MYANMAR

- MAJOR IMPORTANT FACTORS IN MYANMAR: CONSTRUCTION, INSURANCE, COMMUNITY PREPAREDNESS AND PREDICTION

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1 SEISMIC RISK

As Myanmar is situated on the boundary of the Alpine-Himalayan earthquake belt, there is always the seismic risk. Like other countries situated at the border of the seismic activity zone of the Himalayan Ranges, Myanmar often suffered from earthquakes that sometimes caused great loss of human lives and damage to historical buildings (like monuments and pagodas, roads and bridges). A review of historical earthquakes reveals that strong to severe earthquakes had occurred throughout the country, except in Mon and the Tanintharyi coastal areas.

Some earthquakes had caused deaths numbering up to 500. The famous majestic Shwedagon Pagoda had suffered damage many times in its history. The Shwemawdaw Pagoda of Bago had also suffered great damage from strong earthquakes and had to be repaired repeatedly.

Small population and the lack of multistory buildings and infrastructures had minimized the loss of life and damage during past earthquakes (Figure 1).

However, Myanmar is now a practicing market economy. General and abrupt development is taking place in many sectors. There are also greater population, higher urbanization, more industrialization and many infrastructures. Now, there is greater risk. Even a moderately strong earthquake may cause great loss of lives and property damage.

2 SEISMOLOGICAL ORGANIZATIONS

The Myanmar Meteorological Department has been recording earthquakes since the pre-war days and has installed a small seismograph at the University of Yangon. After the Second World War, the first seismological observatory was established at the headquarters of the Department of Meteorology and Hydrology at Kaba-Aye in 1962 and then another one at Mandalay in 1966 (Willmore and Sprengnether photographic seismographs). In 1977, these were replaced with Katsujima visual seismographs.

With the donation of the Government of Japan, two more Katsujima visual (solar-powered) seismographs were installed at Sittwe and Dawei in 1984 and early 1985, respectively.

The Seismological Organization of Myanmar was established in 1986 under the control and management of the Department of Meteorology and

Hydrology. At present, the department has four stations equipped with Japanese Katsujima short-period seismographs. The locations of the existing stations and the planned stations are shown in Figure 2. Although our seismographs are old and in urgent need of calibration, repair and replacement, the Seismological Division is doing its utmost to run all the four stations smoothly and to provide the country with seismological data for projects and construction work.

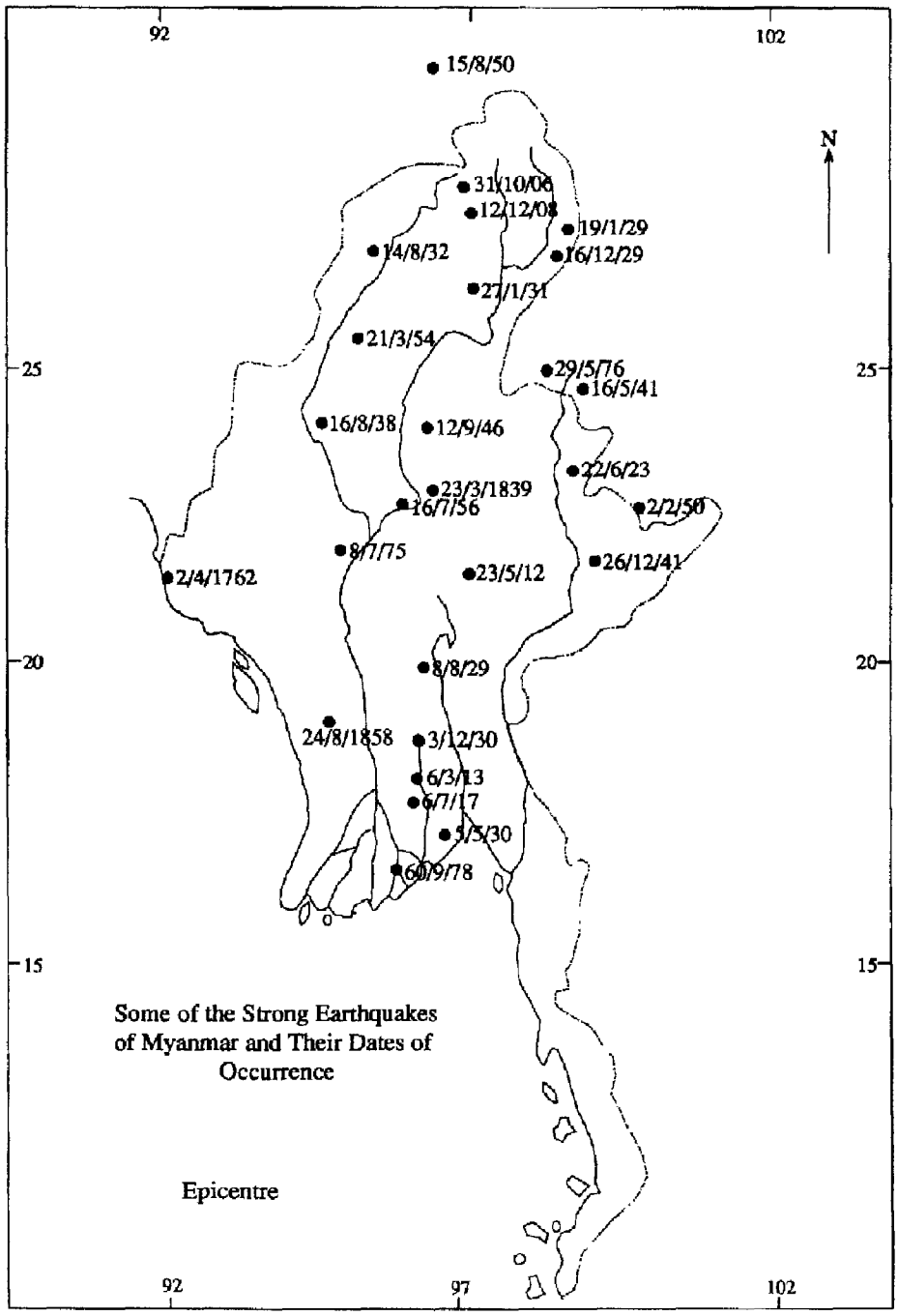

Figure 1: Strong earthquakes in Myanmar

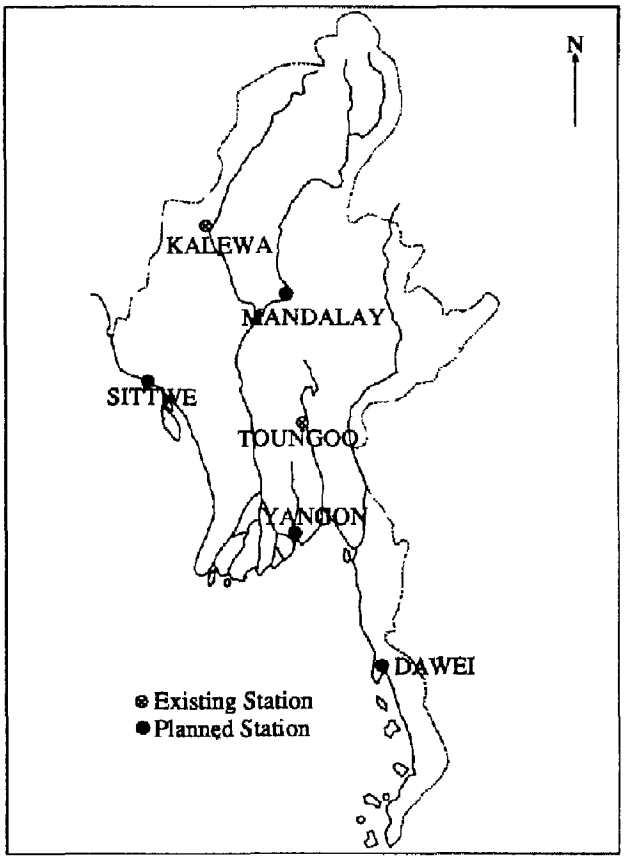

Figure 2: Seismological observatories of Myanmar

The Seismological Division is now run by three officers and fifteen staff members. Earthquakes of Myanmar and neighboring countries have been recorded and the data are stored in hard copy in five volumes:

(a)	Vol. I	Earthquakes up to 1950
(b)	Vol. II	Earthquakes from 1951 to 1960
(c)	Vol. III	Earthquakes from 1961 to 1970
(d)	Vol. IV	Earthquakes from 1971 to 1980
(e)	Vol. V	Earthquakes from 1981 to 1990

It also published the "Seismicity of zone of the towns and cities of Myanmar". A list of some of the strong earthquakes that have occurred in Myanmar is given in Table 1.

Six staff members were trained abroad in seismology: two acquiring diplomas from Japan and three in operational seismology (three members had already left the department and one is going to leave soon). It is not enough. Myanmar urgently needs up-to-date seismology and more trained staff members and modern equipment.

The Regional Seismological Project Himalayan Range - RAS/79/116 had been interrupted (1986). We are left to rely on our own resources to maintain the Seismology Division. We are looking forward to bilateral or international aid to upgrade our seismological network. We plan to open two more stations in Kalewa and Toungoo soon. We also hope to participate and cooperate internationally for mutual benefits.

TABLE 1: LIST OF SOME STRONG EARTHQUAKES IN MYANMAR

Sr. No.	Date	Epicenter Lat. N, Long E	Depth (km)	Magnitude (Richter Scale)	Approximate Intensity (I) near Epicenter	Remarks
1	2.4.1762	North of Rakhine	-	-	Above 10MM	Elevation and submergence of land
2	23 3.1939	21.7-96.0	-	-	9MM-10MM	Amarapura, 300 deaths
3	24.8.1858	19.3-94.8	-	-	9MM	Near Thayetmyo Brick structure damage
4	-/-/1874	Southern Shan State	-	-	Severe	-
5	31.8.1906	27.0-97.0	100	7.0	-	-
6	12.12.1908	26.5-97.0	-	7.5	-	-
7	23.5.1912	21.0-97.0	-	8.0	11MM	North of Taunga
8	6.3.1913	17.4-96.5	-	-	8MM-9MM	Bago
9	5.7.1917	17.4-96.5	-	-	8MM-9MM	Bago
10	22.6.1923	22.75-98.75	-	7.3	-	-
11	16.3.1925	25.5-100.26	60	7.1	-	-
12	19.1.1929	25.9-98.5	-	-	9MM	Htawgaw
13	8.8.1929	19.25-96.25	-	7.0	9MM	Swa
14	16.12.1929	25.9-98.5	-	-	9MM	Htawgaw
15	5.5.1930	17.0-96.5	-	7.3	10MM	Bago destroyed, 500 deaths. Shwemawdaw damaged. At Yangon building considerably damaged and 50 deaths
16	3.12.1930	18.0-96.5	-	7.3	10MM	Pyu, 30 deaths
17	27.1.1931	25.6-96.8	-	7.3	10MM	Kamaing
18	14.8.1932	26.0-95.5	120	7.0	-	-
19	16.8.1938	23.5-94.25	60	7.2	-	-
20	16.5.1941	24.0-99.0	60	6.9	-	-
21	26.12.1941	21.5-99.0	-	7.0	-	-
22	12.9.1946	23.5-96.0	-	7.5	9MM	Tagaung
23	2.2.1950	22.0-100.0	-	7.0	-	-
24	15.8.1950	28.5-96.5	-	8.6	12MM	Great Assam Earthquake
25	21.3.1954	24.6-95.2	150	7.0	6MM	Near Homalin
26	16.7.1956	22.0-96.0	100	7.0	8MM-9MM	Sagaing, more than 40 deaths
27	8.7.1975	21.5-94.7 (near Pagon)	84	6.8	8MM	Religious edifices suffered widespread damage. Two deaths
28	30.9.1978	16.60-15.86	10	5.7	8MM	Many brick structures suffered damage. Two deaths
29	5.1.1991	23.6-95.9	20	7.1	9MM	Tagaung (32) Buildings and 380 hectares of farmland damaged in the Thabeikkyin area

NB: intensity MM = Modified Mercalli Scale

3 DISASTER MITIGATION STRATEGY

To mitigate earthquake related losses in Myanmar, there are four major components:

1. Construction component: Engineers require modern design technology and basic seismic information, preferably for long period, to construct earthquake resistant buildings and infrastructures. Seismic zoning of the country for designing is necessary for safety and efficiency (e.g., to avoid unnecessary expenditure for low seismic risk zone). They need seismic micro-zonation for urbanization. The current zoning shown in Figure 3 is crude and incomplete.

   Myanmar Construction Enterprise (MCE) had already designed and constructed earthquake resistant buildings such as hospitals, parliament building, etc. It has about fifteen engineers trained in IISEE, Japan. More trainees and follow-up programs are needed to fulfill the requirement.

2. Insurance Component: Myanmar Insurance Enterprise is offering earthquake insurance policy but it is almost unknown to many people in Myanmar.

3. Community Preparedness: There are training courses on "Disaster Preparedness and Prevention" given to trainers and trainees throughout the country. The Department of Meteorology and Hydrology participates in lectures on tropical storms, floods and earthquakes. The course mainly concerns with the types, causes, and effects of earthquakes, earthquake zones and waves, intensity and magnitude scales, historical earthquakes, and preparedness.

   Authorities concerned may need special equipment and training in modern technology for speedy and efficient rescue work.

4. Prediction: This is beyond our reach. Even with our best efforts, it is hard to get basic seismic information. As stated earlier, our instruments are old and need calibration, repair and replacement. Our network is not sufficient especially in the northern part of the country. There is also a great shortage of trained personnel.

The seismologists and the engineers concerned agree that there should be a multi-departmental committee of engineers, seismologist, geologists, soil scientists, lawyers, and academicians. The committee should engage in research and formulate a seismic code.

4 CONCLUSIONS

Currently, Myanmar is a practicing market economy. Evidently, general and abrupt development is taking place. Seismological service becomes of great importance in construction work and plays a major role in the mitigation of earthquake-related disasters. It is hoped that international cooperation will greatly benefit our division and indirectly, the department and the people of Myanmar.

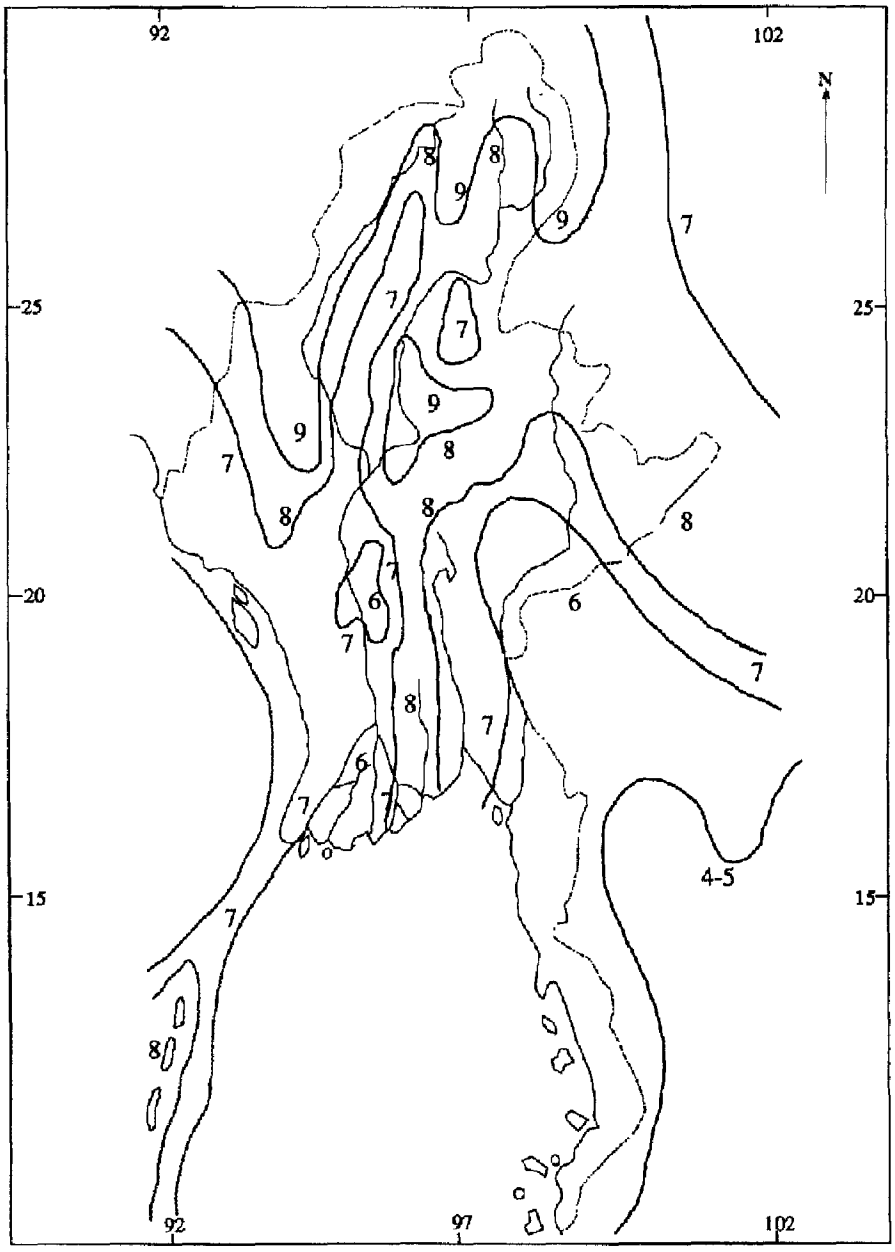

Figure 3: Seismic zoning of Myanmar