GEOTECHNIQUE EAST MALAYSIA SDN. BHD.

| Name of Test | SPECIFIC GRAVITY AND ABSORPTION OF SAND | ASTM C 128 |
|---|---|---|

Name of Project Small Hydro Study For Medamit Date 4-7-1987

Sample TME-2 Tested by F.K.H.

| Specimen NO. | | | 1 | 2 | |
|---|---|---|---|---|---|
| NO. of Flask | ① | | 9 | 10 | |
| Weight of Flask (g) | ② | | 198.82 | 201.73 | |
| Weight of Specimen (g) | ③ | | 500 | 500 | |
| Weight of (Flask+Water +Specimen) (g) | ④ | | 994.8 | 995.5 | |
| Weight of Poured Water into a Flask (g) | ⑤ | ④-(②+ ③) | 295.98 | 293.77 | |
| Specific Gravity | ⑥ | $\frac{③}{500-⑤}$ | 2.451 | 2.424 | |
| Mean Value | ⑦ | | 2.438 | | |
| Weight of Dried Specimen (g) | ⑧ | | 484.48 | 485.3 | |
| Absorption (%) | ⑨ | $\frac{③-⑧}{⑧}\times 100$ | 3.20 | 3.03 | |
| Mean Value (%) | ⑩ | | 3.12 | | |

Remarks :

GEOTECHNIQUE EAST MALAYSIA SDN. BHD.

| Name of Test | SPECIFIC GRAVITY AND ABSORPTION OF SAND | ASTM C 128 |
|---|---|---|

Name of Project Small Hydro Study For Medamit Date 4-7-1987

Sample TME-3 Tested by F.K.H.

| Specimen NO. | | | 1 | 2 | |
|---|---|---|---|---|---|
| NO. of Flask | ① | | 11 | 12 | |
| Weight of Flask (g) | ② | | 201.16 | 202.36 | |
| Weight of Specimen (g) | ③ | | 500 | 500 | |
| Weight of (Flask+Water +Specimen) (g) | ④ | | 986.8 | 991.2 | |
| Weight of Poured Water into a Flask (g) | ⑤ | ④-(②+ ③) | 285.64 | 288.84 | |
| Specific Gravity | ⑥ | $\frac{③}{500-⑤}$ | 2.332 | 2.368 | |
| Mean Value | ⑦ | | 2.350 | | |
| Weight of Dried Specimen (g) | ⑧ | | 480.86 | 481.8 | |
| Absorption (%) | ⑨ | $\frac{③-⑧}{⑧}\times 100$ | 3.98 | 3.64 | |
| Mean Value (%) | ⑩ | | 3.88 | | |

Remarks :

GEOTECHNIQUE EAST MALAYSIA SDN. BHD.

| Name of Test | SPECIFIC GRAVITY AND ABSORPTION OF SAND | ASTM C 128 |
|---|---|---|

Name of Project Small Hydro Study For Medamit Date 4-7-1987

Sample TME-4 Tested by F.K.H.

| Specimen NO. | | | 1 | 2 | |
|---|---|---|---|---|---|
| NO. of Flask | ① | | 13 | 14 | |
| Weight of Flask (g) | ② | | 205.62 | 201.17 | |
| Weight of Specimen (g) | ③ | | 500 | 500 | |
| Weight of (Flask+Water +Specimen) (g) | ④ | | 992.71 | 985.9 | |
| Weight of Poured Water into a Flask (g) | ⑤ | ④-(②+ ③) | 287.09 | 284.73 | |
| Specific Gravity | ⑥ | $\frac{③}{500-⑤}$ | 2.348 | 2.323 | |
| Mean Value | ⑦ | | 2.336 | | |
| Weight of Dried Specimen (g) | ⑧ | | 479.88 | 480.50 | |
| Absorption (%) | ⑨ | $\frac{③-⑧}{⑧}\times 100$ | 4.19 | 4.06 | |
| Mean Value (%) | ⑩ | | 4.13 | | |

Remarks :

GEOTECHNIQUE EAST MALAYSIA SDN. BHD.

| Name of Test | SPECIFIC GRAVITY AND ABSORPTION OF SAND | ASTM C 128 |
|---|---|---|

Name of Project Small Hydro Study for Medamit Date 4-7-1987

Sample TME-5 Tested by F.K.H.

| Specimen NO. | | | 1 | 2 | |
|---|---|---|---|---|---|
| NO. of Flask | ① | | 15 | 16 | |
| Weight of Flask (g) | ② | | 200.34 | 198.57 | |
| Weight of Specimen (g) | ③ | | 500 | 500 | |
| Weight of (Flask+Water +Specimen) (g) | ④ | | 990.65 | 985.12 | |
| Weight of Poured Water into a Flask (g) | ⑤ | ④-(②+ ③) | 290.31 | 286.55 | - |
| Specific Gravity | ⑥ | $\frac{③}{500-⑤}$ | 2.384 | 2.342 | |
| Mean Value | ⑦ | | 2.363 | | |
| Weight of Dried Specimen (g) | ⑧ | | 479.18 | 478.3 | |
| Absorption (%) | ⑨ | $\frac{③-⑧}{⑧}\times 100$ | 4.34 | 4.54 | |
| Mean Value (%) | ⑩ | | 4.44 | | |

Remarks :

GEOTECHINIQUE EAST MALAYSIA SDN. BHD.

| Name of Test | SPECIFIC GRAVITY AND ABSORPTION OF SAND | ASTM C 128 |
|---|---|---|

Name of Project Small Hydro Study For Medamit Date 4-7-1987

Sample TME-6 Tested by F.K.H.

| Specimen NO. | | | 1 | 2 | |
|---|---|---|---|---|---|
| NO. of Flask | ① | | 17 | 18 | |
| Weight of Flask (g) | ② | | 200.02 | 201.36 | |
| Weight of Specimen (g) | ③ | | 500 | 500 | |
| Weight of (Flask+Water +Specimen) (g) | ④ | | 991.24 | 992.21 | |
| Weight of Poured Water into a Flask (g) | ⑤ | ④-(②+ ③) | 291.22 | 290.85 | |
| Specific Gravity | ⑥ | $\frac{③}{500-⑤}$ | 2.395 | 2.391 | |
| Mean Value | ⑦ | | 2.393 | | |
| Weight of Dried Specimen (g) | ⑧ | | 483.3 | 483.6 | |
| Absorption (%) | ⑨ | $\frac{⑤-⑧}{⑧}\times 100$ | 3.46 | 3.99 | |
| Mean Value (%) | ⑩ | | 3.42 | | |

Remarks :

GEOTECHNIQUE EAST MALAYSIA SDN. BHD.

| Name of Test | SPECIFIC GRAVITY AND ABSORPTION OF SAND | ASTM C 128 |
|---|---|---|

Name of Project Small Hydro Study For Medamit Date 4-7-1987

Sample TME-7 Tested by F.K.H.

| Specimen NO. | | | 1 | 2 | |
|---|---|---|---|---|---|
| NO. of Flask | ① | | 19 | 20 | |
| Weight of Flask (g) | ② | | 199.86 | 199.06 | |
| Weight of Specimen (g) | ③ | | 500 | 500 | |
| Weight of (Flask+Water +Specimen) (g) | ④ | | 986.1 | 989.5 | |
| Weight of Poured Water into a Flask (g) | ⑤ | ④-(②+ ③) | 286.24 | 290.44 | |
| Specific Gravity | ⑥ | $\frac{③}{500-⑤}$ | 2.339 | 2.386 | |
| Mean Value | ⑦ | | 2.363 | | |
| Weight of Dried Specimen (g) | ⑧ | | 486.2 | 487.0 | |
| Absorption (%) | ⑨ | $\frac{③-⑧}{⑧}\times 100$ | 2.84 | 2.67 | |
| Mean Value (%) | ⑩ | | 2.75 | | |

Remarks :

GEOTECHNIQUE EAST MALAYSIA SDN. BHD.

| Name of Test | SPECIFIC GRAVITY AND ABSORPTION OF GRAVEL | ASTM C 127 |
|---|---|---|

Name of Project Small Hydro Study For Medamit Date 4.7.1987

Sample TME-1 Tested by K.H.F.

| Specimen NO. | | | 1 | 2 | |
|---|---|---|---|---|---|
| Saturated-Surface-Dry Weight of Specimen | ① | | 5305 | 5972 | |
| Weight of (Specimen + Basket) in Water | ② | | 3462 | 3877 | |
| Weight of Basket in Water | ③ | | 235 | 235 | |
| Weight of Specimen in Water | ④ | ②−③ | 3227 | 3642 | |
| Dry Weight of Specimen | ⑤ | | 5235 | 5888 | |
| Bulk Specific Gravity | ⑥ | $\frac{⑤}{①-④}$ | 2.519 | 2.527 | |
| Mean Value | ⑦ | | 2.523 | | |
| Weight of Pore Water | ⑧ | ①−⑤ | 70 | 84 | |
| Absorption % | ⑨ | $\frac{⑧}{⑤} \times 100$ | 1.34 | 1.43 | |
| Mean Value % | | | 1.39 | | |
| SSD Specific Gravity | | $\frac{①}{①-④}$ | 2.553 | 2.563 | |
| Mean Value | | | 2.558 | | |
| Apparent Specific Gravity | | $\frac{⑤}{⑤-④}$ | 2.607 | 2.622 | |
| Mean Value | | | 2.614 | | |

Remarks :

GEOTECHNIQUE EAST MALAYSIA SDN. BHD.

| Name of Test | SPECIFIC GRAVITY AND ABSORPTION OF GRAVEL | ASTM C 127 |
|---|---|---|

Name of Project Small Hydro Study For Medamit Date 4.7.1987

Sample TME-2 Tested by K.H.F.

| Specimen NO. | | | 1 | 2 | |
|---|---|---|---|---|---|
| Saturated-Surface-Dry Weight of Specimen | ① | | 4646 | 5422 | |
| Weight of (Specimen + Basket) in Water | ② | | 3058 | 3528 | |
| Weight of Basket in Water | ③ | | 235 | 235 | |
| Weight of Specimen in Water | ④ | ②−③ | 2823 | 3293 | |
| Dry Weight of Specimen | ⑤ | | 4564 | 5339 | |
| Bulk Specific Gravity | ⑥ | $\frac{⑤}{①-④}$ | 2.504 | 2.508 | |
| Mean Value | ⑦ | | 2.506 | | |
| Weight of Pore Water | ⑧ | ①−⑤ | 82 | 83 | |
| Absorption % | ⑨ | $\frac{⑧}{⑤} \times 100$ | 1.80 | 1.56 | |
| Mean Value % | | | 1.68 | | |
| SSD Specific Gravity | | $\frac{①}{①-④}$ | 2.549 | 2.547 | |
| Mean Value | | | 2.548 | | |
| Apparent Specific Gravity | | $\frac{⑤}{⑤-④}$ | 2.621 | 2.609 | |
| Mean Value | | | 2.615 | | |

Remarks :

GEOTECHNIQUE EAST MALAYSIA SDN. BHD.

| Name of Test | SPECIFIC GRAVITY AND ABSORPTION OF GRAVEL | ASTM C 127 |
|---|---|---|

Name of Project: Small Hydro Study For Medamit — Date: 4.7.1987

Sample: TME-3 — Tested by: K.H.F.

| Specimen NO. | | | 1 | 2 | |
|---|---|---|---|---|---|
| Saturated-Surface-Dry Weight of Specimen | ① | | 6977 | 6772 | |
| Weight of (Specimen + Basket) in Water | ② | | 4525 | 4405 | |
| Weight of Basket in Water | ③ | | 235 | 235 | |
| Weight of Specimen in Water | ④ | ②−③ | 4290 | 4170 | |
| Dry Weight of Specimen | ⑤ | | 6908 | 6696 | |
| Bulk Specific Gravity | ⑥ | $\frac{⑤}{①-④}$ | 2.571 | 2.573 | |
| Mean Value | ⑦ | | 2.572 | | |
| Weight of Pore Water | ⑧ | ①−⑤ | 69 | 76 | |
| Absorption % | ⑨ | $\frac{⑧}{⑤}\times 100$ | 1.00 | 1.14 | |
| Mean Value % | | | 1.07 | | |
| SSD Specific Gravity | | $\frac{①}{①-④}$ | 2.597 | 2.603 | |
| Mean Value | | | 2.600 | | |
| Apparent Specific Gravity | | $\frac{⑤}{⑤-④}$ | 2.639 | 2.651 | |
| Mean Value | | | 2.645 | | |

Remarks :

GEOTECHNIQUE EAST MALAYSIA SDN. BHD.

| Name of Test | SPECIFIC GRAVITY AND ABSORPTION OF GRAVEL | ASTM C 127 |
|---|---|---|

Name of Project Small Hydro Study For Medamit Date 4.7.1987

Sample TME-4 Tested by K.H.F.

| Specimen NO. | | | 1 | 2 | |
|---|---|---|---|---|---|
| Saturated-Surface-Dry Weight of Specimen | ① | | 6288 | 6090 | |
| Weight of (Specimen + Basket) in Water | ② | | 4076 | 3949 | |
| Weight of Basket in Water | ③ | | 235 | 235 | |
| Weight of Specimen in Water | ④ | ②−③ | 3841 | 3714 | |
| Dry Weight of Specimen | ⑤ | | 6180 | 5992 | |
| Bulk Specific Gravity | ⑥ | $\frac{⑤}{①-④}$ | 2.526 | 2.522 | |
| Mean Value | ⑦ | | 2.524 | | |
| Weight of Pore Water | ⑧ | ①−⑤ | 108 | 98 | |
| Absorption % | ⑨ | $\frac{⑧}{⑤} \times 100$ | 1.75 | 1.64 | |
| Mean Value % | | | 1.70 | | |
| SSD Specific Gravity | | $\frac{①}{①-④}$ | 2.570 | 2.563 | |
| Mean Value | | | 2.566 | | |
| Apparent Specific Gravity | | $\frac{⑤}{⑤-④}$ | 2.642 | 2.630 | |
| Mean Value | | | 2.636 | | |

Remarks :

GEOTECHNIQUE EAST MALAYSIA SDN. BHD.

| Name of Test | SPECIFIC GRAVITY AND ABSORPTION OF GRAVEL | ASTM C 127 |
|---|---|---|

Name of Project Small Hydro Study For Medamit Date 4.7.1987

Sample TME-5 Tested by K.H.F.

| Specimen NO. | | | 1 | 2 | |
|---|---|---|---|---|---|
| Saturated-Surface-Dry Weight of Specimen | ① | | 9295 | 7952 | |
| Weight of (Specimen + Basket) in Water | ② | | 5949 | 5113 | |
| Weight of Basket in Water | ③ | | 235 | 235 | |
| Weight of Specimen in Water | ④ | ②−③ | 5714 | 4878 | |
| Dry Weight of Specimen | ⑤ | | 9201 | 7866 | |
| Bulk Specific Gravity | ⑥ | $\frac{⑤}{①-④}$ | 2.569 | 2.559 | |
| Mean Value | ⑦ | | 2.564 | | |
| Weight of Pore Water | ⑧ | ①−⑤ | 94 | 86 | |
| Absorption % | ⑨ | $\frac{⑧}{⑤}\times 100$ | 1.02 | 1.09 | |
| Mean Value % | | | 1.06 | | |
| SSD Specific Gravity | | $\frac{①}{①-④}$ | 2.596 | 2.587 | |
| Mean Value | | | 2.591 | | |
| Apparent Specific Gravity | | $\frac{⑤}{⑤-④}$ | 2.639 | 2.633 | |
| Mean Value | | | 2.636 | | |

Remarks :

GEOTECHNIQUE EAST MALAYSIA SDN. BHD.

| Name of Test | SPECIFIC GRAVITY AND ABSORPTION OF GRAVEL | ASTM C 127 |
|---|---|---|

Name of Project Small Hydro Study For Medamit Date 4.7.1987

Sample TME-6 Tested by K.H.F.

| Specimen NO. | | | 1 | 2 | |
|---|---|---|---|---|---|
| Saturated-Surface-Dry Weight of Specimen | ① | | 6718 | 5651 | |
| Weight of (Specimen + Basket) in Water | ② | | 4362 | 3701 | |
| Weight of Basket in Water | ③ | | 235 | 235 | |
| Weight of Specimen in Water | ④ | ②−③ | 4127 | 3466 | |
| Dry Weight of Specimen | ⑤ | | 6641 | 5589 | |
| Bulk Specific Gravity | ⑥ | $\frac{⑤}{①-④}$ | 2.563 | 2.558 | |
| Mean Value | ⑦ | | 2.560 | | |
| Weight of Pore Water | ⑧ | ①−⑤ | 77 | 62 | |
| Absorption % | ⑨ | $\frac{⑧}{⑤}\times 100$ | 1.16 | 1.11 | |
| Mean Value % | | | 1.14 | | |
| SSD Specific Gravity | | $\frac{①}{①-④}$ | 2.593 | 2.586 | |
| Mean Value | | | 2.590 | | |
| Apparent Specific Gravity | | $\frac{⑤}{⑤-④}$ | 2.642 | 2.633 | |
| Mean Value | | | 2.637 | | |

Remarks :

GEOTECHNIQUE EAST MALAYSIA SDN. BHD.

| Name of Test | SPECIFIC GRAVITY AND ABSORPTION OF GRAVEL | ASTM C 127 |
|---|---|---|

Name of Project: Small Hydro Study For Medamit  Date: 4.7.1987

Sample: TME-7  Tested by: K.H.F.

| Specimen NO. | | | 1 | 2 | |
|---|---|---|---|---|---|
| Saturated-Surface-Dry Weight of Specimen | ① | | 9975 | 7118 | |
| Weight of (Specimen + Basket) in Water | ② | | 6362 | 4608 | |
| Weight of Basket in Water | ③ | | 235 | 235 | |
| Weight of Specimen in Water | ④ | ②−③ | 6127 | 4373 | |
| Dry Weight of Specimen | ⑤ | | 9875 | 7047 | |
| Bulk Specific Gravity | ⑥ | $\frac{⑤}{①-④}$ | 2.566 | 2.567 | |
| Mean Value | ⑦ | | 2.567 | | |
| Weight of Pore Water | ⑧ | ①−⑤ | 100 | 71 | |
| Absorption % | ⑨ | $\frac{⑧}{⑤} \times 100$ | 1.01 | 1.01 | |
| Mean Value % | | | 1.01 | | |
| SSD Specific Gravity | | $\frac{①}{①-④}$ | 2.592 | 2.593 | |
| Mean Value | | | 2.593 | | |
| Apparent Specific Gravity | | $\frac{⑤}{⑤-④}$ | 2.635 | 2.635 | |
| Mean Value | | | 2.635 | | |

Remarks :

GEOTECHNIQUE EAST MALAYSIA SDN. BHD.

| Name of Test | ORGANIC IMPURITIES OF SAND | ASTM C 40 |
|---|---|---|

Name of Project Small Hydro Study For Medamit Date 4.7.1987

Sample TME-2/Test 1 Tested by L.S.M.

Test Results :

Passed

Remarks :

GEOTECHNIQUE EAST MALAYSIA SDN. BHD.

| Name of Test | ORGANIC IMPURITIES OF SAND | ASTM C 40 |
|---|---|---|

Name of Project Small Hydro Study For Medamit Date 4.7.1987

Sample TME-2/Test 2. Tested by L.S.M.

Test Results :

Passed

Remarks :

GEOTECHNIQUE EAST MALAYSIA SDN. BHD.

| Name of Test | ORGANIC IMPURITIES OF SAND | ASTM C 40 |
|---|---|---|

Name of Project Small Hydro Study For Medamit Date 4.7.1987

Sample TME-3/Test 1 Tested by L.S.M.

Test Results :

Not Passed

Remarks :

GEOTECHNIQUE EAST MALAYSIA SDN. BHD.

| Name of Test | ORGANIC IMPURITIES OF SAND | ASTM C 40 |
|---|---|---|

Name of Project Small Hydro Study For Medamit Date 4.7.1987

Sample TME-3/Test 2 Tested by L.S.M.

Test Results :

Not Passed

Remarks :

GEOTECHNIQUE EAST MALAYSIA SDN. BHD.

| Name of Test | ORGANIC IMPURITIES OF SAND | ASTM C 40 |
|---|---|---|

Name of Project Small Hydro Study For Medamit Date 4.7.1987

Sample TME-4/Test 1 Tested by L.S.M.

Test Results :

Not Passed

Remarks :

GEOTECHNIQUE EAST MALAYSIA SDN. BHD.

| Name of Test | ORGANIC IMPURITIES OF SAND | ASTM C 40 |
|---|---|---|

Name of Project Small Hydro Study For Medamit Date 4.7.1987

Sample TME-4/Test 2 Tested by L.S.M.

Test Results :

Not Passed

Remarks :

GEOTECHNIQUE EAST MALAYSIA SDN. BHD.

| Name of Test | ORGANIC IMPURITIES OF SAND | ASTM C 40 |
|---|---|---|

Name of Project Small Hydro Study For Medamit Date 4.7.1987

Sample TME-5/Test 1 Tested by L.S.M.

Test Results :

Not Passed

Remarks :

GEOTECHNIQUE EAST MALAYSIA SDN. BHD.

| Name of Test | ORGANIC IMPURITIES OF SAND | ASTM C 40 |
|---|---|---|

Name of Project Small Hydro Study For Medamit Date 4.7.1987

Sample TME-5/Test 2. Tested by L.S.M.

Test Results :

Not Passed

Remarks :

GEOTECHNIQUE EAST MALAYSIA SDN. BHD.

| Name of Test | ORGANIC IMPURITIES OF SAND | ASTM C 40 |
|---|---|---|

Name of Project Small Hydro Study For Medamit Date 4.7.1987

Sample TME-6/Test 1 Tested by L.S.M.

Test Results :

Not Passed

Remarks :

GEOTECHNIQUE EAST MALAYSIA SDN. BHD.

| Name of Test | ORGANIC IMPURITIES OF SAND | ASTM C 40 |
|---|---|---|

Name of Project Small Hydro Study For Medamit Date 4.7.1987

Sample TME-6/Test 2 Tested by L.S.M.

Test Results :

Not Passed

Remarks :

GEOTECHNIQUE EAST MALAYSIA SDN. BHD.

| Name of Test | ORGANIC IMPURITIES OF SAND | ASTM C 40 |
|---|---|---|

Name of Project Small Hydro Study For Medamit Date 4.7.1987

Sample TME-7/Test 1 Tested by L.S.M.

Test Results :

Not Passed

Remarks :

GEOTECHNIQUE EAST MALAYSIA SDN. BHD.

| Name of Test | ORGANIC IMPURITIES OF SAND | ASTM C 40 |
|---|---|---|

Name of Project Small Hydro Study For Medamit Date 4.7.1987

Sample TME-7/Test 2 Tested by L.S.M.

Test Results :

Not Passed

Remarks :

GEOTECHNIQUE EAST MALAYSIA SDN. BHD.

| Name of Test | SCRATCH HARDNESS OF SOFT PARTICLES IN GRAVEL | ASTM C 235 |
|---|---|---|

Name of Project Small Hydro Study For Medamit Date 3-7-1987

Sample TME-1/Test 1 Tested by B.C.L.

| Particle Size (mm) | | 10-15 | 15-20 | 20-25 | 25-40 | 40-60 | | Total |
|---|---|---|---|---|---|---|---|---|
| Weight of Each Size (g) | ① | 2636 | 702 | 2888 | 4060 | 5335 | | 15621 |
| Weight Parcentage (%) | ② | 16.87 | 4.49 | 18.49 | 25.99 | 34.15 | | 100 |
| Weight of Before Testing (g) | ③ | 2636 | - | 2888 | 4060 | 5335 | | |
| Number of Particles | ④ | 842 | - | 150 | 69 | 31 | | |
| Weight of Soft Particles (g) | ⑤ | 398 | - | 128 | 158 | 152 | | |
| Number of Soft Particles | ⑥ | 167 | - | 9 | 3 | 1 | | |
| Weight Parcentage of Soft Particles (⑤ /③) ×100 (%) | ⑦ | 15.10 | 9.77 | 4.43 | 3.89 | 2.85 | | |
| Number Parcentage of Soft Particles (⑥ /④) ×100 (%) | ⑧ | 19.83 | - | 6.00 | 4.35 | 3.23 | | |
| Weight Parcentage of Soft Particles in Aggregates (%) (②×⑦) / 100 | ⑨ | 2.55 | 0.44 | 0.82 | 1.01 | 0.97 | | 5.8 |

Remarks :

GEOTECHNIQUE EAST MALAYSIA SDN. BHD.

| Name of Test | SCRATCH HARDNESS OF SOFT PARTICLES IN GRAVEL | ASTM C 235 |
|---|---|---|

Name of Project Small Hydro Study For Medamit Date 3-7-1987

Sample TME-1/Test 2 Tested by B.C.L.

| Particle Size (mm) | | 10-15 | 15-20 | 20-25 | 25-40 | 40-60 | | Total |
|---|---|---|---|---|---|---|---|---|
| Weight of Each Size (g) | ① | 1954 | 1360 | 2308 | 4269 | 5747 | | 15638 |
| Weight Parcentage (%) | ② | 12.50 | 8.70 | 14.76 | 27.30 | 36.75 | | 100 |
| Weight of Before Testing (g) | ③ | 1954 | - | 2308 | 4269 | 5747 | | |
| Number of Particles | ④ | 610 | - | 98 | 92 | 29 | | |
| Weight of Soft Particles (g) | ⑤ | 379 | - | 128 | 169 | 0 | | |
| Number of Soft Particles | ⑥ | 156 | - | 6 | 3 | 0 | | |
| Weight Parcentage of Soft Particles (%) (⑤ /③) ×100 | ⑦ | 19.40 | 12.48 | 5.55 | 3.96 | 3.96 | | |
| Number Parcentage of Soft Particles (%) (⑥ /④) ×100 | ⑧ | 25.57 | - | 6.12 | 3.26 | 0 | | |
| Weight Parcentage of Soft Particles in Aggregates (%) (②×⑦) / 100 | ⑨ | 2.42 | 1.08 | 0.82 | 1.08 | 1.46 | | 6.9 |

Remarks :

Average percentage of soft particles in Aggregate by weight is 6.4% (Average of two test)

GEOTECHNIQUE EAST MALAYSIA SDN. BHD.

| Name of Test | SCRATCH HARDNESS OF SOFT PARTICLES IN GRAVEL | ASTM C 235 |
|---|---|---|

Name of Project Small Hydro Study For Medamit Date 4-7-1987

Sample TME-2/Test 1 Tested by K.H.F.

| Particle Size (mm) | | 10-15 | 15-20 | 20-25 | 25-40 | 40-60 | | Total |
|---|---|---|---|---|---|---|---|---|
| Weight of Each Size (g) | ① | 1123 | 1410 | 1457 | 2413 | 4698 | | 11101 |
| Weight Parcentage (%) | ② | 10.1 | 12.7 | 13.1 | 21.8 | 42.3 | | 100 |
| Weight of Before Testing (g) | ③ | 1123 | 1410 | 1457 | 2413 | 4698 | | 11101 |
| Number of Particles | ④ | 464 | 229 | 113 | 53 | 25 | | |
| Weight of Soft Particles (g) | ⑤ | 177 | 159 | 36 | 80 | 134 | | |
| Number of Soft Particles | ⑥ | 92 | 31 | 6 | 2 | 1 | | |
| Weight Parcentage of Soft Particles (⑤/③) ×100 (%) | ⑦ | 15.76 | 11.28 | 2.47 | 3.32 | 2.85 | | |
| Number Parcentage of Soft Particles (⑥/④) ×100 (%) | ⑧ | 19.83 | 19.49 | 5.31 | 3.77 | 4.00 | | |
| Weight Parcentage of Soft Particles in Aggregates (%) (②×⑦) / 100 | ⑨ | 1.59 | 1.43 | 0.32 | 0.72 | 1.21 | | 5.3 |

Remarks :

GEOTECHNIQUE EAST MALAYSIA SDN. BHD.

| Name of Test | SCRATCH HARDNESS OF SOFT PARTICLES IN GRAVEL | ASTM C 235 |
|---|---|---|

Name of Project Small Hydro Study For Medamit Date 4-7-1987

Sample TME-2/Test 2 Tested by K.H.F.

| Particle Size (mm) | | 10-15 | 15-20 | 20-25 | 25-40 | 40-60 | | Total |
|---|---|---|---|---|---|---|---|---|
| Weight of Each Size (g) | ① | 1017 | 1298 | 1375 | 2612 | 4625 | | 10927 |
| Weight Parcentage (%) | ② | 9.3 | 11.9 | 12.6 | 23.9 | 42.3 | | 100 |
| Weight of Before Testing (g) | ③ | - | 1298 | 1375 | 2612 | 4625 | | |
| Number of Particles | ④ | - | 187 | 93 | 51 | 33 | | |
| Weight of Soft Particles (g) | ⑤ | - | 100 | 130 | 55 | 78 | | |
| Number of Soft Particles | ⑥ | - | 17 | 11 | 1 | 1 | | |
| Weight Parcentage of Soft Particles (⑤/③) ×100 (%) | ⑦ | 7.70 | 7.70 | 9.45 | 2.11 | 1.69 | | |
| Number Parcentage of Soft Particles (⑥/④) ×100 (%) | ⑧ | - | 9.09 | 11.83 | 1.96 | 3.03 | | |
| Weight Parcentage of Soft Particles in Aggregates (②×⑦)/100 (%) | ⑨ | 0.72 | 0.92 | 1.19 | 0.50 | 0.71 | | 4.0 |

Remarks :

Average percentage of soft particles in Aggregate by weight is 4.7% (Average of two test)

GEOTECHNIQUE EAST MALAYSIA SDN. BHD.

| Name of Test | SCRATCH HARDNESS OF SOFT PARTICLES IN GRAVEL | ASTM C 235 |
|---|---|---|

Name of Project: Small Hydro Study For Medamit  Date: 6-7-1987

Sample: TME-3/Test 1  Tested by: K.H.F.

| Particle Size (mm) | | 10-15 | 15-20 | 20-25 | 25-40 | 40-60 | | Total |
|---|---|---|---|---|---|---|---|---|
| Weight of Each Size (g) | ① | 246 | 719 | 1144 | 4036 | 8581 | | 14726 |
| Weight Parcentage (%) | ② | 1.6 | 4.9 | 7.8 | 27.4 | 58.3 | | 100 |
| Weight of Before Testing (g) | ③ | - | - | - | 4036 | 8581 | | |
| Number of Particles | ④ | - | - | - | 78 | 39 | | |
| Weight of Soft Particles (g) | ⑤ | - | - | - | 279 | - | | |
| Number of Soft Particles | ⑥ | - | - | - | 6 | - | | |
| Weight Parcentage of Soft Particles (⑤/③) ×100 (%) | ⑦ | 6.91 | 6.91 | 6.91 | 6.91 | 6.91 | | |
| Number Parcentage of Soft Particles (⑥/④) ×100 (%) | ⑧ | - | - | - | 7.69 | - | | |
| Weight Parcentage of Soft Particles in Aggregates (%) (②×⑦) / 100 | ⑨ | 0.12 | 0.34 | 0.54 | 1.89 | 4.03 | | 6.9 |

Remarks :

GEOTECHNIQUE EAST MALAYSIA SDN. BHD.

| Name of Test | SCRATCH HARDNESS OF SOFT PARTICLES IN GRAVEL | ASTM C 235 |
|---|---|---|

Name of Project: Small Hydro Study For Medamit  Date: 6-7-1987

Sample: TME-3/Test 2  Tested by: K.H.F.

| Particle Size (mm) | | 10-15 | 15-20 | 20-25 | 25-40 | 40-60 | | Total |
|---|---|---|---|---|---|---|---|---|
| Weight of Each Size (g) | ① | 246 | 721 | 1144 | 4026 | 8988 | | 15125 |
| Weight Parcentage (%) | ② | 1.6 | 4.8 | 7.6 | 26.6 | 59.4 | | 100 |
| Weight of Before Testing (g) | ③ | - | - | - | 4026 | 8988 | | |
| Number of Particles | ④ | - | - | - | 60 | 43 | | |
| Weight of Soft Particles (g) | ⑤ | - | - | - | 263 | — | | |
| Number of Soft Particles | ⑥ | - | - | - | 3 | - | | |
| Weight Parcentage of Soft Particles (⑤ /③) ×100 (%) | ⑦ | 6.53 | 6.53 | 6.53 | 6.53 | 6.53 | | |
| Number Parcentage of Soft Particles (⑥ /④) ×100 (%) | ⑧ | - | - | - | 5.00 | - | | |
| Weight Parcentage of Soft Particles in Aggregates (②×⑦) / 100 (%) | ⑨ | 0.11 | 0.31 | 0.49 | 1.74 | 3.88 | | 6.5 |

Remarks :

Average percentage of soft particles in Aggregate by weight is 6.7% (Average of two test)

GEOTECHNIQUE EAST MALAYSIA SDN. BHD.

| Name of Test | SCRATCH HARDNESS OF SOFT PARTICLES IN GRAVEL | ASTM C 235 |
|---|---|---|

Name of Project Small Hydro Study For Medamit Date 8-7-1987

Sample TME-4/Test 1 Tested by K.H.F.

| Particle Size (mm) | | 10-15 | 15-20 | 20-25 | 25-40 | 40-60 | | Total |
|---|---|---|---|---|---|---|---|---|
| Weight of Each Size (g) | ① | 2570 | 3642 | 3848 | 5251 | 5534 | | 20845 |
| Weight Parcentage (%) | ② | 12.3 | 17.5 | 18.5 | 25.2 | 26.5 | | 100 |
| Weight of Before Testing (g) | ③ | 2570 | 3642 | 3848 | 5251 | 5534 | | |
| Number of Particles | ④ | 943 | 436 | 193 | 103 | 39 | | |
| Weight of Soft Particles (g) | ⑤ | 575 | 498 | 490 | 226 | 474 | | |
| Number of Soft Particles | ⑥ | 260 | 78 | 29 | 7 | 4 | | |
| Weight Parcentage of Soft Particles (⑤/③) ×100 (%) | ⑦ | 22.37 | 13.67 | 12.73 | 4.30 | 8.57 | | |
| Number Parcentage of Soft Particles (⑥/④) ×100 (%) | ⑧ | 27.57 | 17.98 | 15.03 | 6.80 | 10.26 | | |
| Weight Parcentage of Soft Particles in Aggregates (②×⑦)/100 (%) | ⑨ | 2.76 | 2.39 | 2.35 | 1.08 | 2.27 | | 10.9 |

Remarks :

GEOTECHNIQUE EAST MALAYSIA SDN. BHD.

| Name of Test | SCRATCH HARDNESS OF SOFT PARTICLES IN GRAVEL | ASTM C 235 |
|---|---|---|

Name of Project: Small Hydro Study For Medamit  Date: 8-7-1987

Sample: TME-4/Test 2  Tested by: K.H.F.

| Particle Size (mm) | | 10-15 | 15-20 | 20-25 | 25-40 | 40-60 | | Total |
|---|---|---|---|---|---|---|---|---|
| Weight of Each Size (g) | ① | 2574 | 3650 | 3854 | 5179 | 5543 | | 20800 |
| Weight Parcentage (%) | ② | 12.4 | 17.5 | 18.5 | 24.9 | 26.7 | | 100 |
| Weight of Before Testing (g) | ③ | 2574 | 3650 | 3854 | 5179 | 5543 | | |
| Number of Particles | ④ | 918 | 441 | 181 | 107 | 39 | | |
| Weight of Soft Particles (g) | ⑤ | 660 | 710 | 501 | 705 | 163 | | |
| Number of Soft Particles | ⑥ | 290 | 104 | 28 | 15 | 2 | | |
| Weight Parcentage of Soft Particles (%) (⑤ /③) ×100 | ⑦ | 25.64 | 19.45 | 13.00 | 13.61 | 2.94 | | |
| Number Parcentage of Soft Particles (%) (⑥ /④) ×100 | ⑧ | 31.59 | 23.58 | 15.47 | 14.02 | 5.13 | | |
| Weight Parcentage of Soft Particles in Aggregates (%) (②×⑦) / 100 | ⑨ | 3.17 | 3.41 | 2.41 | 3.39 | 0.78 | | 13.2 |

Remarks :

Average percentage of soft particles in Aggregate by weight is 12.1% (Average of two test)

GEOTECHNIQUE EAST MALAYSIA SDN. BHD.

| Name of Test | SCRATCH HARDNESS OF SOFT PARTICLES IN GRAVEL | ASTM C 235 |
|---|---|---|

Name of Project: Small Hydro Study For Medamit  Date: 4.7.1987

Sample: TME-5/Test 1  Tested by: K.H.F.

| Particle Size (mm) | | 10-15 | 15-20 | 20-25 | 25-40 | 40-60 | | Total |
|---|---|---|---|---|---|---|---|---|
| Weight of Each Size (g) | ① | - | - | - | - | 11489 | | 11489 |
| Weight Parcentage (%) | ② | - | - | - | - | 100 | | 100 |
| Weight of Before Testing (g) | ③ | - | - | - | - | 11489 | | |
| Number of Particles | ④ | - | - | - | - | 46 | | |
| Weight of Soft Particles (g) | ⑤ | - | - | - | - | 0 | | |
| Number of Soft Particles | ⑥ | - | - | - | - | 0 | | |
| Weight Parcentage of Soft Particles (⑤ /③) ×100 (%) | ⑦ | - | - | - | - | 0 | | |
| Number Parcentage of Soft Particles (⑥ /④) ×100 (%) | ⑧ | - | - | - | - | 0 | | |
| Weight Parcentage of Soft Particles in Aggregates (%) (②×⑦) / 100 | ⑨ | - | - | - | - | 0 | | 0.00 |

Remarks :

GEOTECHNIQUE EAST MALAYSIA SDN. BHD.

| Name of Test | SCRATCH HARDNESS OF SOFT PARTICLES IN GRAVEL | ASTM C 235 |
|---|---|---|

Name of Project Small Hydro Study For Medamit Date 4.7.1987

Sample TME-5/Test 2 Tested by K.H.F.

| Particle Size (mm) | | 10-15 | 15-20 | 20-25 | 25-40 | 40-60 | | Total |
|---|---|---|---|---|---|---|---|---|
| Weight of Each Size (g) | ① | - | - | - | - | 13905 | | 13905 |
| Weight Parcentage (%) | ② | - | - | - | - | 100 | | 100 |
| Weight of Before Testing (g) | ③ | - | - | - | - | 13905 | | |
| Number of Particles | ④ | - | - | - | - | 49 | | |
| Weight of Soft Particles (g) | ⑤ | - | - | - | - | 0 | | |
| Number of Soft Particles | ⑥ | - | - | - | - | 0 | | |
| Weight Parcentage of Soft Particles (⑤ /③) ×100 (%) | ⑦ | - | - | - | - | 0 | | |
| Number Parcentage of Soft Particles (⑥ /④) ×100 (%) | ⑧ | - | - | - | - | 0 | | |
| Weight Parcentage of Soft Particles in Aggregates (%) (②×⑦) / 100 | ⑨ | - | - | - | - | 0 | | 0.00 |

Remarks :

Average percentage of soft particles in Aggregate by weight is 0.00% (Average of two test)

GEOTECHNIQUE EAST MALAYSIA SDN. BHD.

| Name of Test | SCRATCH HARDNESS OF SOFT PARTICLES IN GRAVEL | ASTM C 235 |
|---|---|---|

Name of Project: Small Hydro Study For Medamit  Date: 6.7.1987

Sample: TME-6/Test 1  Tested by: K.H.F.

| Particle Size (mm) | | 10-15 | 15-20 | 20-25 | 25-40 | 40-60 | | Total |
|---|---|---|---|---|---|---|---|---|
| Weight of Each Size (g) | ① | 145 | 344 | 627 | 3055 | 7411 | | 11582 |
| Weight Parcentage (%) | ② | 1.25 | 2.97 | 5.41 | 26.38 | 63.99 | | 100 |
| Weight of Before Testing (g) | ③ | - | - | - | 3055 | 7411 | | |
| Number of Particles | ④ | - | - | - | 53 | 34 | | |
| Weight of Soft Particles (g) | ⑤ | - | - | - | 108 | 166 | | |
| Number of Soft Particles | ⑥ | - | - | - | 3 | 1 | | |
| Weight Parcentage of Soft Particles (⑤ /③) ×100 (%) | ⑦ | 3.54 | 3.54 | 3.54 | 3.54 | 2.24 | | |
| Number Parcentage of Soft Particles (⑥ /④) ×100 (%) | ⑧ | - | - | - | 5.66 | 2.94 | | |
| Weight Parcentage of Soft Particles in Aggregates (②×⑦) / 100 (%) | ⑨ | 0.04 | 0.11 | 0.19 | 0.93 | 1.43 | | 2.7 |

Remarks :

GEOTECHNIQUE EAST MALAYSIA SDN. BHD.

| Name of Test | SCRATCH HARDNESS OF SOFT PARTICLES IN GRAVEL | ASTM C 235 |
|---|---|---|

Name of Project Small Hydro Study For Medamit Date 6.7.1987

Sample TME-6/Test 2 Tested by K.H.F.

| Particle Size (mm) | | 10-15 | 15-20 | 20-25 | 25-40 | 40-60 | | Total |
|---|---|---|---|---|---|---|---|---|
| Weight of Each Size (g) | ① | 165 | 394 | 618 | 3057 | 7946 | | 12180 |
| Weight Parcentage (%) | ② | 1.35 | 3.23 | 5.07 | 25.10 | 65.24 | | 100 |
| Weight of Before Testing (g) | ③ | - | - | - | 3057 | 7946 | | |
| Number of Particles | ④ | | - | - | 46 | 43 | | |
| Weight of Soft Particles (g) | ⑤ | - | - | - | 70 | 0 | | |
| Number of Soft Particles | ⑥ | - | - | - | 1 | 0 | | |
| Weight Parcentage of Soft Particles (⑤/③) ×100 (%) | ⑦ | 2.29 | 2.29 | 2.29 | 2.29 | 0 | | |
| Number Parcentage of Soft Particles (⑥/④) ×100 (%) | ⑧ | - | - | - | 2.17 | 0 | | |
| Weight Parcentage of Soft Particles in Aggregates (%) (②×⑦) / 100 | ⑨ | 0.03 | 0.07 | 0.12 | 0.57 | 0 | | 0.8 |

Remarks :

Average percentage of soft particles in Aggregate by weight is 1.8% (Average of two test)

GEOTECHNIQUE EAST MALAYSIA SDN. BHD.

| Name of Test | SCRATCH HARDNESS OF SOFT PARTICLES IN GRAVEL | ASTM C 235 |
|---|---|---|

Name of Project Small Hydro Study For Medamit Date 8-7-1987

Sample TME-7/Test 1 Tested by K.H.F.

| Particle Size (mm) | | 10-15 | 15-20 | 20-25 | 25-40 | 40-60 | | Total |
|---|---|---|---|---|---|---|---|---|
| Weight of Each Size (g) | ① | - | 305 | 1934 | 6517 | 8100 | | 16856 |
| Weight Parcentage (%) | ② | - | 1.81 | 11.47 | 38.66 | 48.05 | | 100 |
| Weight of Before Testing (g) | ③ | - | - | 1934 | 6517 | 8100 | | |
| Number of Particles | ④ | - | - | 80 | 110 | 51 | | |
| Weight of Soft Particles (g) | ⑤ | - | - | 114 | 285 | 75 | | |
| Number of Soft Particles | ⑥ | - | - | 8 | 10 | 1 | | |
| Weight Parcentage of Soft Particles (⑤/③) ×100 (%) | ⑦ | - | 5.89 | 5.89 | 4.37 | 0.93 | | |
| Number Parcentage of Soft Particles (⑥/④) ×100 (%) | ⑧ | - | - | 10 | 9.09 | 1.96 | | |
| Weight Parcentage of Soft Particles in Aggregates (②×⑦)/100 (%) | ⑨ | - | 0.11 | 0.68 | 1.69 | 0.44 | | 2.9 |

Remarks :

GEOTECHNIQUE EAST MALAYSIA SDN. BHD.

| Name of Test | SCRATCH HARDNESS OF SOFT PARTICLES IN GRAVEL | ASTM C 235 |
|---|---|---|

Name of Project Small Hydro Study For Medamit Date 8-7-1987

Sample TME-7/Test 2 Tested by K.H.F.

| Particle Size (mm) | | 10-15 | 15-20 | 20-25 | 25-40 | 40-60 | | Total |
|---|---|---|---|---|---|---|---|---|
| Weight of Each Size (g) | ① | 0 | 265 | 1844 | 6471 | 7172 | | 15752 |
| Weight Parcentage (%) | ② | - | 1.68 | 11.71 | 41.08 | 45.53 | | 100 |
| Weight of Before Testing (g) | ③ | - | - | 1844 | 6471 | 7172 | | |
| Number of Particles | ④ | - | - | 74 | 101 | 41 | | |
| Weight of Soft Particles (g) | ⑤ | - | - | 135 | 95 | - | | |
| Number of Soft Particles | ⑥ | - | - | 5 | 2 | - | | |
| Weight Parcentage of Soft Particles (%) (⑤ /③) ×100 | ⑦ | - | 7.32 | 7.32 | 1.47 | 1.47 | | |
| Number Parcentage of Soft Particles (%) (⑥ /④) ×100 | ⑧ | - | - | 6.76 | 1.98 | - | | |
| Weight Parcentage of Soft Particles in Aggregates (%) (②×⑦) / 100 | ⑨ | - | 0.12 | 0.86 | 0.60 | 0.67 | | 2.3 |

Remarks :

Average percentage of soft particles in Aggregate by weight is 2.6% (Average of two test)

GEOTECHNIQUE EAST MALAYSIA SDN. BHD.

| Name of Test | Soundness of Aggregates by Use of Sodium Sulphate | ASTM C 88 |
|---|---|---|

Name of Project: Small Hydro Study For Medamit  Date: 3.7.1987

Sample: TME-1  Tested by: L.S.M.

## Soundness of Sand

| Particle Size (mm) | | | | | | | | Total |
|---|---|---|---|---|---|---|---|---|
| Weight of Each Size (g) | | | | | | | | |
| Grading of Original Sample (%) | ① | | | | | | | |
| Weight of Before Testing (g) | ② | | | | | | | |
| Weight of After Testing (g) | ③ | | | | | | | |
| Weight Parcentage of Each Size Loss Particle (1 − ③/②) × 100 (%) | ④ | | | | | | | |
| Weight Percentage of Loss Aggregates (① × ④/100) (%) | ⑤ | | | | | | | |

## Soundness of Gravel

| Particle Size (mm) | | 10-15 | 15-20 | 20-25 | 25-40 | 40-60 | 60-80 | Total |
|---|---|---|---|---|---|---|---|---|
| Weight of Each Size (g) | | 725.6 | 1093.6 | 2400.7 | 5661.0 | 14092.4 | 4901.9 | 28875.2 |
| Grading of Orginal Sample (%) | ① | 2.5 | 3.8 | 8.3 | 19.6 | 48.8 | 17.0 | 100 |
| Weight of Before Testing (g) | ② | - | - | 1001.7 | 1504.2 | 2995.7 | 3250.5 | |
| Weight of After Testing (g) | ③ | - | - | 987.7 | 1475.8 | 2921.3 | 3247.7 | |
| Weight Parcentage of Each Size Loss Particle (1 − ③/②) × 100 (%) | ④ | 1.4 | 1.4 | 1.4 | 1.9 | 2.5 | 0.1 | |
| Weight Percentage of Loss Aggregates (① × ④/100) (%) | ⑤ | 0.04 | 0.05 | 0.12 | 0.37 | 1.22 | 0.02 | 1.8 |

Remarks : Sieves of 1.18mm, 2.36mm, 14.0mm, 19.0mm, 25.4mm, 38.1mm, 63.5mm and 76.2mm were used instead of 1.2mm, 2.5mm, 15.0mm, 20.0mm, 25.0mm, 40.0mm, 60.0mm and 80.0mm.

GEOTECHNIQUE EAST MALAYSIA SDN. BHD.

| Name of Test | Soundness of Aggregates by Use of Sodium Sulphate | ASTM C 88 |
|---|---|---|

Name of Project: Small Hydro Study For Medamit — Date: 3.7.1987

Sample: TME-4 — Tested by: L.S.M.

## Soundness of Sand

| Particle Size (mm) | | 0.3-0.6 | 0.6-1.18 | 1.18-2.36 | 2.36-5.0 | 5.0-10.0 | | Total |
|---|---|---|---|---|---|---|---|---|
| Weight of Each Size (g) | | 834.8 | 980.9 | 565.8 | 654.5 | 1304.8 | | 4340.8 |
| Grading of Original Sample (%) | ① | 19.2 | 22.6 | 13.0 | 15.1 | 30.1 | | 100 |
| Weight of Before Testing (g) | ② | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | | |
| Weight of After Testing (g) | ③ | 90.4 | 75.6 | 85.9 | 82.7 | 86.6 | | |
| Weight Parcentage of Each Size Loss Particle (1 − ③/②) × 100 (%) | ④ | 9.6 | 24.4 | 14.1 | 17.3 | 13.4 | | |
| Weight Percentage of Loss Aggregates (① × ④/100) (%) | ⑤ | 1.84 | 5.51 | 1.83 | 2.61 | 4.03 | | 15.8 |

## Soundness of Gravel

| Particle Size (mm) | | 10-15 | 15-20 | 20-25 | 25-40 | 40-60 | 60-80 | Total |
|---|---|---|---|---|---|---|---|---|
| Weight of Each Size (g) | | 1264.0 | 2772.9 | 4737.5 | 7878.9 | 7317.2 | 1066.1 | 25036.6 |
| Grading of Orginal Sample (%) | ① | 5.0 | 11.1 | 18.9 | 31.5 | 29.2 | 4.3 | 100 |
| Weight of Before Testing (g) | ② | 501.2 | 749.3 | 1006.4 | 1513.0 | 3031.0 | - | |
| Weight of After Testing (g) | ③ | 431.7 | 666.6 | 914.3 | 1336.0 | 2954.0 | - | |
| Weight Parcentage of Each Size Loss Particle (1 − ③/②) × 100 (%) | ④ | 13.9 | 11.0 | 9.2 | 11.7 | 2.5 | 2.5 | |
| Weight Percentage of Loss Aggregates (① × ④/100) (%) | ⑤ | 0.70 | 1.22 | 1.74 | 3.69 | 0.73 | 0.11 | 8.2 |

Remarks : Sieves of 1.18mm, 2.36mm, 14.0mm, 19.0mm, 25.4mm, 38.1mm, 63.5mm and 76.2mm were used instead of 1.2mm, 2.5mm, 15.0mm, 20.0mm, 25.0mm, 40.0mm, 60.0mm and 80.0mm.

GEOTECHNIQUE EAST MALAYSIA SDN. BHD.

| Name of Test | Soundness of Aggregates by Use of Sodium Sulphate | ASTM C 88 |
|---|---|---|

Name of Project: Small Hydro Study For Medamit  Date: 3.7.1987

Sample: TME-7  Tested by: L.S.M.

Soundness of Sand

| Particle Size (mm) | | 0.3-0.6 | 0.6-1.18 | 1.18-2.36 | 2.36-5.0 | 5.0-10.0 | | Total |
|---|---|---|---|---|---|---|---|---|
| Weight of Each Size (g) | | 1368.7 | 768.7 | 191.0 | 15.0 | 0 | | 2343.4 |
| Grading of Original Sample (%) | ① | 58.4 | 32.8 | 8.2 | 0.6 | 0 | | 100 |
| Weight of Before Testing (g) | ② | 100.0 | 100.0 | 100.0 | - | - | | |
| Weight of After Testing (g) | ③ | 81.8 | 71.1 | 73.6 | - | - | | |
| Weight Parcentage of Each Size Loss Particle (1 −③/②)×100 (%) | ④ | 18.2 | 28.9 | 26.4 | 26.4 | - | | |
| Weight Percentage of Loss Aggregates (① × ④/100) (%) | ⑤ | 10.63 | 9.48 | 2.16 | 0.16 | - | | 22.4 |

Soundness of Gravel

| Particle Size (mm) | | 10-15 | 15-20 | 20-25 | 25-40 | 40-60 | 60-80 | Total |
|---|---|---|---|---|---|---|---|---|
| Weight of Each Size (g) | | 0 | 160.6 | 652.4 | 6653.5 | 12559.4 | 1789.0 | 21814.9 |
| Grading of Urginal Sample (%) | ① | 0 | 0.7 | 3.0 | 30.5 | 57.6 | 8.2 | 100 |
| Weight of Before Testing (g) | ② | - | - | - | 1500.1 | 3054.0 | 1789.0 | |
| Weight of After Testing (g) | ③ | - | - | - | 1495.5 | 3052.1 | 1787.2 | |
| Weight Parcentage of Each Size Loss Particle (1 −③/②)×100 (%) | ④ | - | 0.3 | 0.3 | 0.3 | 0.1 | 0.1 | |
| Weight Percentage of Loss Aggregates (① × ④/100) (%) | ⑤ | - | 0.00 | 0.01 | 0.09 | 0.06 | 0.01 | 0.2 |

Remarks : Sieves of 1.18mm, 2.36mm, 14.0mm, 19.0mm, 25.4mm, 38.1mm, 63.5mm and 76.2mm were used instead of 1.2mm, 2.5mm, 15.0mm, 20.0mm, 25.0mm, 40.0mm, 60.0mm and 80.0mm.

GEOTECHNIQUE EAST MALAYSIA SDN. BHD.

| Name of Test | ABRASION TEST OF GRAVEL (USING THE LOS ANGELES MACHINE) | ASTM C 131 & ASTM C 535 |
|---|---|---|

Name of Project: Small Hydro Study For Medamit  Date: 10.7.1987

Sample: TME-1/Test 1 (Grading A)  Tested by: K.H.F.

| Sieve (mm) | | Weight of Each Size | Weight Percentage | Grading | Number of Spheres | ① Weight of Before Testing |
|---|---|---|---|---|---|---|
| Passing | Retained | (g) | (%) | | | (g) |
| 2.5 | | | | | | |
| 5 | 2.5 | | | | | |
| 10 | 5 | | | | | |
| 15 | 10 | | | A | 12 | 1250 |
| 20 | 15 | | | A | 12 | 1250 |
| 25 | 20 | | | A | 12 | 1250 |
| 40 | 25 | | | A | 12 | 1250 |
| 50 | 40 | | | | | |
| 60 | 50 | | | | | |
| 80 | 60 | | | | | |
| Total: | | | | | | 5000 |

| | | |
|---|---|---|
| ② Weight of Retained on 1.7mm Sieve After Testing (g) | | 3563 |
| ③ Weight of Abrasion loss | ①−② (g) | 1437 |
| ④ Percent of Abrasion loss | $\frac{③}{①} \times 100$ (%) | 28.7 |

Remarks:

ASTM C131 grading by A
Mean of Abrasion loss percent of TME-1 = 13.6%

GEOTECHNIQUE EAST MALAYSIA SDN. BHD.

| Name of Test | ABRASION TEST OF GRAVEL (USING THE LOS ANGELES MACHINE) | ASTM C 131 & ASTM C 535 |
|---|---|---|

Name of Project: Small Hydro Study For Medamit  Date: 28.8.1987

Sample: TME-1/Test 2 (Grading A)  Tested by: K.H.F.

| Sieve (mm) | | Weight of Each Size | Weight Percentage | Grading | Number of Spheres | ① Weight of Before Testing |
|---|---|---|---|---|---|---|
| Passing | Retained | (g) | (%) | | | (g) |
| 2.5 | | | | | | |
| 5 | 2.5 | | | | | |
| 10 | 5 | | | | | |
| 15 | 10 | | | A | 12 | 725 |
| 20 | 15 | | | A | 12 | 1665 |
| 25 | 20 | | | A | 12 | 1375 |
| 40 | 25 | | | A | 12 | 1235 |
| 50 | 40 | | | | | |
| 60 | 50 | | | | | |
| 80 | 60 | | | | | |
| Total: | | | | | | 5000 |

| | | | |
|---|---|---|---|
| ② Weight of Retained on 1.7mm Sieve After Testing (g) | | | 3742 |
| ③ Weight of Abrasion loss | ①−② | (g) | 1258 |
| ④ Percent of Abrasion loss | $\frac{③}{①} \times 100$ | (%) | 25.2 |

Remarks:

ASTM C131 grading by A

GEOTECHNIQUE EAST MALAYSIA SDN. BHD.

| Name of Test | ABRASION TEST OF GRAVEL (USING THE LOS ANGELES MACHINE) | ASTM C 131 & ASTM C 535 |
|---|---|---|

Name of Project: Small Hydro Study For Medamit  Date: 9.7.1987

Sample: TME-1/Test 1 (Grading E)  Tested by: K.H.F.

| Sieve (mm) | | Weight of Each Size | Weight Percentage | Grading | Number of Spheres | ① Weight of Before Testing |
|---|---|---|---|---|---|---|
| Passing | Retained | (g) | (%) | | | (g) |
| 2.5 | | | | | | |
| 5 | 2.5 | | | | | |
| 10 | 5 | | | | | |
| 15 | 10 | | | | | |
| 20 | 15 | | | | | |
| 25 | 20 | | | | | |
| 40 | 25 | | | | | |
| 50 | 40 | | | E | 12 | 2500 |
| 60 | 50 | | | E | 12 | 2513 |
| 80 | 60 | | | E | 12 | 5033 |
| Total: | | | | | | 10,046 |

| | | | |
|---|---|---|---|
| ② Weight of Retained on 1.7mm Sieve After Testing (g) | | | 9221 |
| ③ Weight of Abrasion loss | ①−② | (g) | 825 |
| ④ Percent of Abrasion loss | $\frac{③}{①} \times 100$ | (%) | 8.2 |

Remarks:

JIS A1121 grading by E
(The same as ASTM C535 grading 1)

GEOTECHNIQUE EAST MALAYSIA SDN. BHD.

| Name of Test | ABRASION TEST OF GRAVEL (USING THE LOS ANGELES MACHINE) | ASTM C 131 & ASTM C 535 |
|---|---|---|

Name of Project: Small Hydro Study For Medamit  Date: 9.7.1987

Sample: TME-1/Test 2 (Grading E)  Tested by: K.H.F.

| Sieve (mm) | | Weight of Each Size | Weight Percentage | Grading | Number of Spheres | ① Weight of Before Testing |
|---|---|---|---|---|---|---|
| Passing | Retained | (g) | (%) | | | (g) |
| 2.5 | | | | | | |
| 5 | 2.5 | | | | | |
| 10 | 5 | | | | | |
| 15 | 10 | | | | | |
| 20 | 15 | | | | | |
| 25 | 20 | | | | | |
| 40 | 25 | | | | | |
| 50 | 40 | | | E | 12 | 2500 |
| 60 | 50 | | | E | 12 | 2505 |
| 80 | 60 | | | E | 12 | 5000 |
| Total: | | | | | | 10,005 |

| | | |
|---|---|---|
| ② Weight of Retained on 1.7mm Sieve After Testing (g) | | 9446 |
| ③ Weight of Abrasion loss | ①−② (g) | 559 |
| ④ Percent of Abrasion loss | $\frac{③}{①} \times 100$ (%) | 5.6 |

Remarks:

JIS A1121 grading by E
(The same as ASTM C535 grading 1)

GEOTECHNIQUE EAST MALAYSIA SDN. BHD.

| Name of Test | ABRASION TEST OF GRAVEL (USING THE LOS ANGELES MACHINE) | ASTM C 131 & ASTM C 535 |
|---|---|---|

Name of Project: Small Hydro Study For Medamit  Date: 10.7.1987

Sample: TME-4/Test 1 (Grading A)  Tested by: K.H.F.

| Sieve (mm) | | Weight of Each Size | Weight Percentage | Grading | Number of Spheres | ① Weight of Before Testing |
|---|---|---|---|---|---|---|
| Passing | Retained | (g) | (%) | | | (g) |
| 2.5 | | | | | | |
| 5 | 2.5 | | | | | |
| 10 | 5 | | | | | |
| 15 | 10 | | | A | 12 | 1250 |
| 20 | 15 | | | A | 12 | 1250 |
| 25 | 20 | | | A | 12 | 1250 |
| 40 | 25 | | | A | 12 | 1250 |
| 50 | 40 | | | | | |
| 60 | 50 | | | | | |
| 80 | 60 | | | | | |
| Total: | | | | | | 5000 |

| | | |
|---|---|---|
| ② Weight of Retained on 1.7mm Sieve After Testing (g) | | 3367 |
| ③ Weight of Abrasion loss | ①−② (g) | 1633 |
| ④ Percent of Abrasion loss | $\frac{③}{①} \times 100$ (%) | 32.7 |

Remarks:

ASTM C,131 grading by A
Mean of Abrasion loss percent of TME-4 = 21.0%

GEOTECHNIQUE EAST MALAYSIA SDN. BHD.

| Name of Test | ABRASION TEST OF GRAVEL (USING THE LOS ANGELES MACHINE) | ASTM C 131 & ASTM C 535 |
|---|---|---|

Name of Project: Small Hydro Study For Medamit  Date: 10.7.1987

Sample: TME-4/Test 2 (Grading A)  Tested by: K.H.F.

| Sieve (mm) | | Weight of Each Size | Weight Percentage | Grading | Number of Spheres | ① Weight of Before Testing |
|---|---|---|---|---|---|---|
| Passing | Retained | (g) | (%) | | | (g) |
| 2.5 | | | | | | |
| 5 | 2.5 | | | | | |
| 10 | 5 | | | | | |
| 15 | 10 | | | A | 12 | 1250 |
| 20 | 15 | | | A | 12 | 1250 |
| 25 | 20 | | | A | 12 | 1250 |
| 40 | 25 | | | A | 12 | 1250 |
| 50 | 40 | | | | | |
| 60 | 50 | | | | | |
| 80 | 60 | | | | | |
| Total: | | | | | | 5000 |

| | | | |
|---|---|---|---|
| ② Weight of Retained on 1.7mm Sieve After Testing (g) | | | 3426 |
| ③ Weight of Abrasion loss | ①−② | (g) | 1574 |
| ④ Percent of Abrasion loss | $\frac{③}{①} \times 100$ | (%) | 31.5 |

Remarks:

ASTM C131 grading by A

GEOTECHNIQUE EAST MALAYSIA SDN. BHD.

| Name of Test | ABRASION TEST OF GRAVEL (USING THE LOS ANGELES MACHINE) | ASTM C 131 & ASTM C 535 |
|---|---|---|

Name of Project: Small Hydro Study For Medamit  Date: 10.7.1987

Sample: TME-4/Test 1 (Grading C)  Tested by: K.H.F.

| Sieve (mm) | | Weight of Each Size | Weight Percentage | Grading | Number of Spheres | ① Weight of Before Testing |
|---|---|---|---|---|---|---|
| Passing | Retained | (g) | (%) | | | (g) |
| 2.5 | | | | | | |
| 5 | 2.5 | | | | | |
| 10 | 5 | | | C | 8 | 2500 |
| 15 | 10 | | | C | 8 | 2500 |
| 20 | 15 | | | | | |
| 25 | 20 | | | | | |
| 40 | 25 | | | | | |
| 50 | 40 | | | | | |
| 60 | 50 | | | | | |
| 80 | 60 | | | | | |
| Total: | | | | | | 5000 |

| | | |
|---|---|---|
| ② Weight of Retained on 1.7mm Sieve After Testing (g) | | 3482 |
| ③ Weight of Abrasion loss | ①−② (g) | 1518 |
| ④ Percent of Abrasion loss | $\frac{③}{①} \times 100$ (%) | 30.4 |

Remarks:

ASTM grading by C

GEOTECHNIQUE EAST MALAYSIA SDN. BHD.

| Name of Test | ABRASION TEST OF GRAVEL (USING THE LOS ANGELES MACHINE) | ASTM C 131 & ASTM C 535 |
|---|---|---|

Name of Project: Small Hydro Study For Medamit  Date: 28.8.1987

Sample: TME-4/Test 2 (Grading C)  Tested by: K.H.F.

| Sieve (mm) | | Weight of Each Size | Weight Percentage | Grading | Number of Spheres | ① Weight of Before Testing |
|---|---|---|---|---|---|---|
| Passing | Retained | (g) | (%) | | | (g) |
| 2.5 | | | | | | |
| 5 | 2.5 | | | | | |
| 10 | 5 | | | C | 8 | 2500 |
| 15 | 10 | | | C | 8 | 2500 |
| 20 | 15 | | | | | |
| 25 | 20 | | | | | |
| 40 | 25 | | | | | |
| 50 | 40 | | | | | |
| 60 | 50 | | | | | |
| 80 | 60 | | | | | |
| Total: | | | | | | 5000 |

| | | | |
|---|---|---|---|
| ② Weight of Retained on 1.7mm Sieve After Testing (g) | | | 3496 |
| ③ Weight of Abrasion loss | ①−② | (g) | 1504 |
| ④ Percent of Abrasion loss | $\frac{③}{①} \times 100$ | (%) | 30.1 |

Remarks:
ASTM C131 grading by C

GEOTECHNIQUE EAST MALAYSIA SDN. BHD.

| Name of Test | ABRASION TEST OF GRAVEL (USING THE LOS ANGELES MACHINE) | ASTM C 131 & ASTM C 535 |
|---|---|---|

Name of Project: Small Hydro Study For Medamit  Date: 9.7.1987

Sample: TME-4/Test 1 (Grading E)  Tested by: K.H.F.

| Sieve (mm) | | Weight of Each Size | Weight Percentage | Grading | Number of Spheres | ① Weight of Before Testing |
|---|---|---|---|---|---|---|
| Passing | Retained | (g) | (%) | | | (g) |
| 2.5 | | | | | | |
| 5 | 2.5 | | | | | |
| 10 | 5 | | | | | |
| 15 | 10 | | | | | |
| 20 | 15 | | | | | |
| 25 | 20 | | | | | |
| 40 | 25 | | | | | |
| 50 | 40 | | | E | 12 | 2505 |
| 60 | 50 | | | E | 12 | 2516 |
| 80 | 60 | | | E | 12 | 5000 |
| Total: | | | | | | 10,021 |

| | | |
|---|---|---|
| ② Weight of Retained on 1.7mm Sieve After Testing (g) | | 8958 |
| ③ Weight of Abrasion loss | ①−② (g) | 1063 |
| ④ Percent of Abrasion loss | $\frac{③}{①} \times 100$ (%) | 10.6 |

Remarks:

JIS A1121 grading by E
(The same as ASTM C535 grading 1)

GEOTECHNIQUE EAST MALAYSIA SDN. BHD.

| Name of Test | ABRASION TEST OF GRAVEL (USING THE LOS ANGELES MACHINE) | ASTM C 131 & ASTM C 535 |
|---|---|---|

Name of Project: Small Hydro Study For Medamit  Date: 9.7.1987

Sample: TME-4/Test 2 (Grading E)  Tested by: K.H.F.

| Sieve (mm) | | Weight of Each Size | Weight Percentage | Grading | Number of Spheres | ① Weight of Before Testing |
|---|---|---|---|---|---|---|
| Passing | Retained | (g) | (%) | | | (g) |
| 2.5 | | | | | | |
| 5 | 2.5 | | | | | |
| 10 | 5 | | | | | |
| 15 | 10 | | | | | |
| 20 | 15 | | | | | |
| 25 | 20 | | | | | |
| 40 | 25 | | | | | |
| 50 | 40 | | | E | 12 | 2511 |
| 60 | 50 | | | E | 12 | 2515 |
| 80 | 60 | | | E | 12 | 5000 |
| Total: | | | | | | 10,026 |

| | | | |
|---|---|---|---|
| ② Weight of Retained on 1.7mm Sieve After Testing (g) | | | 8927 |
| ③ Weight of Abrasion loss | ①−② | (g) | 1099 |
| ④ Percent of Abrasion loss | $\frac{③}{①} \times 100$ | (%) | 11.0 |

Remarks:

JIS A1121 grading by E
(The same as ASTM C535 grading 1)

GEOTECHNIQUE EAST MALAYSIA SDN. BHD.

| Name of Test | ABRASION TEST OF GRAVEL (USING THE LOS ANGELES MACHINE) | ASTM C 131 & ASTM C 535 |
|---|---|---|

Name of Project: Small Hydro Study For Medamit  Date: 9.7.1987

Sample: TME-7/Test 1 (Grading A)  Tested by: K.H.F.

| Sieve (mm) | | Weight of Each Size | Weight Percentage | Grading | Number of Spheres | ① Weight of Before Testing |
|---|---|---|---|---|---|---|
| Passing | Retained | (g) | (%) | | | (g) |
| 2.5 | | | | | | |
| 5 | 2.5 | | | | | |
| 10 | 5 | | | | | |
| 15 | 10 | | | A | 12 | 1250 |
| 20 | 15 | | | A | 12 | 1250 |
| 25 | 20 | | | A | 12 | 1250 |
| 40 | 25 | | | A | 12 | 1250 |
| 50 | 40 | | | | | |
| 60 | 50 | | | | | |
| 80 | 60 | | | | | |
| Total: | | | | | | 5000 |

| | | |
|---|---|---|
| ② Weight of Retained on 1.7mm Sieve After Testing (g) | | 4126 |
| ③ Weight of Abrasion loss | ①−② (g) | 874 |
| ④ Percent of Abrasion loss | $\frac{③}{①} \times 100$ (%) | 17.5 |

Remarks:

ASTM C131 grading by A

Mean of Abrasion loss percent of TME-7 = 10.3%

GEOTECHNIQUE EAST MALAYSIA SDN. BHD.

| Name of Test | ABRASION TEST OF GRAVEL (USING THE LOS ANGELES MACHINE) | ASTM C 131 & ASTM C 535 |
|---|---|---|

Name of Project: Small Hydro Study For Medamit  Date: 28.8.1987

Sample: TME-7/Test 2 (Grading A)  Tested by: K.H.F.

| Sieve (mm) | | Weight of Each Size | Weight Percentage | Grading | Number of Spheres | ① Weight of Before Testing |
|---|---|---|---|---|---|---|
| Passing | Retained | (g) | (%) | | | (g) |
| 2.5 | | | | | | |
| 5 | 2.5 | | | | | |
| 10 | 5 | | | | | |
| 15 | 10 | | | A | 12 | 127 |
| 20 | 15 | | | A | 12 | 373 |
| 25 | 20 | | | A | 12 | 3109 |
| 40 | 25 | | | A | 12 | 1391 |
| 50 | 40 | | | | | |
| 60 | 50 | | | | | |
| 80 | 60 | | | | | |
| Total: | | | | | | 5000 |

| | | |
|---|---|---|
| ② Weight of Retained on 1.7mm Sieve After Testing (g) | | 4174 |
| ③ Weight of Abrasion loss | ①−② (g) | 826 |
| ④ Percent of Abrasion loss | $\frac{③}{①} \times 100$ (%) | 16.5 |

Remarks:

ASTM C131 grading by A

GEOTECHNIQUE EAST MALAYSIA SDN. BHD.

| Name of Test | ABRASION TEST OF GRAVEL (USING THE LOS ANGELES MACHINE) | ASTM C 131 & ASTM C 535 |
|---|---|---|

Name of Project: Small Hydro Study For Medamit  Date: 6.7.1987

Sample: TME-7/Test 1 (Grading E)  Tested by: K.H.F.

| Sieve (mm) | | Weight of Each Size | Weight Percentage | Grading | Number of Spheres | ① Weight of Before Testing |
|---|---|---|---|---|---|---|
| Passing | Retained | (g) | (%) | | | (g) |
| 2.5 | | | | | | |
| 5 | 2.5 | | | | | |
| 10 | 5 | | | | | |
| 15 | 10 | | | | | |
| 20 | 15 | | | | | |
| 25 | 20 | | | | | |
| 40 | 25 | | | | | |
| 50 | 40 | | | E | 12 | 2500 |
| 60 | 50 | | | E | 12 | 2502 |
| 80 | 60 | | | E | 12 | 5000 |
| Total: | | | | | | 10,002 |

| | | |
|---|---|---|
| ② Weight of Retained on 1.7mm Sieve After Testing (g) | | 9114 |
| ③ Weight of Abrasion loss | ①−② (g) | 888 |
| ④ Percent of Abrasion loss | $\frac{③}{①} \times 100$ (%) | 9.0 |

Remarks:

JIS A1121 grading by E
(The same as ASTM C535 grading 1)

GEOTECHNIQUE EAST MALAYSIA SDN. BHD.

| Name of Test | ABRASION TEST OF GRAVEL (USING THE LOS ANGELES MACHINE) | ASTM C 131 & ASTM C 535 |
|---|---|---|

Name of Project: Small Hydro Study For Medamit  Date: 6.7.1987

Sample: TME-7/Test 2 (Grading E)  Tested by: K.H.F.

| Sieve (mm) | | Weight of Each Size | Weight Percentage | Grading | Number of Spheres | ① Weight of Before Testing |
|---|---|---|---|---|---|---|
| Passing | Retained | (g) | (%) | | | (g) |
| 2.5 | | | | | | |
| 5 | 2.5 | | | | | |
| 10 | 5 | | | | | |
| 15 | 10 | | | | | |
| 20 | 15 | | | | | |
| 25 | 20 | | | | | |
| 40 | 25 | | | | | |
| 50 | 40 | | | E | 12 | 2500 |
| 60 | 50 | | | E | 12 | 2500 |
| 80 | 60 | | | E | 12 | 5000 |
| Total: | | | | | | 10,000 |

| | | | |
|---|---|---|---|
| ② Weight of Retained on 1.7mm Sieve After Testing (g) | | | 9498 |
| ③ Weight of Abrasion loss | ①−② | (g) | 502 |
| ④ Percent of Abrasion loss | $\frac{③}{①} \times 100$ | (%) | 5.0 |

Remarks:

JIS A1121 grading by E
(The same as ASTM C535 grading 1)

GEOTECHNIQUE EAST MALAYSIA SDN. BHD.

| Name of Test | UNIT WEIGHT TEST OF AGGREGATES ( SAND ) | ASTM C 29 |
|---|---|---|

Name of Project: Small Hydro Study For Medamit — Date: 17.6.1987

Sample: TME-4 — Tested by: B.C.L.

Inside Diameter of Mold: 15 cm — Volume ①: 2305 $cm^3$

Number of Blows: 25 — Layers: 3

Moisture Condition of Sample: 9.46 %

Specific Gravity(SSD) ②: 2.34 — Absorption ③: 4.13 %

| Specimen NO. | | | 1 | 2 | Mean Value |
|---|---|---|---|---|---|
| Date of Specimen Made | | | 17.6.1987 | 17.6.1987 | |
| Mold No. | | | | | |
| Weight of (Specimen + Mold) (g) | ④ | | 12,000 | 12,000 | |
| Weight of Mold (g) | ⑤ | | 9,000 | 9,000 | |
| Weight of Specimen (g) | ⑥ | ④−⑤ | 3,000 | 3,000 | |
| Unit Weight ($t/m^3$) | ⑦ | ⑥/① | 1.302 | 1.302 | 1.302 |
| Solid Volume Percentage (%) | ⑧ | $\frac{⑦*(100+③)}{②}$ | 57.9 | 57.9 | 57.9 |
| Void Ratio (%) | ⑨ | 100−⑧ | 42.1 | 42.1 | 42.1 |

Remarks :

GEOTECHNIQUE EAST MALAYSIA SDN. BHD.

| Name of Test | UNIT WEIGHT TEST OF AGGREGATES ( SAND ) | ASTM C 29 |
|---|---|---|

Name of Project: Small Hydro Study For Medamit — Date: 18.6.1987

Sample: TME-7 — Tested by: B.C.L.

Inside Diameter of Mold: 15 cm — Volume ①: 2305 $cm^3$

Number of Blows: 25 — Layers: 3

Moisture Condition of Sample: 17.50 %

Specific Gravity(SSD) ②: 2.36 — Absorption ③: 5.51 %

| Specimen NO. | | | 1 | 2 | Mean Value |
|---|---|---|---|---|---|
| Date of Specimen Made | | | 18.6.1987 | 18.6.1987 | |
| Mold No. | | | | | |
| Weight of (Specimen + Mold) (g) | ④ | | 12,000 | 12,300 | |
| Weight of Mold (g) | ⑤ | | 9,000 | 9,000 | |
| Weight of Specimen (g) | ⑥ | ④−⑤ | 3,000 | 3,300 | |
| Unit Weight ($t/m^3$) | ⑦ | ⑥/① | 1.302 | 1.432 | 1.367 |
| Solid Volume Percentage (%) | ⑧ | $\frac{⑦*(100+③)}{②}$ | 58.2 | 64.0 | 61.1 |
| Void Ratio (%) | ⑨ | 100−⑧ | 41.8 | 36.0 | 38.9 |

Remarks :

GEOTECHNIQUE EAST MALAYSIA SDN. BHD.

| Name of Test | UNIT WEIGHT TEST OF AGGREGATES ( GRAVEL ) | ASTM C 29 |
|---|---|---|

Name of Project: Small Hydro Study For Medamit — Date: 17.6.1987

Sample: TME-1 — Tested by: B.C.L.

Inside Diameter of Mold: 30 cm — Volume ①: 21500 $cm^3$

Number of Blows: 25 — Layers: 3

Moisture Condition of Sample: 4.62 %

Specific Gravity(SSD) ②: 2.56 — Absorption ③: 1.39 %

| Specimen NO. | | | 1 | 2 | Mean Value |
|---|---|---|---|---|---|
| Date of Specimen Made | | | 17.6.1987 | 17.6.1987 | |
| Mold No. | | | | | |
| Weight of (Specimen + Mold) | (g) | ④ | 48,500 | 47,500 | |
| Weight of Mold | (g) | ⑤ | 10,000 | 10,000 | |
| Weight of Specimen | (g) | ⑥ | ④−⑤ | 38,500 | 37,500 | |
| Unit Weight | ($t/m^3$) | ⑦ | ⑥/① | 1.791 | 1.744 | 1.768 |
| Solid Volume Percentage | (%) | ⑧ | $\frac{⑦*(100+③)}{②}$ | 70.9 | 69.1 | 70.0 |
| Void Ratio | (%) | ⑨ | 100−⑧ | 29.1 | 30.9 | 30.0 |

Remarks :

GEOTECHNIQUE EAST MALAYSIA SDN. BHD.

| Name of Test | UNIT WEIGHT TEST OF AGGREGATES ( GRAVEL ) | ASTM C 29 |
|---|---|---|

Name of Project: Small Hydro Study For Medamit — Date: 17.6.1987

Sample: TME-4 — Tested by: B.G.L.

Inside Diameter of Mold: 30 cm — Volume ①: 21500 $cm^3$

Number of Blows: 25 — Layers: 3

Moisture Condition of Sample: 6.50 %

Specific Gravity(SSD) ②: 2.57 — Absorption ⑤: 1.70 %

| Specimen NO. | | | 1 | 2 | Mean Value |
|---|---|---|---|---|---|
| Date of Specimen Made | | | 17.6.1987 | 17.6.1987 | |
| Mold No. | | | | | |
| Weight of (Specimen + Mold) (g) | ④ | | 48,500 | 48,000 | |
| Weight of Mold (g) | ⑤ | | 10,000 | 10,000 | |
| Weight of Specimen (g) | ⑥ | ④−⑤ | 38,500 | 38,000 | |
| Unit Weight ($t/m^3$) | ⑦ | ⑥/① | 1.791 | 1.767 | 1.779 |
| Solid Volume Percentage (%) | ⑧ | $\frac{⑦*(100+⑤)}{②}$ | 70.9 | 69.9 | 70.4 |
| Void Ratio (%) | ⑨ | 100−⑧ | 29.1 | 30.1 | 29.6 |

Remarks :

GEOTECHNIQUE EAST MALAYSIA SDN. BHD.

| Name of Test | UNIT WEIGHT TEST OF AGGREGATES ( GRAVEL ) | ASTM C 29 |
|---|---|---|

Name of Project: Small Hydro Study For Medamit — Date: 18.6.1987

Sample: TME-7 — Tested by: B.C.L.

Inside Diameter of Mold: 30 cm — Volume ①: 21500 $cm^3$

Number of Blows: 25 — Layers: 3

Moisture Condition of Sample: 4.15 %

Specific Gravity(SSD) ②: 2.59 — Absorption ③: 1.01 %

| Specimen NO. | | | 1 | 2 | Mean Value |
|---|---|---|---|---|---|
| Date of Specimen Made | | | 18.6.1987 | 18.6.1987 | |
| Mold No. | | | | | |
| Weight of (Specimen + Mold) (g) | ④ | | 48,000 | 47,500 | |
| Weight of Mold (g) | ⑤ | | 10,000 | 10,000 | |
| Weight of Specimen (g) | ⑥ | ④−⑤ | 38,000 | 37,500 | |
| Unit Weight ($t/m^3$) | ⑦ | ⑥／① | 1.767 | 1.744 | 1.756 |
| Solid Volume Percentage (%) | ⑧ | $\frac{⑦*(100+③)}{②}$ | 68.9 | 68.0 | 68.5 |
| Void Ratio (%) | ⑨ | 100−⑧ | 31.1 | 32.0 | 31.6 |

Remarks :

GEOTECHNIQUE EAST MALAYSIA SDN. BHD.

| Name of Test | COMPRESSIVE STRENGTH | ASTM D 2938 |
|---|---|---|

Name of Project: Small Hydro Study For Medamit — Date: 3.9.1987

Sample: BME-1 — Tested by: C. H. Wang

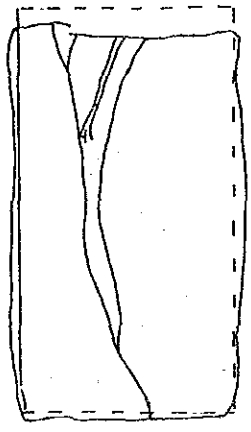
Moisture Condition of Sample: 0.53 % (In-Situ)

Specific Gravity: - — Unit Weight : 2.63 Mg/$m^3$ — Absorption:

Rate of loading: 90 KN Per Minute — Rock Type: SANDSTONE

| Sample No | Depth | Diameter (cm) | Height (cm) | Compressive Strength ($kg/cm^2$) |
|---|---|---|---|---|
| BME-1 | 15.50 - 15.80m | 5.40 | 10.25 | 499.76 |
| | | | | |
| | | | | |
| Mean Value | | | | |

Remarks :



Failure along weak subvertical plane

## GEOTECHNIQUE EAST MALAYSIA SDN. BHD.

| Name of Test | COMPRESSIVE STRENGTH | ASTM D 2938 |
|---|---|---|

Name of Project: Small Hydro Study For Medamit — Date: 3.9.1987

Sample: BME-2 — Tested by: C. H. Wang

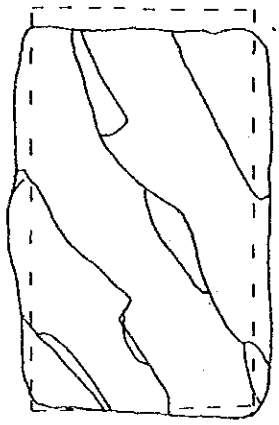
Moisture Condition of Sample: 0.29 % (In-Situ)

Specific Gravity: - Unit Weight : 2.69 $Mg/m^3$ — Absorption:

Rate of loading: 90 KN Per Minute — Rock Type: SHALE

| Sample No | Depth | Diameter (cm) | Height (cm) | Compressive Strength ($kg/cm^2$) |
|---|---|---|---|---|
| BME-2 | 19.60 - 19.80m | 5.40 | 9.97 | 21.52 |
| | | | | |
| | | | | |
| Mean Value | | | | |

Remarks :



Failure along weak subvertical plane

## GEOTECHNIQUE EAST MALAYSIA SDN. BHD.

| Name of Test | COMPRESSIVE STRENGTH | ASTM D 2938 |
|---|---|---|

Name of Project: Small Hydro Study For Medamit — Date: 20.8.1987

Sample: BME-3 — Tested by: C. H. Wang

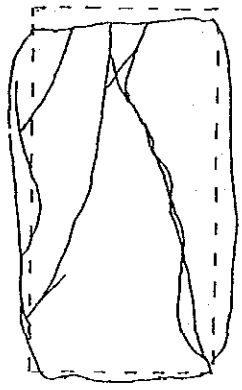
Moisture Condition of Sample: 0.55 % (In-Situ)

Specific Gravity: - Unit Weight: 2.64 $Mg/m^3$ — Absorption: 1.40 %

Rate of loading: 90 KN Per Minute — Rock Type: SHALE

| Sample No | Depth | Diameter (cm) | Height (cm) | Compressive Strength ($kg/cm^2$) |
|---|---|---|---|---|
| BME-3 | 5.30 - 5.55m | 5.40 | 9.80 | 86.06 |
| | | | | |
| | | | | |
| Mean Value | | | | |

Remarks :



Failure along weak subvertical plane

## GEOTECHNIQUE EAST MALAYSIA SDN. BHD.

| Name of Test | COMPRESSIVE STRENGTH | ASTM D 2938 |
|---|---|---|

Name of Project: Small Hydro Study For Medamit — Date: 20.8.1987

Sample: BME-4/Sample A — Tested by: C. H. Wang

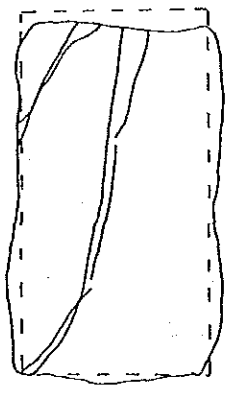
Moisture Condition of Sample: Saturated

Specific Gravity: - — Unit Weight 2.62 $Mg/m^3$ — Absorption: 0.2 %

Rate of loading: 90 KN Per Minute — Rock Type: SANDSTONE

| Sample No | Depth | Diameter (cm) | Height (cm) | Compressive Strength ($kg/cm^2$) |
|---|---|---|---|---|
| BME-4/ Sample A | 3.07 - 3.33m | 5.40 | 9.80 | 561.66 |
| | | | | |
| | | | | |
| Mean Value | | | | |

Remarks :



Failure along weak subvertical plane

**GEOTECHNIQUE EAST MALAYSIA SDN. BHD.**

| Name of Test | COMPRESSIVE STRENGTH | ASTM D 2938 |
|---|---|---|

Name of Project: Small Hydro Study For Medamit — Date: 20.8.1987

Sample: BME-4/Sample B — Tested by: C. H. Wang

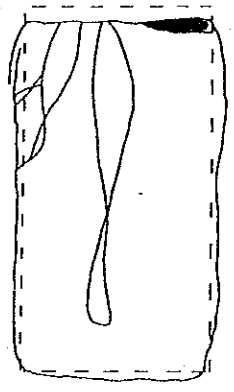
Moisture Condition of Sample: Saturated

Specific Gravity: - — Unit Weight: 2.64 $Mg/m^3$ — Absorption: 0.2 %

Rate of loading: 90 KN Per Minute — Rock Type: SANDSTONE

| Sample No | Depth | Diameter (cm) | Height (cm) | Compressive Strength ($kg/cm^2$) |
|---|---|---|---|---|
| BME-4/ Sample B | 17.15 - 17.35m | 5.40 | 9.80 | 643.02 |
| | | | | |
| | | | | |
| Mean Value | | | | |

Remarks :



Failure along weak subvertical plane

## GEOTECHNIQUE EAST MALAYSIA SDN. BHD.

| Name of Test | COMPRESSIVE STRENGTH | ASTM D 2938 |
|---|---|---|

Name of Project: Small Hydro Study for Medamit — Date: 20.7.1987

Sample: BME-5 — Tested by: C. H. Wang

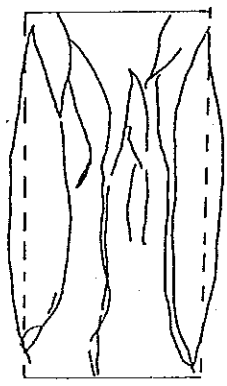
Moisture Condition of Sample: (Saturated)

Specific Gravity: - — Unit Weight 2.57 $Mg/m^3$ — Absorption: 1.83 %

Rate of loading: 90KN per minute — Rock Type: SHALE

| Sample No | Depth | Diameter (cm) | Height (cm) | Compressive Strength ($kg/cm^2$) |
|---|---|---|---|---|
| BME-5 | 26.40 - 26.55 | 5.40 | 9.60 | 172.74 |
| | | | | |
| | | | | |
| Mean Value | | | | |

Remarks :



Failure along weak subvertical plane

GEOTECHNIQUE EAST MALAYSIA SDN. BHD.

| Name of Test | COMPRESSIVE STRENGTH | ASTM D 2938 |
|---|---|---|

Name of Project: Small Hydro Study for Medamit — Date: 20.7.1987

Sample: BME-7 — Tested by: C. H. Wang

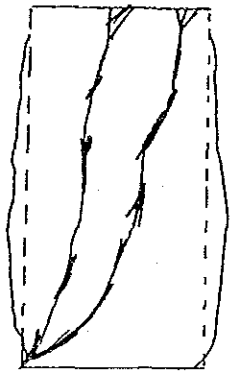
Moisture Condition of Sample: (Saturated)

Specific Gravity: - — Unit Weight 2.66 $Mg/m^3$ — Absorption: 0.22 %

Rate of loading: 90KN per minute — Rock Type: LIMESTONE

| Sample No | Depth | Diameter (cm) | Height (cm) | Compressive Strength ($kg/cm^2$) |
|---|---|---|---|---|
| BME-7 | 9.15 - 9.33m | 5.40 | 9.90 | 259.01 |
| | | | | |
| | | | | |
| Mean Value | | | | |

Remarks :



Failure along weak subvertical plane

GEOTECHNIQUE EAST MALAYSIA SDN. BHD.

| Name of Test | SCRATCH HARDNESS OF SOFT PARTICLES IN GRAVEL | ASTM C 235 |
|---|---|---|

Name of Project SESCO Medamit Quarry Date 3.6.88

Sample Medamit Quarry Samples (Crushed Rock) Tested by B.C.L.

Test 1

| Particle Size (mm) | | 9.5-12.5 | 12.5-19.0 | 19.0-25.0 | 25.0-37.5 | 37.5-50.0 | | Total |
|---|---|---|---|---|---|---|---|---|
| Weight of Each Size (g) | ① | 4097 | 4097 | 5343 | 7890 | 24675 | | 46,102 |
| Weight Parcentage (%) | ② | 8.89 | 8.89 | 11.59 | 17.11 | 53.52 | | 100 |
| Weight of Before Testing (g) | ③ | 200 | 600 | 1500 | 4500 | 12000 | | |
| Number of Particles | ④ | 145 | 176 | 175 | 144 | 113 | | |
| Weight of Soft Particles (g) | ⑤ | 0 | 0 | 0 | 0 | 69.8 | | |
| Number of Soft Particles | ⑥ | 0 | 0 | 0 | 0 | 1 | | |
| Weight Parcentage of Soft Particles (%) (⑤/③) ×100 | ⑦ | 0.58 | 0.58 | 0.58 | 0.58 | 0.58 | | |
| Number Parcentage of Soft Particles (%) (⑥/④) ×100 | ⑧ | 0 | 0 | 0 | 0 | 0.88 | | |
| Weight Parcentage of Soft Particles in Aggregates (%) (②×⑦) / 100 | ⑨ | 0.052 | 0.052 | 0.067 | 0.099 | 0.31 | | 0.6 |

Remarks :

Average percentage of soft particles in Aggregate by weight is 0.3% (Average of two tests)

GEOTECHNIQUE EAST MALAYSIA SDN. BHD.

| Name of Test | SCRATCH HARDNESS OF SOFT PARTICLES IN GRAVEL | ASTM C 235 |
|---|---|---|

Name of Project SESCO Medamit Quarry Date 3.6.88

Sample Medamit Quarry Samples (Crushed Rock) Tested by B.C.L.

Test 2

| Particle Size (mm) | | 9.5-12.5 | 12.5-19.0 | 19.0-25.0 | 25.0-37.5 | 37.5-50.0 | | Total |
|---|---|---|---|---|---|---|---|---|
| Weight of Each Size (g) | ① | 4097 | 4097 | 5343 | 7890 | 246 75 | | 46,102 |
| Weight Parcentage (%) | ② | 8.89 | 8.89 | 11.59 | 17.11 | 53.52 | | 100 |
| Weight of Before Testing (g) | ③ | 250 | 680 | 1680 | 3350 | 12,000 | | |
| Number of Particles | ④ | 188 | 208 | 175 | 118 | 127 | | |
| Weight of Soft Particles (g) | ⑤ | 0 | 0 | 0 | 0 | 0 | | |
| Number of Soft Particles | ⑥ | 0 | 0 | 0 | 0 | 0 | | |
| Weight Parcentage of Soft Particles (%) (⑤/③) ×100 | ⑦ | 0 | 0 | 0 | 0 | 0 | | |
| Number Parcentage of Soft Particles (%) (⑥/④) ×100 | ⑧ | 0 | 0 | 0 | 0 | 0 | | |
| Weight Parcentage of Soft Particles in Aggregates (%) (②×⑦) / 100 | ⑨ | 0 | 0 | 0 | 0 | 0 | | |

Remarks :

GEOTECHNIQUE EAST MALAYSIA SDN. BHD.

| Name of Test | SPECIFIC GRAVITY AND ABSORPTION OF GRAVEL | ASTM C 127 |
|---|---|---|

Name of Project: Material Test On Medamit Quarry Rock Samplea — Date: 3.6.88

Sample: Medamit Quarry Sample (Crushed Rock) Test 1 — Tested by: K.H.F.

| Specimen NO. | | | 1 | 2 | 3 |
|---|---|---|---|---|---|
| Saturated-Surface-Dry Weight of Specimen | ① | | 4453 | 4189 | |
| Weight of (Specimen + Basket) in Water | ② | | 3356 | 3188 | |
| Weight of Basket in Water | ③ | | 598 | 598 | |
| Weight of Specimen in Water | ④ | ②−③ | 2758 | 2590 | |
| Dry Weight of Specimen | ⑤ | | 4412 | 4150 | |
| Bulk Specific Gravity | ⑥ | $\frac{⑤}{①-④}$ | 2.603 | 2.595 | |
| Mean Value | ⑦ | | 2.599 | | |
| Weight of Pore Water | ⑧ | ①−⑤ | 41 | 39 | |
| Absorption % | ⑨ | $\frac{⑧}{⑤} \times 100$ | 0.93 | 0.94 | |
| Mean Value % | | | 0.94 | | |
| SSD Specific Gravity | | $\frac{①}{①-④}$ | 2.627 | 2.620 | |
| Mean Value | | | 2.624 | | |
| Apparent Specific Gravity | | $\frac{⑤}{⑤-④}$ | 2.667 | 2.660 | |
| Mean Value | | | 2.664 | | |

Remarks :

GEOTECHNIQUE EAST MALAYSIA SDN. BHD.

| Name of Test | SPECIFIC GRAVITY AND ABSORPTION OF GRAVEL | | | | ASTM C 127 |
|---|---|---|---|---|---|
| Name of Project | Material Test On Medamit Quarry Rock Samples | | | Date 9.6.88 | |
| Sample | Mediamit Quarry Sample (Crushed Rock) Test 2 | | | Tested by K.H.F. | |
| Specimen NO. | | | 3 | 4 | |
| Saturated-Surface-Dry Weight of Specimen | ① | | 3291 | 3218 | |
| Weight of (Specimen + Basket) in Water | ② | | 2647 | 2598 | |
| Weight of Basket in Water | ③ | | 598 | 598 | |
| Weight of Specimen in Water | ④ | ②−③ | 2049 | 2000 | |
| Dry Weight of Specimen | ⑤ | | 3272 | 3198 | |
| Bulk Specific Gravity | ⑥ | ⑤ / ①−④ | 2.634 | 2.626 | |
| Mean Value | ⑦ | | 2.630 | | |
| Weight of Pore Water | ⑧ | ①−⑤ | 19 | 20 | |
| Absorption % | ⑨ | ⑧ / ⑤ ×100 | 0.58 | 0.63 | |
| Mean Value % | | | 0.605 | | |
| SSD Specific Gravity | | ① / ①−④ | 2.650 | 2.642 | |
| Mean Value | | | 2.646 | | |
| Apparent Specific Gravity | | ⑤ / ⑤−④ | 2.675 | 2.669 | |
| Mean Value | | | 2.672 | | |
| Remarks : | | | | | |

GEOTECHNIQUE EAST MALAYSIA SDN. BHD.

| Name of Test | ABRASION TEST OF GRAVEL (USING THE LOS ANGELES MACHINE) | ASTM C 131 & ASTM C 535 |
|---|---|---|

Name of Project Material Tests on Medamit Quarry Sample Date 4.6.1988

Sample Grading A/Test 1 (Crushed Rock) Tested by K.H.F.

| Sieve (mm) | | Weight of Each Size | Weight Percentage | Grading | Number of Spheres | ① Weight of Before Testing |
|---|---|---|---|---|---|---|
| Passing | Retained | (g) | (%) | | | (g) |
| 100 | 90 | | | | | |
| 90 | 75 | | | | | |
| 75 | 63 | | | | | |
| 63 | 50 | | | | | |
| 50 | 37.5 | | | | | |
| 37.5 | 25 | | | A | 12 | 1250 |
| 25 | 19 | | | A | 12 | 1250 |
| 19.0 | 12.5 | | | A | 12 | 1250 |
| 12.5 | 9.5 | | | A | 12 | 1250 |
| | | | | | | |
| Total: | | | | A | 12 | 5000 |

| | | | |
|---|---|---|---|
| ② Weight of Retained on 1.7mm Sieve After Testing (g) | | | 3818 |
| ③ Weight of Abrasion loss | ①−② | (g) | 1182 |
| ④ Percent of Abrasion loss | $\frac{③}{①} \times 100$ | (%) | 23.6 |

Remarks:

ASTM C131 grading by A

Means of Abrasion loss percent of Quarry Sample ≒ 17.8%

GEOTECHNIQUE EAST MALAYSIA SDN. BHD.

| Name of Test | ABRASION TEST OF GRAVEL (USING THE LOS ANGELES MACHINE) | ASTM C 131<br>ASTM C 535 |
|---|---|---|

Name of Project Material Tests on Medamit Quarry Sample Date 4.6.1988

Sample Grading A/Test 2 (Crushed Rock) Tested by K.H.F.

| Sieve (mm) | | Weight of Each Size | Weight Percentage | Grading | Number of Spheres | ① Weight of, Before Testing |
|---|---|---|---|---|---|---|
| Passing | Retained | (g) | (%) | | | (g) |
| 100 | 90 | | | | | |
| 90 | 75 | | | | | |
| 75 | 63 | | | | | |
| 63 | 50 | | | | | |
| 50 | 37.5 | | | | | |
| 37.5 | 25 | | | A | 12 | 1250 |
| 25 | 19 | | | A | 12 | 1250 |
| 19.0 | 12.5 | | | A | 12 | 1250 |
| 12.5 | 9.5 | | | A | 12 | 1253 |
| | | | | | | |
| Total: | | | | A | 12 | 5003 |

| | | |
|---|---|---|
| ② Weight of Retained on 1.7mm Sieve After Testing (g) | | 3830 |
| ③ Weight of Abrasion loss | ①−② (g) | 1173 |
| ④ Percent of Abrasion loss | $\frac{③}{①} \times 100$ (%) | 23.4 |

*Remarks:*

ASTM C131 grading by A

GEOTECHNIQUE EAST MALAYSIA SDN. BHD.

| Name of Test | ABRASION TEST OF GRAVEL (USING THE LOS ANGELES MACHINE) | ASTM C 131 & ASTM C 535 |
|---|---|---|

Name of Project Material Tests on Madamit Quarry Sample Date 4.6.1988

Sample Grading E/Test 1 (Crushed Rock) Tested by K.H.F.

| Sieve (mm) | | Height of Each Size | Weight Percentage | Grading | Number of Spheres | ① Weight of Before Testing |
|---|---|---|---|---|---|---|
| Passing | Retained | (g) | (%) | | | (g) |
| 100 | 90 | | | | | |
| 90 | 75 | | | | | |
| 75 | 63 | | | E | 12 | 2608 |
| 63 | 50 | | | E | 12 | 2520 |
| 50 | 37.5 | | | E | 12 | 5023 |
| 37.5 | 25 | | | | | |
| 25 | 19 | | | | | |
| 19.0 | 12.5 | | | | | |
| 12.5 | 9.5 | | | | | |
| | | | | | | |
| Total: | | | | E | 12 | 10151 |

| | | | |
|---|---|---|---|
| ② Weight of Retained on 1.7mm Sieve After Testing (g) | | | 8655 |
| ③ Weight of Abrasion loss | ①−② | (g) | 1496 |
| ④ Percent of Abrasion loss | $\frac{③}{①} \times 100$ | (%) | 14.7 |

Remarks:

JIS A 1121 grading by E
(The same as ASTM C 535 grading 1)

GEOTECHNIQUE EAST MALAYSIA SDN. BHD.

| Name of Test | ABRASION TEST OF GRAVEL (USING THE LOS ANGELES MACHINE) | ASTM C 131 & ASTM C 535 |
|---|---|---|

Name of Project Material Tests on Medamit Quarry Sample Date 4.6.1988

Sample Grading E/Test 2 (Crushed Rock) Tested by K.H.F.

| Sieve (mm) | | Height of Each Size | Weight Percentage | Grading | Number of Spheres | ① Weight of Before Testing |
|---|---|---|---|---|---|---|
| Passing | Retained | (g) | (%) | | | (g) |
| 100 | 90 | | | | | |
| 90 | 75 | | | | | |
| 75 | 63 | | | E | 12 | 2566 |
| 63 | 50 | | | E | 12 | 2530 |
| 50 | 37.5 | | | E | 12 | 5017 |
| 37.5 | 25 | | | | | |
| 25 | 19 | | | | | |
| 19.0 | 12.5 | | | | | |
| 12.5 | 9.5 | | | | | |
| | | | | | | |
| Total: | | | | E | 12 | 10113 |

| | | | |
|---|---|---|---|
| ② Weight of Retained on 1.7mm Sieve After Testing (g) | | | 8568 |
| ③ Weight of Abrasion loss | ①−② | (g) | 1545 |
| ④ Percent of Abrasion loss | $\frac{③}{①} \times 100$ | (%) | 15.3 |

Remarks:

JIS A 1121 grading by E
(The same as ASTM C535 grading 1)

GEOTECHNIQUE EAST MALAYSIA SDN. BHD.

| Name of Test | Soundness of Aggregates by Use of Sodium Sulphate | ASTM C 88 |
|---|---|---|

Name of Project Material Test on Medamit Quarry Sample Date 3.6.88

Sample Crushed Sample Tested by L.S.M.

Soundness of Gravel (Test 1)

| Particle Size (mm) | | 63.0-50.0 (50~40) | 50.0-37.5 (40~25) | 37.5-26.5 (25~20) | 26.5-19.0 (20~15) | 19.0-13.2 (15~10) | 13.2-9.5 (10~5) | 9.5-4.75 (5~No.4) | Total |
|---|---|---|---|---|---|---|---|---|---|
| Weight of Each Size (g) | | 13310 | 24675 | 7725 | 5508 | 3986 | 4208 | 1685 | 61097 |
| Grading of Original Sample (%) | ① | 62.17 | | 21.66 | | 13.41 | | 2.76 | 100.0 |
| Weight of Before Testing (g) | ② | 5156.0 | | 1519.7 | | 996.0 | | 301.7 | |
| Weight of After Testing (g) | ③ | 5105.0 | | 1488.6 | | 986.1 | | 295.3 | |
| Weight Parcentage of Each Size Loss Particle (1 −③/②)×100 (%) | ④ | 0.989 | | 2.046 | | 0.994 | | 2.121 | |
| Weight Percentage of Loss Aggregates (① × ④/100) (%) | ⑤ | 0.61 | | 0.44 | | 0.13 | | 0.06 | 1.24 |

Soundness of Gravel (Test 2)

| Particle Size (mm) | | 63.0-50.0 | 50.0-37.5 | 37.5-26.5 | 26.5-19.0 | 19.0-13.2 | 13.2-9.5 | 9.5-4.75 | Total |
|---|---|---|---|---|---|---|---|---|---|
| Weight of Each Size (g) | | 13310 | 24675 | 7725 | 5508 | 3986 | 4208 | 1685 | 61097 |
| Grading of Orginal Sample (%) | ① | 62.17 | | 21.66 | | 13.41 | | 2.76 | 100.0 |
| Weight of Before Testing (g) | ② | 5064.0 | | 1504.6 | | 1003.7 | | 306.3 | |
| Weight of After Testing (g) | ③ | 5044.0 | | 1477.0 | | 998.2 | | 298.7 | |
| Weight Parcentage of Each Size Loss Particle (1 −③/②)×100 (%) | ④ | 0.395 | | 1.834 | | 1.544 | | 2.481 | |
| Weight Percentage of Loss Aggregates (① × ④/100) (%) | ⑤ | 0.25 | | 0.40 | | 0.21 | | 0.07 | 0.93 |

Remarks : i) Sieves of 13.2mm & 26.5mm were used instead of 12.5mm & 25mm

ii) Test 1. 3126.0g(63.0-50.0mm)+2030.0g(50.0-37.5mm) = 5156.0g
1007.4g(37.5-26.5mm)+512.3g(26.5-19.0mm) = 1519.7g
663.3g(19.0-13.2mm)+332.7g(13.2-9.5mm) = 996.0g
Test 2. 3022.0g(63.0-50.0mm)+2042.0g(50.0-37.5mm) = 5064.0g
1002.6g(37.5-26.5mm)+502.0g(26.5-19.0mm) = 1504.6g
673.0g(19.0-13.2mm)+330.7g(13.2-9.5mm) = 1003.7g

GEOTECHNIQUE EAST MALAYSIA SDN. BHD.

| Name of Test | AGGREGATE IMPACT VALUE | BS 812 |
|---|---|---|

Name of Project Material Tests on Medamit Quarry Samples Date 6.6.1988

Sample _____ Tested by CML

Test Results :

Average of two tests : 18%

Test 1 : 17.7%

Test 2 : 18.8%

Remarks :

BS 812

GEOTECHNIQUE EAST MALAYSIA SDN. BHD.

| Name of Test | AGGREGATE CRUSHING VALUE | BS 812 |
|---|---|---|

Name of Project Material Tests on Medamit Quarry Sample Date 6.6.1988

Sample _____ Tested by CML

Test Results :

Average of two tests : 19%

Test 1 : 19.3%

Test 2 : 19.1%

Remarks :

BS 812