GRAVITY BASE STATIONS IN INDONESIA
AND IN THE SOUTHWEST PACIFIC

By
Peter Jezek

WOODS HOLE OCEANOGRAPHIC INSTITUTION
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June 1976

TECHNICAL REPORT


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Department of Geology & Geophysics
GRAVITY BASE STATIONS IN INDONESIA
AND IN THE SOUTHWEST PACIFIC

Peter Jezek*
Woods Hole Oceanographic Institution
Woods Hole, Massachusetts 02543

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During October, November, and December of 1975, seventy gravity base stations were established on the islands of eastern Indonesia (Timor, Wetar, Leti, Moa, Sermata, Babar, Ambon, Seram, Manawoko, Kasiui, Kao Besar, Hungar, Serua, Banda Neira, Boano, Kelang and S.W. Sulawesi), New Caledonia and Fiji. The measurements were made with LaCoste and Romberg land gravimeter G-114. This report presents station descriptions and summarizes the results.
GRAVITY BASE STATIONS IN INDONESIA AND IN THE SOUTH-WEST PACIFIC

During October, November and December of 1975, seventy gravity base stations were established on the islands of eastern Indonesia (Timor, Wetar, Leti, Moa, Sermata, Babar, Ambon, Seram, Manawoco, Kasiui, Kai Besar, Hungar, Serua, Banda Neira, Boano, Kelang and S.W. Sulawesi), New Caledonia and Fiji. The islands were visited during the Greater Banda Expedition organized by the Indonesian Ministry of Mines and by the Geological Survey of Indonesia. Field parties during the expedition were transported by R.V. KRI JALANIDHI. LeCoste and Romberg land gravimeter G-114 was used in executing the measurements. The gravimeter was kept "on heat" during the three-month duration of the Woods Hole to Woods Hole loop. This was accomplished using two Gulden power cells with capacity of 5 Amp-hrs each. The batteries were able to supply sufficient energy to the instrument for 12-14 hours. In transit the batteries were recharged by connecting to a line source in hotel rooms or on the ship. On the islands of eastern Indonesia the batteries were recharged by 300 W portable Honda generator driven by a gasoline engine. Both batteries, after 20 hours work (about 10 hours each) were recharged in this way in about 4-5 hours using a charge rate of 2.8 A (for two batteries).

The gravimeter was transported in its case by jet aircraft, ship, small outboard equipped boat and in a back pack on some of the islands. Caution was exercised to protect the instrument from vibrations and shocks.

The base stations were established whenever possible at airports, thus providing good position and elevation control. In eastern Indonesia the majority of the stations were located in Mosques because these are usually easily found and are located near the sea so that elevation can be established with
a single altimeter. Also because the mosques are centers of religion they are seldom disturbed or relocated, thus they guarantee long preservation of the stations.

The elevation of the majority of the stations was established using a single Wallace and Tiernan altimeter by comparing to sea level. All measurements were corrected for temperature, and pressure change corrections were made utilizing the records of a portable Weather Measure Recording Barograph. The accuracy of the elevation of the stations is estimated to be better than ±3 m.

Latitudes and longitudes of the stations were derived in most instances from Operational Navigation Chart (ONC, scale 1:1,000,000) in conjunction with topographical charts (mostly scale 1:250,000) of individual islands when available. It is quite difficult to establish the accuracy of the positions because the accuracy of the topographical charts is not known and the absolute positions of the islands may be different from their mapped positions.

In calculating the base stations the following stations were held constant and the accompanying EGSN71 values and the 1967 reference system were used:

Seismological Observatory, Wellington, New Zealand:
\[ g = 980250.98 \]

BIPM, Sevres, France:
\[ g = 980925.97 \]

Logan Airport station Q, Boston, Mass.:
\[ g = 980387.54 \]

Observations were corrected for earth tides and a correction for an instrument drift by linear regression was made. The
maximum standard error at a station was 0.04 mgal. In the calculation of Bouguer values the density of 2.67 gm/cm³ was used.

On the next pages a list of gravity values for each station is presented, followed by station descriptions and sketches.

ACKNOWLEDGMENTS

I would like to thank the Defense Mapping Agency for providing the instrument and partial financial support for the project. They also performed the data reductions. Geological Survey of Indonesia and the Indonesian Ministry of Mines provided the invitation to participate in the Greater Banda Expedition during which the measurements in eastern Indonesia were made.

I would like to thank Ir. Jako Sukarman of the Geological Survey of Indonesia for help during the measurements. Thanks are also due to participants of the Greater Banda Expeditions especially to the expedition leader Drs. H.M.S. Hortono. In New Caledonia Dr. F. Dugas and other ORSTOM scientists provided a helping hand. In Fiji the measurements were made in cooperation with and on request of Mr. R. Richmond, director of Mineral Resources Development of Fiji. Nan Galbraith assisted in the final preparation of this report.

This project was initiated and supported by Dr. Carl O. Bowin to whom my warmest thanks are due.
## GRAVITY STATION VALUES

<table>
<thead>
<tr>
<th>Station No.</th>
<th>Station</th>
<th>Gravity Value (g)</th>
</tr>
</thead>
<tbody>
<tr>
<td>189-1</td>
<td>BIPM, Sevres, France</td>
<td>980925.97</td>
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<tr>
<td>189-2</td>
<td>Kemajoran Airport, Jakarta, Indonesia</td>
<td>978146.81</td>
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<tr>
<td>189-3</td>
<td>Tanjung Priok, Jakarta, Indonesia</td>
<td>978146.29</td>
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<td>189-4</td>
<td>Kupang Post Office, Timor Island, Indonesia</td>
<td>978160.04</td>
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<td>189-5</td>
<td>Penfui Airport, Timor Island, Indonesia</td>
<td>978155.45</td>
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<td>189-6</td>
<td>Tenau Harbor, Timor Island, Indonesia</td>
<td>978153.27</td>
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<td>189-7</td>
<td>Ilwaki, Wetar Island, Indonesia</td>
<td>978259.33</td>
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<td>189-8</td>
<td>Masapun, Wetar Island, Indonesia</td>
<td>978245.62</td>
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<tr>
<td>189-9</td>
<td>Wonreli Landing, Kisar Island, Indonesia</td>
<td>978239.71</td>
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<tr>
<td>189-10</td>
<td>Wonreli District Chief's House, Kisar Island, Indonesia</td>
<td>978245.29</td>
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<td>189-11</td>
<td>Abusur, Kisar Island, Indonesia</td>
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<td>189-12</td>
<td>Oiratatimur, Kisar Island, Indonesia</td>
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<td>Lebelau, Kisar Island, Indonesia</td>
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<td>Serwaru, Leti Island, Indonesia</td>
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<td>Kaiwatu Church, Moa Island, Indonesia</td>
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<td>Poru House, Kaiwatu, Moa Island, Indonesia</td>
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<td>Ambon, Ambon Island, Indonesia</td>
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<td>Paso, Ambon Island, Indonesia</td>
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<td>Tulehu, Ambon Island, Indonesia</td>
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<td>Place Name</td>
<td>Location</td>
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<td>------------------------------------------------</td>
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<td>Hitulama, Ambon Island, Indonesia</td>
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<td>Latuhalat, Ambon Island, Indonesia</td>
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<td>Hotel Anggrek, Ambon Island, Indonesia</td>
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<td>189-29</td>
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<td>Keldor, Kasiui Island, Indonesia</td>
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<td>189-33</td>
<td>Elat Church, Kei Besar Island, Indonesia</td>
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<tr>
<td>189-34</td>
<td>Elat Mosque, Kei Besar Island, Indonesia</td>
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<td>Tamangil Nuhuten, Kei Besar Island, Indonesia</td>
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<td>189-36</td>
<td>Hungar Island, Indonesia</td>
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<td>Anauni, Boano Island, Indonesia</td>
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<td>Tahalupu, Kelang Island, Indonesia</td>
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<td>Piru, Seram Island, Indonesia</td>
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<td>189-46</td>
<td>Talaga, Seram Island, Indonesia</td>
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<td>Code</td>
<td>Location</td>
<td>Latitude</td>
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<td>Ujung Pandang, Sulawesi Island, Indonesia</td>
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<td>Gowa Palace, Sunggu Minasa, Sulawesi Is., Ind.</td>
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<td>Maros, Sulawesi Island, Indonesia</td>
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<td>Ngurah Ray airport, Bali Island, Indonesia</td>
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<td>Mengwi, Bali Island, Indonesia</td>
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<td>Selaparang airport, Lombok Island, Indonesia</td>
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<td>Bandung, Java Island, Indonesia</td>
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<td>ORSTOM, Noumea, New Caledonia</td>
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<td>Ouen Toro, Noumea, New Caledonia</td>
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<td>Mont Coffin, Noumea, New Caledonia</td>
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<td>Seismological Observatory, Wellington, New Zealand</td>
<td>980250.98</td>
</tr>
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<td>189-63</td>
<td>MRD, Suva, Fiji</td>
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<td>Nausori airport, Viti Levu Island, Fiji</td>
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<td>189-65</td>
<td>Tailevu Hotel, Korovou, Viti Levu Island, Fiji</td>
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<td>Nandarivatu, Viti Levu Island, Fiji</td>
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<td>Korolevu, Viti Levu Island, Fiji</td>
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<td>189-69</td>
<td>Nandi airport 1, Viti Levu Island, Fiji</td>
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<tr>
<td>189-70</td>
<td>Nandi airport 2, Viti Levu Island, Fiji</td>
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</tr>
</tbody>
</table>
The station is located at Kemajoran airport (for domestic flights) in Jakarta. On a porch on the air field side of the second floor of the terminal building.

Remarks: Station experiences variable noise levels.
**COUNTRY**
Indonesia

**NEAREST CITY**
Jakarta

**GRAVITY STATION DESCRIPTION**

<table>
<thead>
<tr>
<th>Country</th>
<th>Nearest City</th>
<th>Gravity Station Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Indonesia</td>
<td>Jakarta</td>
<td>The station is located at Tanjung Priok, Jakarta, on a concrete platform leading to floating Dok 3. Remarks: Station experiences variable noise levels. Access is restricted; permission to enter is obtained with difficulty.</td>
</tr>
</tbody>
</table>

**LATITUDE**
6°5.83'S

**LONGITUDE**
106°52.76'E

**ELEVATION**
1.5 m

**WAGL STATION NO.**
189-3

**GRAVITY VALUE (g)**

**DESCRIPTION**

The station is located at Tanjung Priok, Jakarta, on a concrete platform leading to floating Dok 3.

Remarks: Station experiences variable noise levels. Access is restricted; permission to enter is obtained with difficulty.

**POSITION CONTROL DESCRIPTION**

*Diagram*

Maps

**ELEVATION CONTROL DESCRIPTION**

Tape from sea level

**DIAGRAM**

*Diagram by P. Jezek*  
*Date 9/75*

**DATE**

**OBSERVED BY**

**INSTRUMENT**

**STATION OF REFERENCE**

**REFERENCE VALUE**

**$\Delta g$**

**REMARKS**

---

**GRAVITY VALUE**

**SOURCE OF OTHER GRAVITY VALUES FOR THIS SITE**
Indonesia  Kupang  Kupang Post Office
Timor  

<table>
<thead>
<tr>
<th>LATITUDE</th>
<th>LONGITUDE</th>
<th>ELEVATION</th>
<th>N.I.I.R. STATION NO.</th>
<th>GRAVITY VALUE [g]</th>
</tr>
</thead>
<tbody>
<tr>
<td>10°10.40'S</td>
<td>123°34.50'E</td>
<td>8.0 m</td>
<td>189-4</td>
<td></td>
</tr>
</tbody>
</table>

**DESCRIPTION**

The station is located in Kupang post office on the floor at the street side wall of the public area about two feet from the corner.

**POSITION CONTROL DESCRIPTION**

Operational navigation chart in conjunction with local maps.

**ELEVATION CONTROL DESCRIPTION**

Altimeter elevation tied to sea level.

**DIAGRAM**

[Diagram showing the location of the station with key points labeled: Flag pole, concrete wall, public area, Post Office, counters.]
<table>
<thead>
<tr>
<th>COUNTRY</th>
<th>Nearest City</th>
<th>Gravity Station Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Indonesia</td>
<td>Kupang</td>
<td>The station is located at Penfui airport (near Kupang) in the corner of the briefing room on the ground floor of the airport traffic tower.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Lat/Long Elevation</th>
<th>W.H.O. Station No.</th>
<th>Gravity Value (g)</th>
</tr>
</thead>
<tbody>
<tr>
<td>10°10.60'S 123°40.20'E</td>
<td>102.0 m 189-5</td>
<td></td>
</tr>
</tbody>
</table>

**Description**

The station is located at Penfui airport (near Kupang) in the corner of the briefing room on the ground floor of the airport traffic tower.

**Diagram**

![Diagram of station location]

**Position Control Description**

Airport location

**Elevation Control Description**

Airport elevation

**Diagram**

![Diagram of station location]

**Position Control Description**

Airport location

**Elevation Control Description**

Airport elevation

**Diagram**

![Diagram of station location]
<table>
<thead>
<tr>
<th>COUNTRY</th>
<th>NEAREST CITY</th>
<th>GRAVITY STATION DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Indonesia</td>
<td>Kupang</td>
<td></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>STATE/PROVINCE</th>
<th>STATION NAME</th>
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</tr>
</thead>
<tbody>
<tr>
<td>Timor</td>
<td>Tenau Harbor</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>LATITUDE</th>
<th>LONGITUDE</th>
<th>ELEVATION</th>
<th>WAGL STATION NO.</th>
<th>GRAVITY VALUE (g)</th>
</tr>
</thead>
<tbody>
<tr>
<td>10°11.60'S</td>
<td>123°31.5'E</td>
<td>3.0 m</td>
<td>189-6</td>
<td></td>
</tr>
</tbody>
</table>

**DESCRIPTION**

The station is located at Tenau Harbor (near Kupang) in the immigration office found near the harbor access road.

---

**POSITION CONTROL DESCRIPTION**

Operational navigation chart in conjunction with local maps

**ELEVATION CONTROL DESCRIPTION**

Altimeter elevation tied to sea level

---

**DIAGRAM**

![Diagram of Tenau Harbor with labels: Kantor, Seksipabean, Tenau, entrance, harbor access road, to pier.]

---

**DATE** | **OBSERVED BY** | **INSTRUMENT** | **STATION OF REFERENCE** | **REFERENCE VALUE** | **A g** | **REMARKS**
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
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<th></th>
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<tbody>
<tr>
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<td></td>
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<td></td>
</tr>
</tbody>
</table>

---

**GRAVITY VALUE** | **SOURCE OF OTHER GRAVITY VALUES FOR THIS SITE**
|                 |                                               |
CO'UNTR.Y

Indonesia

NEAREST CITY

Ilwaki

GRAVITY STATION DESCRIPTION

STATE/PROVINCE

Wetar

STATION NAME

Ilwaki Church

LATITUDE

7°56.10'S

LONGITUDE

126°25.80'E

ELEVATION

21.0 m

W.H.E. STATION NO.

189-7

GRAVITY VALUE (g)

7°56.10'

21.0

m

DESCRIPTION

The station is located at Ilwaki new church, in the corner formed by the bell tower and the church. The church is visible from the bay.

POSITION CONTROL DESCRIPTION

Operational navigation chart in conjunction with local maps

ELEVATION CONTROL DESCRIPTION

Altimeter elevation tied to sea level

DIAGRAM

Operational navigation chart in conjunction with local maps

Altimeter elevation tied to sea level

DIAGRAM

Operational navigation chart in conjunction with local maps

Altimeter elevation tied to sea level

GRAVITY VALUE

SOURCE OF OTHER GRAVITY VALUES FOR THIS SITE
<table>
<thead>
<tr>
<th>COUNTRY</th>
<th>NEAREST CITY</th>
<th>GRAVITY STATION DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Indonesia</td>
<td>Masapun</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>STATE/PROVINCE</th>
<th>STATION NAME</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Wetar</td>
<td>Masapun Church</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>LATITUDE</th>
<th>LONGITUDE</th>
<th>ELEVATION</th>
<th>NRNL STATION NO.</th>
<th>GRAVITY VALUE (g)</th>
</tr>
</thead>
<tbody>
<tr>
<td>7°46'95&quot;S</td>
<td>126°37'95&quot;E</td>
<td>1.7 m</td>
<td>189-8</td>
<td></td>
</tr>
</tbody>
</table>

**DESCRIPTION**

The station is located in Masapun on the south side of a 2-foot boulder found on the village side of the church. The church is built out of wood and straw.

---

**POSITION CONTROL DESCRIPTION**

Operational navigation chart in conjunction with local maps

**ELEVATION CONTROL DESCRIPTION**

Altimeter elevation tied to sea level

---

**DIAGRAM**

![Diagram of the station location showing the church, a graveyard, and other geographical features.]

---

**DATE** | **OBSERVED BY** | **INSTRUMENT** | **STATION OF REFERENCE** | **REFERENCE VALUE** | **A.G.** | **REMARKS**
---|---|---|---|---|---|---

---

**GRAVITY VALUE**

Source of other gravity values for this site
The station is located near Wonreli at a base of a wall of stone house found at the beginning of the access road leading from the sea to Wonreli.

Remarks: The station may be unstable due to oscillations produced by wave action.
COUNTRY
Indonesia

NEAREST CITY
Wonreli

GRAVITY STATION DESCRIPTION

<table>
<thead>
<tr>
<th>STATION NAME</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chief's House</td>
<td>The station is located on a concrete floor of a porch of district chief's house in Wonreli.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>LATTITUDE</th>
<th>LONGITUDE</th>
<th>ELEVATION</th>
<th>WKG. STATION NO.</th>
<th>GRAVITY VALUE (g)</th>
</tr>
</thead>
<tbody>
<tr>
<td>8°4.50'S</td>
<td>127°10.03'E</td>
<td>26.0m</td>
<td>189-10</td>
<td></td>
</tr>
</tbody>
</table>

POSITION CONTROL DESCRIPTION
Operational navigation chart in conjunction with local maps

ELEVATION CONTROL DESCRIPTION
Altimeter elevation tied to sea level

DIAGRAM

N
white needle & monument

road

HECAMATAN

porch
concrete floor

DATE
10/75

DIAGRAM BY
P. Jezek

DATE
10/75
**Country:** Indonesia
**Nearest City:** Abusur

<table>
<thead>
<tr>
<th>Country</th>
<th>Nearest City</th>
<th>Gravity Station Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Indonesia</td>
<td>Abusur</td>
<td>The station is located on a raised concrete platform connecting the steps of Rehoboth church found on the hill top in Abusur.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Latitude</th>
<th>Longitude</th>
<th>Elevation</th>
<th>WADL Station No.</th>
<th>Gravity Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>6°4.80'S</td>
<td>127°10.42'E</td>
<td>73.8m</td>
<td>189-11</td>
<td></td>
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</tbody>
</table>

**Station Name:** Rehoboth Church

**Position Control Description:** Operational navigation chart in conjunction with local maps

**Elevation Control Description:** Altimeter elevation tied to sea level

**Diagram**

![Diagram of Rehoboth Church](image)

**Diagram by:** P. Jezek
**Date:** 10/75

<table>
<thead>
<tr>
<th>Date</th>
<th>Observed By</th>
<th>Instrument</th>
<th>Station of Reference</th>
<th>Reference Value</th>
<th>A D</th>
<th>Remarks</th>
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</thead>
<tbody>
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</tbody>
</table>

**Gravity Value**

**Source of Other Gravity Values for This Site**
**GRAVITY STATION DESCRIPTION**

**COUNTRY:** Indonesia  
**NEAREST CITY:** Oiratatimur

<table>
<thead>
<tr>
<th>STATE/PROVINCE</th>
<th>STATION NAME</th>
<th>LATITUDE</th>
<th>LONGITUDE</th>
<th>ELEVATION</th>
<th>M.N.G.L STATION NO.</th>
<th>GRAVITY VALUE (g)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kisar</td>
<td>Rehoboth Church</td>
<td>8° 5.50'S</td>
<td>127° 11.95'E</td>
<td>61.4m</td>
<td>189-12</td>
<td></td>
</tr>
</tbody>
</table>

**DESCRIPTION**

The station is located on the ground at a northern corner of Rehoboth church in Oiratatimur. The church is built out of wood and straw and mortar on a stone footing.

**POSITION CONTROL DESCRIPTION**

Operational navigation chart in conjunction with local maps

**ELEVATION CONTROL DESCRIPTION**

Altimeter elevation tied to sea level

**DIAGRAM**

```
\[\text{\includegraphics[width=\textwidth]{diagram.jpg}}\]
```

**DATE**  
**OBSERVED BY**  
**INSTRUMENT**  
**STATION OF REFERENCE**  
**REFERENCE VALUE**  
**A g**  
**REMARKS**

<table>
<thead>
<tr>
<th>DATE</th>
<th>OBSERVED BY</th>
<th>INSTRUMENT</th>
<th>STATION OF REFERENCE</th>
<th>REFERENCE VALUE</th>
<th>A g</th>
<th>REMARKS</th>
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</tbody>
</table>

**GRAVITY VALUE**

Source of other gravity values for this site
**Gravity Station Description**

<table>
<thead>
<tr>
<th>Country</th>
<th>Nearest City</th>
<th>Gravity Station Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Indonesia</td>
<td>Lebelau</td>
<td>The station is located on the ground on the eastern side of the new Protestant church in Lebelau. The church, built out of mortar with metal roof, is on a hillside overlooking the village.</td>
</tr>
</tbody>
</table>

**Position Control Description**
Operational navigation chart in conjunction with local maps

**Elevation Control Description**
Altimeter elevation tied to sea level

**Diagram**

```
N

Protestant Church

Steeple
```

**Table**

<table>
<thead>
<tr>
<th>Date</th>
<th>Observed By</th>
<th>Instrument</th>
<th>Station of Reference</th>
<th>Reference Value</th>
<th>d g</th>
<th>Remarks</th>
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</thead>
</table>

**Gravity Value**
Source of other gravity values for this site
<table>
<thead>
<tr>
<th>COUNTRY</th>
<th>NEAREST CITY</th>
<th>GRAVITY STATION DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Indonesia</td>
<td>Serwaru</td>
<td>Kantor Pemerintahan</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>STATE/PROVINCE</th>
<th>STATION NAME</th>
<th>LATTITUDE</th>
<th>LONGITUDE</th>
<th>ELEVATION</th>
<th>MNL Station No.</th>
<th>GRAVITY VALUE (g)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Leti</td>
<td>Kantor Pemerintahan</td>
<td>8° 9.70'S</td>
<td>127° 40.77'E</td>
<td>2.8m</td>
<td>189-14</td>
<td></td>
</tr>
</tbody>
</table>

**DESCRIPTION**

The station is located on the concrete floor of the porch of Kantor Pemerintahan in Serwaru.

**Position Control Description**

Operational navigation chart in conjunction with local maps

**Elevation Control Description**

Altimeter elevation tied to sea level

**Diagram**

![Diagram showing Kantor Pemerintahan Serwaru, porch, flag pole, and beach.]

**Diagram by** P. Jezek  **Date** 10/75

**Table**

<table>
<thead>
<tr>
<th>DATE</th>
<th>OBSERVED BY</th>
<th>INSTRUMENT</th>
<th>STATION OF REFERENCE</th>
<th>REFERENCE VALUE</th>
<th>A.B</th>
<th>REMARKS</th>
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</table>

**Gravity Value**

Source of other gravity values for this site
<table>
<thead>
<tr>
<th>COUNTRY</th>
<th>NEAREST CITY</th>
<th>GRAVITY STATION DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Indonesia</td>
<td>Kaiwatu</td>
<td></td>
</tr>
</tbody>
</table>

**STATE/PROVINCE**

| Moa        |

**STATION NAME**

| Kaiwatu, W. Moa, Church |

**LATITUDE**

| 8°6.60'S |

**LONGITUDE**

| 127°49.08'E |

**ELEVATION**

| 15.4m |

**W.G.S. STATION NO.**

| 189-15 |

**GRAVITY VALUE (q)**

| 0.1.89.15 |

**DESCRIPTION**

The station is located in the middle of the concrete base of a small bell tower. The tower is in the vicinity of the south corner of an old Protestant church in Kaiwatu. (New church is planned to be built on the site of the old one.)

**OPERATIONAL NAVIGATION**

| Diagram by P. Jezek, Date 10/75 |

**Altimeter elevation tied to sea level**

**DIAGRAM**

- Protestant Church
- Wooden fence
- Bell tower with concrete base

<table>
<thead>
<tr>
<th>DATE</th>
<th>OBSERVED BY</th>
<th>INSTRUMENT</th>
<th>STATION OF REFERENCE</th>
<th>REFERENCE VALUE</th>
<th>q</th>
<th>REMARKS</th>
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</tbody>
</table>

**GRAVITY VALUE**

<table>
<thead>
<tr>
<th>SOURCE OF OTHER GRAVITY VALUES FOR THIS SITE</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
</tbody>
</table>
COUNTRY | Indonesia
---|---
NEAREST CITY | Kaiwatu

<table>
<thead>
<tr>
<th>STATE/PROVINCE</th>
<th>Moa</th>
<th>STATION NAME</th>
<th>Poru House</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>LATITUDE</th>
<th>8°6.60'S</th>
<th>LONGITUDE</th>
<th>127°49.00'E</th>
<th>ELEVATION</th>
<th>1.5m</th>
<th>WAGS STATION NO.</th>
<th>189-15</th>
<th>GRAVITY VALUE (g)</th>
<th></th>
</tr>
</thead>
</table>

**DESCRIPTION**

The station is located on a floor of the porch of a house owned by Jesayas Poru in Kaiwatu. The house is near the sea next to the road leading to the school.

**POSITION CONTROL DESCRIPTION**

Operational navigation chart in conjunction with local maps

**ELEVATION CONTROL DESCRIPTION**

Altimeter elevation tied to sea level

**DIAGRAM**

![Diagram](image)

**DIAGRAM BY** P. Jezek **DATE** 10/75

<table>
<thead>
<tr>
<th>DATE</th>
<th>OBSERVED BY</th>
<th>INSTRUMENT</th>
<th>STATION OF REFERENCE</th>
<th>REFERENCE VALUE</th>
<th>g</th>
<th>REMARKS</th>
</tr>
</thead>
</table>

**GRAVITY VALUE**

Source of other gravity values for this site
The station is located on high concrete footing supporting the walls of Protestant church in Mahaleta.

**Diagram**

- **Position Control Description**: Operational navigation chart in conjunction with local maps.
- **Elevation Control Description**: Altimeter elevation tied to sea level.

```
<table>
<thead>
<tr>
<th>DATE</th>
<th>OBSERVED BY</th>
<th>INSTRUMENT</th>
<th>STATION OF REFERENCE</th>
<th>REFERENCE VALUE</th>
<th>G G</th>
<th>REMARKS</th>
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</thead>
<tbody>
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</tbody>
</table>
```

**Gravity Value**: Source of other gravity values for this site.
The station is located on the concrete floor of the porch of districts administrators office in Tepa.
The station is located on the ground, on the north side of a concrete base (originally used as a bell tower base), south of Protestant Church in Eliara. The church is built out of wood and straw and the village plans to build a new one in 1976-77.
**Gravity Station Description**

<table>
<thead>
<tr>
<th>Country</th>
<th>Nearest City</th>
<th>Gravity Station Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Indonesia</td>
<td>Emroing</td>
<td>The station is located on a concrete floor west of the western support pillar in the Protestant Church in Emroing. The church is very solidly built.</td>
</tr>
</tbody>
</table>

**Position Control Description**

Operational navigation chart in conjunction with local maps

**Elevation Control Description**

Altimeter elevation tied to sea level

---

**Diagram**

- A diagram showing the location of the station on a map.
  - A bell tower is marked.
  - A location marked as "to the beach".

**Diagram by**

P. Jezek  
**Date** 10/75

---

**Table**

<table>
<thead>
<tr>
<th>Date</th>
<th>Observed By</th>
<th>Instruments</th>
<th>Station of Reference</th>
<th>Reference Value</th>
<th>E. G.</th>
<th>Remarks</th>
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<tbody>
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</tbody>
</table>

**Gravity Value**

Source of other gravity values for this site

---

**Description**

Mr.

---
### GRAVITY STATION DESCRIPTION

**Country**: Indonesia  
**Nearest City**: Amboi  
**Station Name**: Governor's Offices

<table>
<thead>
<tr>
<th>Latitude</th>
<th>Longitude</th>
<th>Elevation</th>
<th>WHGL Station No.</th>
<th>Gravity Value (g)</th>
</tr>
</thead>
<tbody>
<tr>
<td>3°41.60'S</td>
<td>128°10.90'E</td>
<td>16.6m</td>
<td>189-21</td>
<td></td>
</tr>
</tbody>
</table>

**Description**

The station is located in the lobby of the building housing the governor's offices. Above the station on the wall dedication plate is found with the following writing: Kantor Gubernur Kepala Daerah, etc.

- **AMIR MACHMUD**

**Remarks**: The station is experiencing variable noise levels.

**Position Control Description**: Operational navigation chart in conjunction with local maps  
**Elevation Control Description**: Altimeter elevation tied to sea level

### Diagram

- Main entrance
- Staircase
- Dedication plate
- Pillars

**Diagram by**: P. Jezek  
**Date**: 10/75

### Table

<table>
<thead>
<tr>
<th>Date</th>
<th>Observed By</th>
<th>Instrument</th>
<th>Station of Reference</th>
<th>Reference Value</th>
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</tbody>
</table>

**Gravity Value Source**: Other gravity values for this site
<table>
<thead>
<tr>
<th>COUNTRY</th>
<th>NEAREST CITY</th>
<th>GRAVITY STATION DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Indonesia</td>
<td>0</td>
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</table>

<table>
<thead>
<tr>
<th>STATE/PROVINCE</th>
<th>STATION NAME</th>
<th>LATTITUDE</th>
<th>LONGITUDE</th>
<th>ELEVATION</th>
<th>W.G.B.L STATION NO</th>
<th>GRAVITY VALUE (g)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ambon</td>
<td>Protestant Church</td>
<td>3°37.60'S</td>
<td>128°15.30'E</td>
<td>8.0m</td>
<td>189-22</td>
<td></td>
</tr>
</tbody>
</table>

**DESCRIPTION**

The station is located on a concrete step on a right side of a left hand entrance to the Protestant Church in Paso.

**POSITION CONTROL DESCRIPTION**

Operational navigation chart in conjunction with local maps

**ELEVATION CONTROL DESCRIPTION**

Altimeter elevation tied to sea level

**DIAGRAM**

![Diagram of the Protestant Church showing steps and a concrete walkway.]

**DIAGRAM BY** P. Jezeck **DATE** 10/75

<table>
<thead>
<tr>
<th>DATE</th>
<th>OBSERVED BY</th>
<th>INSTRUMENT</th>
<th>STATION OF REFERENCE</th>
<th>REFERENCE VALUE</th>
<th>A &amp; B</th>
<th>REMARKS</th>
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</tbody>
</table>

**GRAVITY VALUE**

Source of other gravity values for this site
The station is located on a concrete base on a west side of Slamet Riyadi monument found south of mosque in Tulehu.

POSITION CONTROL DESCRIPTION
Operational navigation chart in conjunction with local maps

ELEVATION CONTROL DESCRIPTION
Altimeter elevation tied to sea level

DIAGRAM

Mosque

SLAMET RIYADI monument (concrete)

green concrete balls

steps

street

DATE | OBSERVED BY | INSTRUMENT | STATION OF REFERENCE | REFERENCE VALUE | S.D | REMARKS

DIAGRAM BY | P. Jezek | DATE: 10/75

| GRAVITY VALUE | SOURCE OF OTHER GRAVITY VALUES FOR THIS SITE |
**COUNTRY**
Indonesia

**NEAREST CITY**
Liang

**GRAVITY STATION DESCRIPTION**

<table>
<thead>
<tr>
<th>STATE/PROVINCE</th>
<th>STATION NAME</th>
<th>LATITUDE</th>
<th>LONGITUDE</th>
<th>ELEVATION</th>
<th>WHOL. STATION NO.</th>
<th>GRAVITY VALUE (g)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ambon</td>
<td>Chief's House</td>
<td>3°30.40'S</td>
<td>128°19.15'E</td>
<td>1.5m</td>
<td>199-24</td>
<td></td>
</tr>
</tbody>
</table>

**DESCRIPTION**

The station is located on a concrete floor of veranda of village chief's house in Liang. Chief's name is Suleiman Soplistuni.

**POSITION CONTROL DESCRIPTION**
Operational navigation chart in conjunction with local maps

**ELEVATION CONTROL DESCRIPTION**
Altimeter elevation tied to sea level

**DIAGRAM**

```
  +-------------------+    +-------------------+
  |                   |    |                   |
  | veranda with      |    | concrete floor    |
  |                   |    |                   |
  +-------------------+    +-------------------+
                    ^  +-------------------+
                    N    |                   |
                    +    | steps              |
                    +    +-------------------+
                    ↔  +-------------------+
                    +    | fence              |
                    +    +-------------------+
                    +    +-------------------+
                    +    | road to Ambon     |
                    +-------------------+
  +-------------------+    +-------------------+
  |                   |    |                   |
  +-------------------+    +-------------------+
```

**DATE**
10/75

**DIAGRAM BY**
P. Jezek

**INSTRUMENT STATION OF REFERENCE REFERENCE VALUE REMARKS**

<table>
<thead>
<tr>
<th>DATE</th>
<th>OBSERVED BY</th>
<th>INSTRUMENT</th>
<th>STATION OF REFERENCE</th>
<th>REFERENCE VALUE</th>
<th>g</th>
<th>REMARKS</th>
</tr>
</thead>
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</tbody>
</table>

**GRAVITY VALUE**

SOURCE OF OTHER GRAVITY VALUES FOR THIS SITE
**COUNTRY**: Indonesia  
**NEAREST CITY**: Hitulama  
**GRAVITY STATION DESCRIPTION**

**STATE/PROVINCE**: Ambon  
**STATION NAME**: Hitulama Mosque  
**LATITUDE**: 3.35.11'S  
**LONGITUDE**: 128°10.20' E  
**ELEVATION**: 3.0m  
**MSL STATION NO.**: 189-25  
**GRAVITY VALUE (g)**:  

**DESCRIPTION**: The station is located on a concrete floor in a southeast corner of a new mosque in Hitulama. The mosque was under construction in 1975.

**POSITION CONTROL DESCRIPTION**: Operational navigation chart in conjunction with local maps

**ELEVATION CONTROL DESCRIPTION**: Altimeter elevation tied to sea level

**DIAGRAM**:

- Mosque
- Overhanging roof
- Main entrance
- Concrete corner
- Road to Ambon

**DRAWN BY**: P. Jezek  
**DATE**: 10/75

**TABLE**:  
**DATE** | **OBSERVED BY** | **INSTRUMENT** | **STATION OF REFERENCE** | **REFERENCE VALUE** | **G** | **REMARKS**
---|---|---|---|---|---|---

**GRAVITY VALUE**:  
**SOURCE OF OTHER GRAVITY VALUES FOR THIS SITE**: 
**Gravity Station Description**

<table>
<thead>
<tr>
<th>Country</th>
<th>Nearest City</th>
<th>Gravity Station Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Indonesia</td>
<td>Ambon</td>
<td>The station is located on a walk between the traffic control tower and the office building at Laha airport.</td>
</tr>
</tbody>
</table>

**Position Control Description**

- Airport location

**Elevation Control Description**

- Airport elevation

**Diagram**

- Diagram by P. Jezek, Date 10/75

```
N

airport offices

air traffic tower

to runway
```

**Observation Table**

<table>
<thead>
<tr>
<th>Date</th>
<th>Observes By</th>
<th>Instrument</th>
<th>Station of Reference</th>
<th>Reference Value</th>
<th>E &amp; G</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
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</tbody>
</table>

**Gravity Value**

- Source of other gravity values for this site.
The station is located on a concrete walk near the middle of the northeast wall of Protestant Church (Peniel) in Latuhalat. On the wall above station is placed dedication plate.

Operational navigation chart in conjunction with local maps

Altimeter elevation tied to sea level

Diagram

Protestant Church (Peniel)
COUNTRY: Indonesia  
NEAREST CITY: Ambon

GRAVITY STATION DESCRIPTION

LATITUDE: 3°41.85'S  
LONGITUDE: 128°10.90' E  
ELEVATION: 6.8m  
WAGI STATION NO.: 189-28

DESCRIPTION:
The station is located on the floor of veranda of hotel Anggrek in Ambon.

DIAGRAM:

Operational navigation chart in conjunction with local maps

Altimeter elevation tied to sea level

DATE  OBSERVED BY  INSTRUMENT  STATION OF REFERENCE  REFERENCE VALUE  A g  REMARKS

GRAVITY VALUE  SOURCE OF OTHER GRAVITY VALUES FOR THIS SITE
<table>
<thead>
<tr>
<th>COUNTRY</th>
<th>NEAREST CITY</th>
<th>GRAVITY STATION DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Indonesia</td>
<td>Tunsai</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>STATE/PROVINCE</th>
<th>STATION NAME</th>
<th>LATICITUDE</th>
<th>LONGITUDE</th>
<th>ELEVATION</th>
<th>STATION NO.</th>
<th>GRAVITY VALUE</th>
</tr>
</thead>
<tbody>
<tr>
<td>South Seram</td>
<td>Tunsai Mosque</td>
<td>3°20.11'S</td>
<td>129°54.80'E</td>
<td>9.0m</td>
<td>189-29</td>
<td></td>
</tr>
</tbody>
</table>

**DESCRIPTION**

The station is located in Tunsai mosque, on a concrete base in the middle of porch opening facing the sea (no steps leading to this opening). The mosque is well visible from the sea.

**POSITION CONTROL DESCRIPTION**

Operational navigation chart in conjunction with local maps

**ELEVATION CONTROL DESCRIPTION**

Altimeter elevation tied to sea level

---

**DIAGRAM**

- Fence
- Main entrance
- Mosque
- Veranda
- Detailed front view
- Wooden porch wall
- Concrete floor
- Concrete foundation
- To the sea

---

**DIAGRAM BY**

P. Jezek

**DATE** 10/75

---

**GRAVITY VALUE**

Source of other gravity values for this site.
The station is located on a concrete floor in the entrance to mosque for men in Laimu.
The station is located on a concrete platform connecting the access steps to the mosque in Inlomin.

**Position Control Description**
Operational navigation chart in conjunction with local maps

**Elevation Control Description**
Altimeter elevation tied to sea level

**Diagram**

---

<table>
<thead>
<tr>
<th>DATE</th>
<th>OBSERVED BY</th>
<th>INSTRUMENT</th>
<th>STATION OF REFERENCE</th>
<th>REFERENCE VALUE</th>
<th>SQ</th>
<th>REMARKS</th>
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</thead>
<tbody>
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</tbody>
</table>

**Gravity Value**

Source of other gravity values for this site
The station is located on concrete floor of the porch of mosque in Keldor.
The station is located on concrete floor one foot from the right hand door.

The measurement was made inside of the new Catholic church in Elat. The station is located on a concrete floor next to the wall and about one foot from the left hand side entrance. The church, on the hillside, is visible from the bay.

**DESCRIPTION**

<table>
<thead>
<tr>
<th>COUNTRY</th>
<th>NEAREST CITY</th>
<th>GRAVITY STATION DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Indonesia</td>
<td>Elat</td>
<td></td>
</tr>
<tr>
<td>STAT listening</td>
<td></td>
<td>SITATION NAME:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Catholic Church</td>
</tr>
<tr>
<td>LATITUDE</td>
<td>LONGITUDE</td>
<td>ELEVATION</td>
</tr>
<tr>
<td>5°39.30'S</td>
<td>132.59.80'E</td>
<td>17.8m</td>
</tr>
</tbody>
</table>

**DESCRIPTION**

The station is located on concrete floor one foot from the right hand door.

The measurement was made inside of the new Catholic church in Elat. The station is located on a concrete floor next to the wall and about one foot from the left hand side entrance. The church, on the hillside, is visible from the bay.

**POSITION CONTROL DESCRIPTION**

Operational navigation chart in conjunction with local maps

**ELEVATION CONTROL DESCRIPTION**

Altimeter elevation tied to sea level

**DIAGRAM**

```
    N
   /
  /    to the sea
 target
```

**DIAGRAM BY** P. Jezek **DATE 10/75**

**DATE** | **OBSERVED BY** | **INSTRUMENT** | **STATION OF REFERENCE** | **REFERENCE VALUE** | **S.Q.** | **REMARKS**
---|---|---|---|---|---|---

**GRAVITY VALUE** | **SOURCE OF OTHER GRAVITY VALUES FOR THIS SITE**
The station is located at the base of a support pillar in the largest mosque in Elat (found near the pier on an elevated limestone terrace).
**Country:** Indonesia  
**Nearest City:** Tamangil Nuhuten  
**Gravity Station Description**

<table>
<thead>
<tr>
<th>Country</th>
<th>Nearest City</th>
<th>Gravity Station Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Indonesia</td>
<td>Tamangil Nuhuten</td>
<td>The station is located at the base of a support pillar in mosque in Tamangil Nuhuten.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Latitude</th>
<th>Longitude</th>
<th>Elevation</th>
<th>WHRL Station No.</th>
<th>Gravity Value (g)</th>
</tr>
</thead>
<tbody>
<tr>
<td>5°50.42'S</td>
<td>122°53.10'E</td>
<td>2.0m</td>
<td>189-35</td>
<td></td>
</tr>
</tbody>
</table>

**Description:**
The station is located at the base of a support pillar in mosque in Tamangil Nuhuten.

**Position Control Description:**
Operational navigation chart in conjunction with local maps.

**Elevation Control Description:**
Altimeter elevation tied to sea level.

**Diagram:**

- **Diagram by:** P. Jezek  
  **Date:** 11/75

<table>
<thead>
<tr>
<th>Diagram by</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>P. Jezek</td>
<td>11/75</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Date</th>
<th>Observed By</th>
<th>Instrument</th>
<th>Station of Reference</th>
<th>Reference Value</th>
<th>g</th>
<th>Remarks</th>
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</tbody>
</table>

**Gravity Value:**
Source of other gravity values for this site.
The station is located on a sandstone platform found on the western side of the Hungar island near Laibobar. The station marked by X cut in the sandstone, is submerged at high tide.
The station is located on a concrete platform at the base of gravestone on the southern access path to Jerili. The gravestone carries the writing: DISINI TEMPAT 19.2 1953.
The station is located on the floor near the entrance of Jerili church. The church is built out of mortar and has a red tile roof.

**Description**

Operational navigation chart in conjunction with local maps

Altimeter elevation tied to sea level

![Diagram](image_url)
**Gravity Station Description**

**Location:**
- **Country:** Indonesia
- **Nearest City:** Neira
- **Station Name:** Harbor Master's Offices

**Coordinates:**
- **Latitude:** 4°31.40'S
- **Longitude:** 129°53.60'E
- **Elevation:** 5.0 m

**Description:**
The station is located on the floor of street side porch of a building housing harbor master's office.

**Operational Navigation Chart:**
Operational navigation chart in conjunction with local maps

**Elevation Control Description:**
Altimeter elevation tied to sea level

**Diagram:**
- Orientation: North (N)
- Steps leading to the porch
- Porch with concrete floor

**Diagram by:** P. Jezek
**Date:** 11/75

**Table:**

<table>
<thead>
<tr>
<th>Date</th>
<th>Observed By</th>
<th>Instrument</th>
<th>Station of Reference</th>
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<th>Remarks</th>
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</tbody>
</table>

**Gravity Value:**
Source of other gravity values for this site
The station is located on the floor of veranda, in the middle of the main entrance, of Anauni mosque.
<table>
<thead>
<tr>
<th>COUNTRY</th>
<th>NEAREST CITY</th>
<th>GRAVITY STATION DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Indonesia</td>
<td>Soleh</td>
<td></td>
</tr>
<tr>
<td>STATE/PROVINCE</td>
<td></td>
<td>Soleh Mosque</td>
</tr>
<tr>
<td>LATITUDE</td>
<td>LONGITUDE</td>
<td>ELEVATION</td>
</tr>
<tr>
<td>3°9.70'S</td>
<td>127°46.20'E</td>
<td>1.0 m</td>
</tr>
</tbody>
</table>

**DESCRIPTION**

The station is located next to the right pillar of left main entrance to Soleh mosque. The mosque was under construction in 1975.

**POSITION CONTROL DESCRIPTION**

Operational navigation chart in conjunction with local maps

**ELEVATION CONTROL DESCRIPTION**

Altimeter elevation tied to sea level

**DIAGRAM**

![Diagram of Soleh Mosque and vicinity](attachment:diagram.png)

**DATE** | **OBSERVED BY** | **INSTRUMENT** | **STATION OF REFERENCE** | **REFERENCE VALUE** | **S 0** | **REMARKS**
|---------|----------------|----------------|--------------------------|---------------------|-------|------------------|

**GRAVITY VALUE**

SOURCE OF OTHER GRAVITY VALUES FOR THIS SITE
### Gravity Station Description

**Country:** Indonesia  
**Nearest City:** Tihu  
**Gravity Station Name:** Tihu Mosque

<table>
<thead>
<tr>
<th>State/Province</th>
<th>Latitude</th>
<th>Longitude</th>
<th>Elevation</th>
<th>M.K.G.L Station No.</th>
<th>Gravity Value (g)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kelang</td>
<td>3°15.10'S</td>
<td>127°41.40'E</td>
<td>1.0 m</td>
<td>189-42</td>
<td></td>
</tr>
</tbody>
</table>

**Description:**

The station is located on the ground at the northwest corner of Tihu mosque. The mosque and its foundations were in very poor shape in 1975.

**Position Control Description:**

Operational navigation chart in conjunction with local maps

**Elevation Control Description:**

Altimeter elevation tied to sea level

**Diagram:**

![Diagram of Tihu Mosque]  

**Diagram By:** P. Jezek  
**Date:** 11/75

**Date** | **Observed By** | **Instrument** | **Station of Reference** | **Reference Value** | **g** | **Remarks**
<table>
<thead>
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</tbody>
</table>

**Gravity Value:**

Source of other gravity values for this site.
The station is located on the porch floor next to the wall near the main entrance to Tahalupu mosque.
The station is located on a concrete tile walk to the right of the entrance to Kaibobo Protestant Church.
**GRAVITY STATION DESCRIPTION**

<table>
<thead>
<tr>
<th>COUNTRY</th>
<th>NEAREST CITY</th>
<th>GRAVITY STATION DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Indonesia</td>
<td>Piru</td>
<td></td>
</tr>
</tbody>
</table>

**STATE/PROVINCE**

- West Saram

**LATITUDE**

- 3°3.61'S

**LONGITUDE**

- 128°11.03'E

**ELEVATION**

- 1.8 m

**W.A.O.L. STATION NO.**

- 189-45

**GRAVITY VALUE (g)**

- 1

**DESCRIPTION**

The station is located on a concrete footing supporting one of the roof pillars in Piru mosque.

---

**OPERATIONAL NAVIGATION**

- Operational navigation chart in conjunction with local maps

---

**ELEVATION CONTROL DESCRIPTION**

- Altimeter elevation tied to sea level

---

**DIAGRAM**

![Diagram of the station location and surroundings]

---

**DATE**

- 11/75

**OBSERVES BY**

- P. Jezek

**INSTRUMENT**

-

**STATION OF REFERENCE**

-

**REFERENCE VALUE**

-

**Δ g**

-

**REMARKS**

-
The station is located at the base of a roof pillar in Talaga mosque.
**Country**: Indonesia  
**Nearest City**: Ani

**Gravity Station Description**

<table>
<thead>
<tr>
<th>Latitude</th>
<th>Longitude</th>
<th>Elevation</th>
<th>Station No.</th>
<th>Gravity Value (g)</th>
</tr>
</thead>
<tbody>
<tr>
<td>3°14.26'S</td>
<td>128°3.98'E</td>
<td>1.0 m</td>
<td>159-47</td>
<td></td>
</tr>
</tbody>
</table>

**Description**

The station is located in the middle of the main entrance to Ani mosque.

**Position Control Description**

Operational navigation chart in conjunction with local maps

**Elevation Control Description**

Altimeter elevation tied to sea level

**Diagram**

![Diagram of Ani Mosque](image)

*Diagram by P. Jezek*  
*Date 11/75*

**Table**

<table>
<thead>
<tr>
<th>Date</th>
<th>Observed By</th>
<th>Instrument</th>
<th>Station of Reference</th>
<th>Reference Value</th>
<th>g</th>
<th>Remarks</th>
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<tbody>
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</tbody>
</table>

**Gravity Value**

Source of other gravity values for this site
The station is located on a concrete footing, on the western side of a three-foot concrete pillar found near the beach. There are two parallel concrete footings rimming dirt road leading from the beach to the village but only the southern footing has a concrete pillar at the beach end.
<table>
<thead>
<tr>
<th>COUNTRY</th>
<th>NEAREST CITY</th>
<th>GRAVITY STATION DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Indonesia</td>
<td>Luhu</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>STATE/PROVINCE</th>
<th>STATION NAME</th>
<th>LONITUDE</th>
<th>ELEVATION</th>
<th>W.G.N. STATION NO.</th>
<th>GRAVITY VALUE (g)</th>
</tr>
</thead>
<tbody>
<tr>
<td>West Seram</td>
<td>Luhu Mosque</td>
<td>127°59.56'E</td>
<td>6.0 m</td>
<td>189-49</td>
<td></td>
</tr>
</tbody>
</table>

**DESCRIPTION**

The station is located on the floor at a base of one of the roof supporting pillars in Luhu mosque.

**DIAGRAM**

```
  water basin
    ^
   to the beach

  steps
    ^

Mosque
  concrete floor

verandah
```

**DATE**

11/75

**DIAGRAM BY**

P. Jezek

**SOURCE OF OTHER GRAVITY VALUES FOR THIS SITE**

-54-
## Gravity Station Description

<table>
<thead>
<tr>
<th>Country</th>
<th>Nearest City</th>
<th>Gravity Station Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Indonesia</td>
<td>Ujung Pandang</td>
<td>The station is located in the terminal building of Hasanuddin airport (near Ujung Pandang).</td>
</tr>
</tbody>
</table>

### Coordinates

<table>
<thead>
<tr>
<th>Latitude</th>
<th>Longitude</th>
</tr>
</thead>
<tbody>
<tr>
<td>5°4'00&quot;S</td>
<td>119°33'00&quot;E</td>
</tr>
</tbody>
</table>

### Elevation

- 32.0m

### Station Name

- Hasanuddin Airport

### Reference

- Reference Value: 189-50

### Diagram

- Diagram by P. Jezek

### Table

<table>
<thead>
<tr>
<th>Date</th>
<th>Observed By</th>
<th>Instrument</th>
<th>Station of Reference</th>
<th>Reference Value</th>
<th>φ</th>
<th>Remarks</th>
</tr>
</thead>
</table>

### Gravity Value

- Source of Other Gravity Values for This Site
<table>
<thead>
<tr>
<th>COUNTRY</th>
<th>NEAREST CITY</th>
<th>GRAVITY STATION DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Indonesia</td>
<td>Sunggu Minasa</td>
<td></td>
</tr>
</tbody>
</table>

**State/Province**
- Sulawesi

**Latitude**
- 5°12.4'S

**Longitude**
- 119°27.5'E

**Elevation**
- 4.0 m

**M.G.S. Station No.**
- 189-51

**Gravity Value (g)**
- 9.812.4'S

**Description**
The station is located on a concrete platform at the base of wooden steps leading to Gowa Palace in Sunggu Minasa.

**Position Control Description**
Operational navigation chart in conjunction with local maps

**Elevation Control Description**
Altimeter elevation tied to sea level

**Diagram**
- Entrance
- Overhanging roof
- Concrete wall
- Wooden pillars
- Concrete floor
- Wooden steps
- Mortar building
- Gowa Palace

**Diagram By**
- P. Jezek

**Date**
- 11/75

**Table**

<table>
<thead>
<tr>
<th>Date</th>
<th>Observed By</th>
<th>Instrument</th>
<th>Station of Reference</th>
<th>Reference Value</th>
<th>Δg</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
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</tr>
</tbody>
</table>

**Gravity Value**

**Source of Other Gravity Values for This Site**

---
The station is located on the floor inside of largest mosque in Maros. This mosque, with many steel, roof supporting pillars is found at a major intersection on the left hand side of the road after crossing single lane river bridge on the way from Ujung Pandang to Maros.
The station is located at a base of a large stone statue near the departure entrance of Ngurah Ray international airport.
**Indonesia**  |  **Mengwi**  |  **Purataman Hayun Temple**

**Country**  |  **Nearest City**  |  **Gravity Station Description**

**State/Province**  |  **Station Name**

Bali  |  **189-54**

**Latitude**  |  **Longitude**  |  **Elevation**  |  **Gravity Value (g)**

8°33.00'S  |  115°10.60'E  |  20.0m  |  **189-54**

**Description**

The station is located on an elevated brick porch of the first left hand building found after entering through the main stone gate of Purataman Hayun temple in Mengwi.

**Operational navigation chart in conjunction with local maps**

**Elevation Control Description**

Altimeter elevation tied to sea level

**Diagram**

![Diagram of Purataman Hayun Temple]

**Date**  |  **Observed By**  |  **Instrument**  |  **Station of Reference**  |  **Reference Value**  |  **A S**  |  **Remarks**

**Gravity Value**  |  **Source of Other Gravity Values for this Site**
<table>
<thead>
<tr>
<th>COUNTRY</th>
<th>NEAREST CITY</th>
<th>GRAVITY STATION DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Indonesia</td>
<td>Bedugul</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>STATE/PROVINCE</th>
<th>STATION NAME</th>
<th>LATTITUDE</th>
<th>LONGITUDE</th>
<th>ELEVATION</th>
<th>M.G.EL STATION NO.</th>
<th>GRAVITY VALUE (g)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bali</td>
<td>Bratan lake shore</td>
<td>8°17.10'S</td>
<td>115°10.20'E</td>
<td>1152.0 m</td>
<td>189-55</td>
<td></td>
</tr>
</tbody>
</table>

**DESCRIPTION**

The station is located on a concrete base between the concrete wall marking the Bratan Lake shore and the wall of eight sided stone near the landing in Bedugul.

---

**DIAGRAM**

- Concrete wall
- Boat landings
- Rain shelters
- Access road
- Restaurant
- Lodging

---

**DATE OBSERVED**

<table>
<thead>
<tr>
<th>DATE</th>
<th>OBSERVED BY</th>
<th>INSTRUMENT</th>
<th>STATION OF REFERENCE</th>
<th>REFERENCE VALUE</th>
<th>A D</th>
<th>REMARKS</th>
</tr>
</thead>
</table>

**GRAVITY VALUE**

Source of other gravity values for this site

---
<table>
<thead>
<tr>
<th>COUNTRY</th>
<th>NEAREST CITY</th>
<th>GRAVITY STATION DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Indonesia</td>
<td>Bandung</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>STATE/PROVINCE</th>
<th>STATION NAME</th>
<th>LATITUDE</th>
<th>LONGITUDE</th>
<th>ELEVATION</th>
<th>M.G.HL STATION NO.</th>
<th>GRAVITY VALUE (µ)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Java</td>
<td>Geological Survey of Indonesia</td>
<td>6°53.90'S</td>
<td>107°37.90'E</td>
<td>718.0 m</td>
<td>189-57</td>
<td></td>
</tr>
</tbody>
</table>

**DESCRIPTION**

The station is located on the floor behind the railing under the relief chart of Indonesia found in the entrance hall of the main building of the Geological Survey of Indonesia.

---

**POSITION CONTROL DESCRIPTION**

Given by Geological Survey of Indonesia (G.S.I.)

**ELEVATION CONTROL DESCRIPTION**

Given by Geological Survey of Indonesia (G.S.I.)

**DIAGRAM**

![Diagram of the relief map of Indonesia and the steel railing](image)

---

**DATE** | **OBSERVED BY** | **INSTRUMENT** | **STATION OF REFERENCE** | **REFERENCE VALUE** | **Δ g** | **REMARKS**
|--------|-----------------|----------------|--------------------------|---------------------|----------|----------------|

**GRAVITY VALUE**

**SOURCE OF OTHER GRAVITY VALUES FOR THIS SITE**

---
The station is located on the left side of the lowest step of entrance to quarantine and phytosanitary service of New Caledonia. The building is near the ORSTOM main office. The station is marked by a brass disc, carrying date 12-5-67, set in the concrete step.
<table>
<thead>
<tr>
<th>COUNTRY</th>
<th>Nearest City</th>
<th>Gravity Station Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>New Caledonia</td>
<td>Noumea</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>State/Province</th>
<th>Station Name</th>
<th>Latitude</th>
<th>Longitude</th>
<th>Elevation</th>
<th>Gravity Value (g)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Ouen Toro (Orstom)</td>
<td>22°18.08'S</td>
<td>166°27.02'E</td>
<td>130.0 m</td>
<td>189.59</td>
</tr>
</tbody>
</table>

**Description:**

The station is located on the ground floor of Ouen Toro seismological station, part of ORSTOM facilities. The station location is marked by three rivets in the concrete floor.

**Position Control Description**

**Elevation Control Description**

**Diagram**

![Diagram of Ouen Toro station](image)

**Table of Observations**

<table>
<thead>
<tr>
<th>Date</th>
<th>Observed By</th>
<th>Instrument</th>
<th>Station of Reference</th>
<th>Reference Value</th>
<th>S g</th>
<th>Remarks</th>
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</tbody>
</table>

**Gravity Value**

- Source of other gravity values for this site.
The station is located on the field side of the control building at Magenta airport. The location is marked by three rivets set in the concrete walkway.

Diagram by ORSTOM

Date 11/75
**Country**: Indonesia  
**Nearest City**: Mataram  
**Gravity Station**: Selaparang Airport

<table>
<thead>
<tr>
<th>Country</th>
<th>Nearest City</th>
<th>Gravity Station Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Indonesia</td>
<td>Mataram</td>
<td>Selaparang Airport</td>
</tr>
</tbody>
</table>

**Position Control Description**

Airport location

**Elevation Control Description**

Airport elevation

**Diagram**

Control tower

airport offices

flag pole

to terminal → building

opening
tower

3 ft wall
(concrete)

concrete and tile floor

step

**Diagram by**: P. Jezek  
**Date**: 11/75

<table>
<thead>
<tr>
<th>Date</th>
<th>Observed By</th>
<th>Instrument</th>
<th>Station of Reference</th>
<th>Reference Value</th>
<th>Δ g</th>
<th>Remarks</th>
</tr>
</thead>
</table>

**Gravity Value**

**Source of Other Gravity Values for This Site**

---

The station is located at the base of Selaparang airport traffic tower.
COUNTRY: New Caledonia
NEAREST CITY: Noumea

GRAVITY STATION DESCRIPTION

STATENAME: Mont Coffin Monument

LATITUDE: 22°17.08'S
LONGITUDE: 166°26.12'E
ELEVATION: 51.0 m
WAGL STATION NO.: 189-61
GRAVITY VALUE (g): 189-61

DESCRIPTION:

The station is located at the base of Mont Coffin Monument carrying the date 19 September 1940.

The station is marked by 3 rivets set in the concrete base.

DIAGRAM: [Diagram of Mont Coffin Monument]

DATE: 11/75

Diagram by: ORSTOM

<table>
<thead>
<tr>
<th>DATE</th>
<th>OBSERVED BY</th>
<th>INSTRUMENT</th>
<th>STATION OF REFERENCE</th>
<th>REFERENCE VALUE</th>
<th>Δ g</th>
<th>REMARKS</th>
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</tr>
</tbody>
</table>

GRAVITY VALUE: Source of other gravity values for this site

ORSTOM DATE: 11/75
**Country**: New Zealand  
**Nearest City**: Wellington  
**Gravity Station Description**

<table>
<thead>
<tr>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Observations were made in Kelburn, Wellington at the Seismological Observatory below ground level in the basement. The site is located on the floor of the hallway outside of the instrument (seismometer) room, east of the ramp from the workshop. The site is marked by a brass disc.</td>
</tr>
</tbody>
</table>

**Position Control Description**

**Previous report**

**Elevation Control Description**

**Diagram**

- Diagram by P. Jezek  
- Date: 11/75

**Table**

<table>
<thead>
<tr>
<th>Date</th>
<th>Observed by</th>
<th>Instrument</th>
<th>Station of Reference</th>
<th>Difference Value</th>
<th>q</th>
<th>Remarks</th>
</tr>
</thead>
</table>

**Gravity Value**

Source of other gravity values for this site
<table>
<thead>
<tr>
<th>COUNTRY</th>
<th>Fiji Islands</th>
</tr>
</thead>
<tbody>
<tr>
<td>NEAREST CITY</td>
<td>Suva</td>
</tr>
<tr>
<td>GRAVITY STATION DESCRIPTION</td>
<td>Mineral Resources Division</td>
</tr>
<tr>
<td>STATE/PROVINCE</td>
<td>Viti Levu</td>
</tr>
<tr>
<td>LATITUDE</td>
<td>18°07'S</td>
</tr>
<tr>
<td>LONGITUDE</td>
<td>178°27.5'</td>
</tr>
<tr>
<td>ELEVATION</td>
<td>176m</td>
</tr>
<tr>
<td>WAGL STATION NO.</td>
<td>189-63</td>
</tr>
<tr>
<td>GRAVITY VALUE (g)</td>
<td></td>
</tr>
</tbody>
</table>

**DESCRIPTION**

The station is near the entrance to the W.C. located by the Lapidary on the ground floor of the M.R.D. The station is marked by a brass disc.

**POSITION CONTROL DESCRIPTION**

Mineral Resources Division

**ELEVATION CONTROL DESCRIPTION**

Altimeter tied to sea level

**DIAGRAM**

![Diagram of the station](image)

**DIAGRAM BY** P. Jezek  **DATE 12/75**

**DATE** | **OBSERVED BY** | **INSTRUMENT** | **STATION OF REFERENCE** | **REFERENCE VALUE** | **g** | **REMARKS**
<table>
<thead>
<tr>
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</tbody>
</table>

**GRAVITY VALUE** | **SOURCE OF OTHER GRAVITY VALUES FOR THIS SITE**
<table>
<thead>
<tr>
<th>COUNTRY</th>
<th>NEAREST CITY</th>
<th>GRAVITY STATION DESCRIPTION</th>
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</thead>
<tbody>
<tr>
<td>Fiji</td>
<td>Nausori</td>
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<table>
<thead>
<tr>
<th>STATE/PROVINCE</th>
<th>LATITUDE</th>
<th>LONGITUDE</th>
<th>ELEVATION</th>
<th>MSLL STATION NO.</th>
<th>GRAVITY VALUE (g)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Viti Levu</td>
<td>18°2.83'S</td>
<td>178°33.75'E</td>
<td>5.8 m</td>
<td>189-64</td>
<td></td>
</tr>
</tbody>
</table>

**DESCRIPTION**

The station is located on a concrete abutment over ditch near Nausori airport. The abutment is found, when driving toward the airport, on the left side of the road about 100 m from the terminal building.

**POSITION CONTROL DESCRIPTION**

From Min. Resource Div. of Fiji

**ELEVATION CONTROL DESCRIPTION**

Airport location

[Diagram showing the location of the station with a concrete abutment and ditch]

**Diagram by** P. Jezek  **Date** 12/75
The station is located in the entrance to the lounge of Tailevu hotel in Korovou.

POSITION CONTROL DESCRIPTION
From Min. Resource Div. of Fiji

ELEVATION CONTROL DESCRIPTION
Altimeter elevation tied to sea level

DIAGRAM

DATE | OBSERVED BY | INSTRUMENT | STATION OF REFERENCE | REFERENCE VALUE | Δ g | REMARKS
--- | --- | --- | --- | --- | --- | ---

GRAVITY VALUE | SOURCE OF OTHER GRAVITY VALUES FOR THIS SITE
**Country:** Fiji  
**Nearest City:** Fiji  
**Gravity Station Description:**

<table>
<thead>
<tr>
<th>Country</th>
<th>Nearest City</th>
<th>Gravity Station Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fiji</td>
<td>Fiji</td>
<td>The station is located on a walkway next to the toilet at the new wing of Raki Roki hotel, on the ground level.</td>
</tr>
</tbody>
</table>

**Station Details:**

<table>
<thead>
<tr>
<th>Latitude</th>
<th>Longitude</th>
<th>Elevation</th>
<th>Reference Station Number</th>
<th>Gravity Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>17°21.68'S</td>
<td>178°9.41'E</td>
<td>12.6 m</td>
<td>189-66</td>
<td></td>
</tr>
</tbody>
</table>

**Description:** The station is located on a walkway next to the toilet at the new wing of Raki Roki hotel, on the ground level.

**Position Control Description:**

- From Mineral Resource Division of Fiji

**Elevation Control Description:**

- Altimeter elevation tied to sea level

**Diagram:**

```
covered concrete walkway

toilet         steps up

Rm 101  Rm 102  Rm 103
```

**Diagram by:** P. Jezek  
**Date:** 12/75

**Table:**

<table>
<thead>
<tr>
<th>Date</th>
<th>Observed By</th>
<th>Instrument</th>
<th>Station of Reference</th>
<th>Reference Value</th>
<th>G G</th>
<th>Remarks</th>
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</table>

**Gravity Value:**

- Source of other gravity values for this site
<table>
<thead>
<tr>
<th>COUNTRY</th>
<th>NEAREST CITY</th>
<th>GRAVITY STATION DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fiji</td>
<td>Nandarivatu</td>
<td></td>
</tr>
</tbody>
</table>

**STATE/PROVINCE**

Viti Levu

**LATITUDE**

17°34.92'S

**LONGITUDE**

177°56.24'E

**ELEVATION**

1003.5 m

**MAG. STATION NO.**

189-67

**GRAVITY VALUE (g)**

The station is located on the concrete floor near the entrance to the Koro-O telecommunication station at Nandarivatu.

**DIAGRAM**

[Diagram of the station showing the concrete floor, gate, verandah, instrument room, and small concrete ditch.]

**DESCRIPTION**

From Min. Resource Div. of Fiji

**ELEVATION CONTROL DESCRIPTION**

Altimeter elevation tied to sea level

**DATE OBSERVED BY INSTRUMENT STATION OF REFERENCE REFERENCE VALUE A & MEASUREMENTS**

<table>
<thead>
<tr>
<th>DATE</th>
<th>OBSERVED BY</th>
<th>INSTRUMENT</th>
<th>STATION OF REFERENCE</th>
<th>REFERENCE VALUE</th>
<th>A &amp; MEASUREMENTS</th>
</tr>
</thead>
</table>

**SOURCE OF OTHER GRAVITY VALUES FOR THIS SITE**
**GRAVITY STATION DESCRIPTION**

**COUNTRY** Fiji  
**NEAREST CITY** Korolevu  
**STATION NAME** Paradise Point Hotel  

<table>
<thead>
<tr>
<th>STATE/PROVINCE</th>
<th>LATITUDE</th>
<th>LONGITUDE</th>
<th>ELEVATION</th>
<th>M.N.O.L. STATION NO.</th>
<th>GRAVITY VALUE (g)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Viti Levu</td>
<td>18°12.96'S</td>
<td>177°43.92'E</td>
<td>1.0 m</td>
<td>189-68</td>
<td></td>
</tr>
</tbody>
</table>

**DESCRIPTION**

The station is located on a concrete walk front of entrance to room B1 at Paradise Point hotel in Korolevu.

**DIAGRAM**

- Access road to the hotel
- Steps
- Covered concrete walk
- Room B3
- Room B1

**SOURCE OF OTHER GRAVITY VALUES FOR THIS SITE**

---
**GRAVITY STATION DESCRIPTION**

<table>
<thead>
<tr>
<th>COUNTRY</th>
<th>NEAREST CITY</th>
<th>GRavity Station Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fiji</td>
<td>Nandi</td>
<td>The station is located on the side walk in the corner formed by the walls of departure and arrival terminals at Nandi international airport.</td>
</tr>
</tbody>
</table>

**Position Control Description**

<table>
<thead>
<tr>
<th>AirPort Location</th>
</tr>
</thead>
</table>

**Elevation Control Description**

<table>
<thead>
<tr>
<th>AirPort Elevation</th>
</tr>
</thead>
</table>

**Diagram**

![Diagram of Nandi Airport]

**Remarks**

<table>
<thead>
<tr>
<th>Date</th>
<th>Observed By</th>
<th>Instrument</th>
<th>Station of Reference</th>
<th>Reference Value</th>
<th>δq</th>
<th>Remarks</th>
</tr>
</thead>
</table>

**Gravity Value**

| Source of Other Gravity Values for This Site |
The station is located in the entrance of operations building at Nandi international airport.

During October, November, and December of 1976, seventy gravity base stations were established on the islands of eastern Indonesia (Timor, Wetar, Laiti, Nias, Seram, Kator, Bawean, Memba, Kustut, San Blas, Dusun, Seram, Kei, Banda, Anambas, Belang and S.W. Moluccas), New Caledonia and Fiji. The measurements were made with Laclede and Humby land gravimeter G-114. This report presents station descriptions and summarizes the results.


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This card is UNCLASSIFIED
During October, November, and December of 1975, seventy gravity base stations were established on the islands of eastern Indonesia (Timor, Wetar, Leti, Moa, Sermata, Babar, Ambon, Seram, Manawoko, Kastui, Kao Besar, Hungar, Serua, Banda Neira, Boano, Kelang and S.W. Sulawesi), New Caledonia and Fiji. The measurements were made with LaCoste and Romberg land gravimeter G-114. This report presents station descriptions and summarizes the results.