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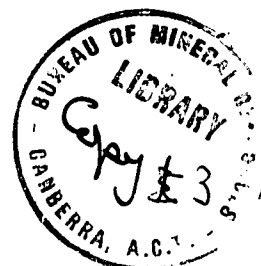
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RECORDS 1960 No. 129



FLINDERS GUNNERY VIBRATION TESTS No. 2,

VICTORIA 1960

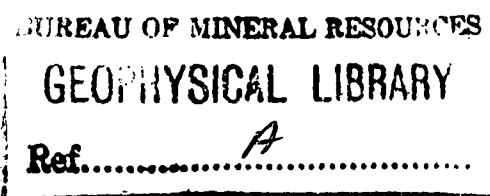
by

E.J. Polak

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FLINDERS GUNNERY VIBRATION TESTS No. 2,
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ILLUSTRATIONS

Plate 1. Locality map and sample vibration records. G344-69.

1. INTRODUCTION

The first series of tests at Flinders was conducted on 31st August 1960 (Polak, 1960). These showed that the damaging vibrations produced by gunnery practice were of rather high frequency (80 to 100 c/s). In an effort to reduce the transfer of this high-frequency energy, a groove one or two inches wide was cut in the concrete slab between the guns and the control towers.

This present Record describes a second series of tests conducted by the author on 29th November 1960. Four recordings of ground vibration were taken during a gunnery practice in which 25 salvos were fired from two synchronised barrels of a gun. The purpose of the tests was to discover whether the groove cut in the concrete slab was effective in reducing the transfer of high-frequency energy. The equipment used was the same as in the previous tests.

2. RESULTS

Plate 1 shows the positions in which the tests were made, and copies of some of the records obtained. Test 7 was made in the same position as Test 3 of the previous series. The measured values of displacement, frequency, and acceleration are listed in Table 1.

The highest acceleration recorded was 2.6 g during Test 7. At this same point the acceleration recorded in the previous series was 2.2 g, for a single-barrel firing. In order to compare this previous value with the present value recorded from a two-barrel synchronised firing, we must multiply it by the square root of two, which brings it to 3.1 g. This suggests that there has been some reduction of transfer of high-frequency energy. However, 2.6 g is well within the "danger" zone of Thoenen and Windes (1942), and is higher than any of the accelerations recorded during the previous series of tests.

Test 8 was conducted on the site of the proposed Administrative Building. The 100-c/s vibration there had an acceleration well within the "caution" zone of Thoenen and Windes.

Tests 9 and 10 recorded accelerations which are "safe" according to Thoenen and Windes. As Test 10 was made near the Accommodation Building, it suggests that reported damage to light fittings in that building could not be due to ground vibration from gunnery tests.

3. CONCLUSIONS

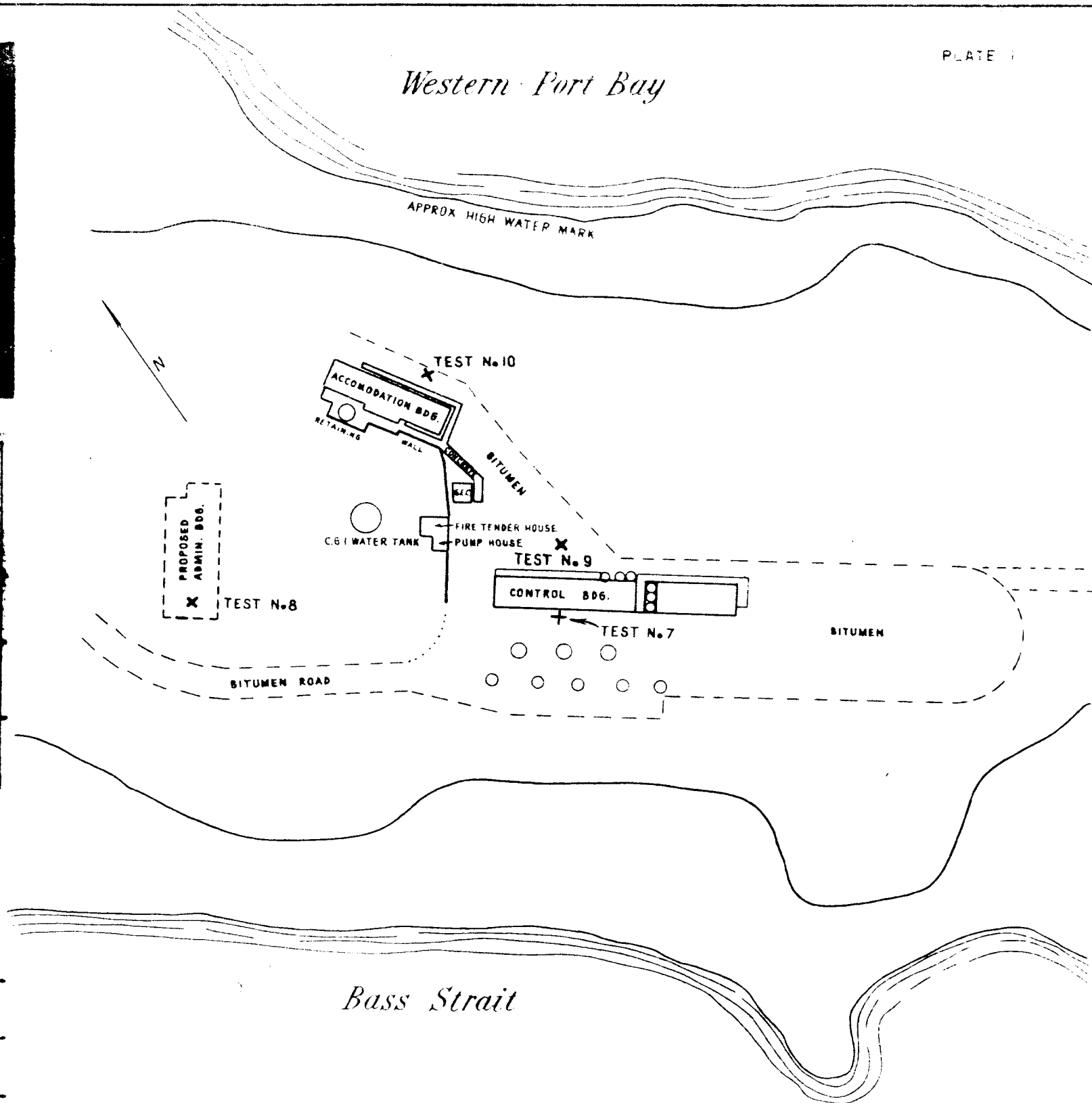
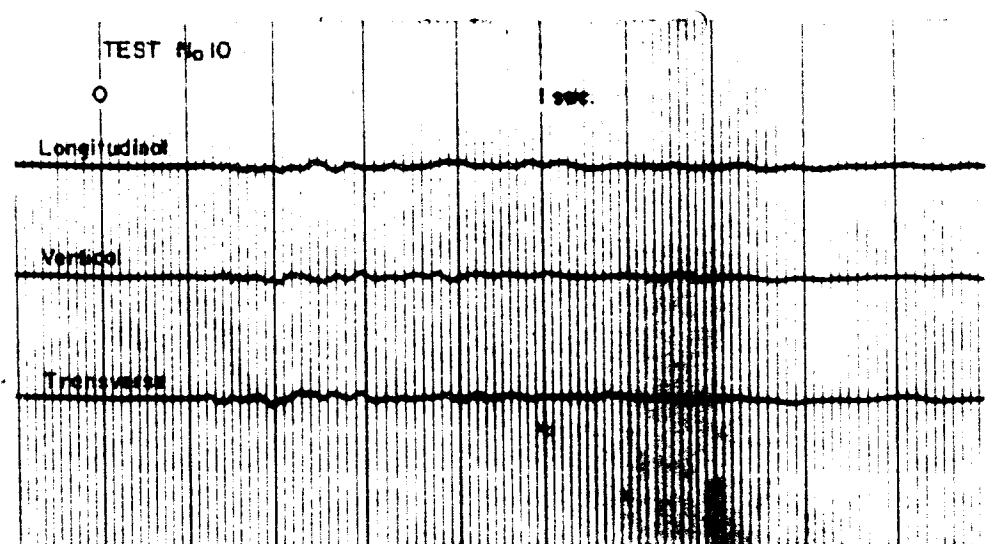
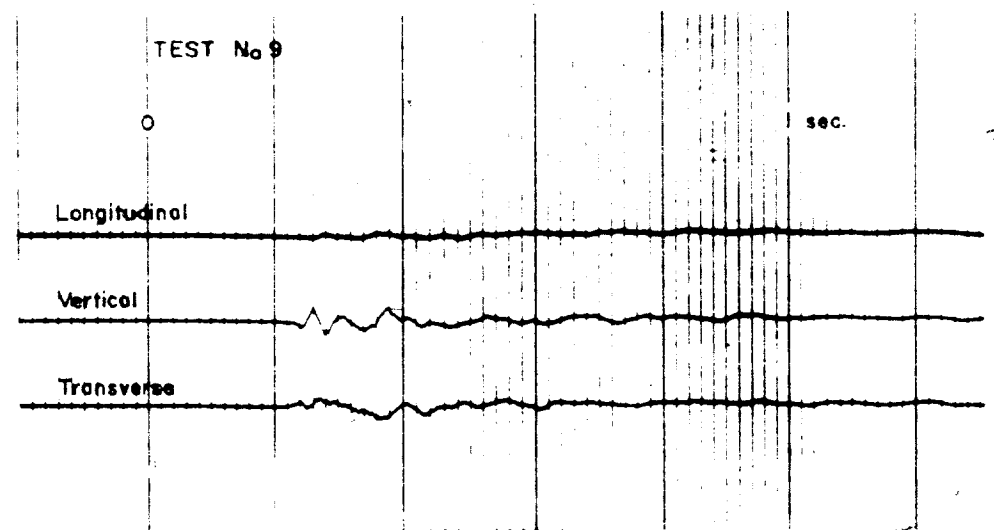
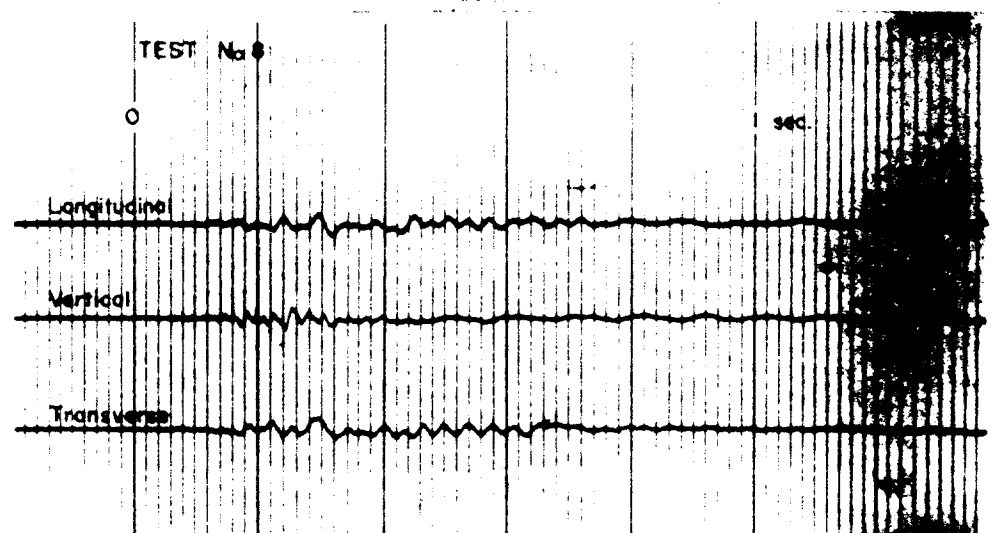
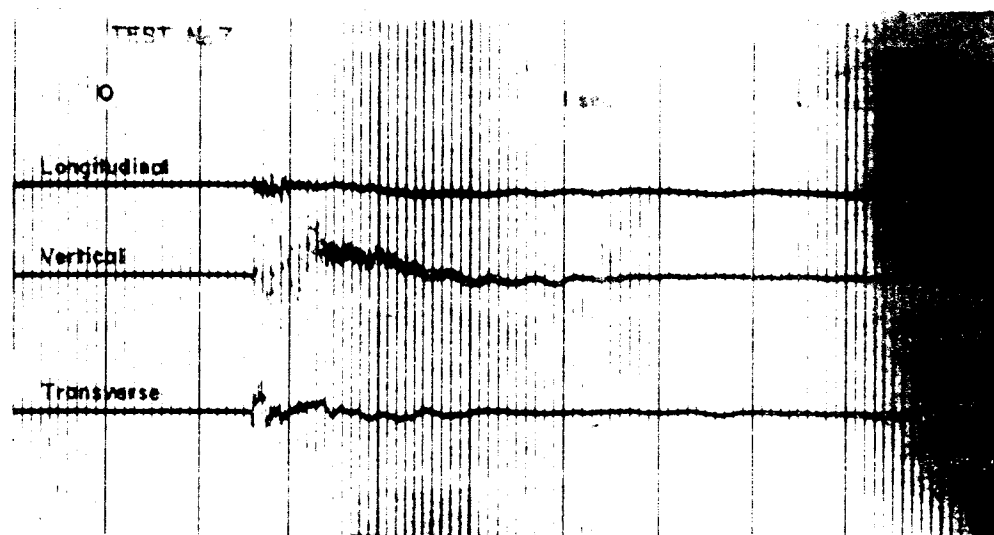
The cutting of a groove in the concrete slab may have slightly reduced the transfer of high-frequency energy from the guns, but the recorded acceleration near the Control Building is still considerably greater than the lower limit of the "damage" zone of Thoenen and Windes. The ground acceleration at the site of the proposed Administrative Building is in the "caution" zone of Thoenen and Windes.

4. REFERENCES

- POLAK, E.J., 1960 Flinders gunnery vibration tests
Victoria 1960. Bur. Min. Resour.
Aust. Records 1960/87.
- THOENEN, J.R. and 1942 Seismic effects of quarry blasting.
WINDES, S.L., Bull. U.S. Bur. Min. 442.

TABLE 1

<u>Test No.</u>	<u>Location</u>	<u>Displacement (in.)</u>			<u>Resultant displacement</u>	<u>Approx. Freq. (c/s)</u>	<u>Accel. (in terms of g)</u>
		<u>Long.</u>	<u>Vert.</u>	<u>Trans.</u>			
7	On asphalt floor (same as Test 3)	0.0005	0.00225	0.0008	0.00225	100	2.6
		0.0005	0.001	0.001	0.0015	25	0.1
8	On concrete paving stone	0.0007	0.0005	0.0006	0.0011	20	0.046
		0.00015	0.0002	0.0001	0.0003	100	0.31
9	On concrete pavement	0.0002	0.0006	0.0004	0.0008	20	0.033
10	On concrete pavement	0.0002	0.0002	0.0002	0.00035	12	0.0052



VIBRATION TESTS, FLINDERS GUNNERY

TESTS No. 7-10 SAMPLE RECORDS AND LOCALITY MAP

SCALE IN FEET



LOCALITY MAP AFTER DEPARTMENT OF WORKS VH 80/143 C/