultra-left groups learned more from that incident than did the government.

Early on Friday morning, radical groups, armed with garden shears and knowledge of where to find the cables for the national railways' central traffic control and automatic train stop systems, struck at 23 locations in the Tokyo area. The first the railway authorities knew was when screens at the central computer headquarters went blank; when they tried to contact key stations through their own telephone network, that too was found to be dead. Similar events took place in Osaka. That morning, the two cities' entire public rail systems were paralysed.

Repairing the cables is a difficult task: a minimum of four hours is required when a single break is made in the more sophisticated communication links. When there are several cuts in the same cable, the difficulties are multiplied many times over. During the day, huge traffic jams developed and enormous queues formed at the stations of the private railway line still running. One queue in Tokyo was said to consist of 35,000 people. Businesses opened late and a fifth of Tokyo's schools closed for the day.

In a related incident, other radicals,

dressed in business suits and ties but wearing helmets, attacked a medium-sized station in the centre of downtown Tokyo with Molotov cocktails. They then flung away their helmets and disappeared among the crowds of commuters. The station burned throughout the day.

No statement has been issued by the attackers, but it is assumed that they were members of the People's Revolutionary Army of the ultra-left Chukaku-ha (Middle Core Faction). Their attacks were timed to coincide with a strike by a break-away chapter of the National Railmen's Union based in Chiba, a little to the east of Tokyo, protesting against plans to privatize the National Railways.

The Chukaku-ha is a strong and well-organized revolutionary group with probably around 3,000 members, many of them recruited at universities. Membership of its secret revolutionary army probably numbers several hundreds.

Previously, the group has been most conspicuous in its bitter fight against the construction of Tokyo's new international airport at Narita. Although the airport was opened seven years ago, the radicals are still fighting for it to be closed and for land expropriated from small farmers to be returned. The airport is constantly guarded by some thousand police, but this has not prevented frequent disruptions in service.

That radicals now seem willing to use similar tactics against the railways is bad news for the Japanese government. Railway authorities have already admitted that there is no way they can guard hundreds of kilometres of communication cables against attack, nor can they install a complete back-up system without ruinous expenditure. Selling off the railways is going to be a considerably tougher task with radical opposition which could continue indefinitely. And police fear that the Chukaku-ha may be planning something big for the Tokyo summit of world leaders next May.

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