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LAMPIRAN 1
HASIL ANALISA DATA

TABEL ANALISA DATA MODEL KEKASARAN KO

| MODEL | Periode (T) (detik) | Stoke | L (cm) | d (cm) | Sudut (θ) ($^{\circ}$) | $\tan \theta$ | Kr | Hi (cm) | Hr (Cm) | Ru (Cm) | Rd (Cm) | d/l | HI/L | $\frac{\tan \theta}{\sqrt{Hi/L}}$ | Ru/d | Ru/Hi | Rd/Hi |
|-------|---------------------|-------|--------|--------|-----------------------------------|---------------|--------|---------|---------|---------|----------|--------|--------|-----------------------------------|--------|--------|---------|
| KO | 1 | 4 | 126 | 20 | 30 | 0.5774 | 0.7786 | 3.5733 | 2.7823 | 10.1242 | -10.2956 | 0.1587 | 0.0284 | 3.4284 | 0.5062 | 2.8333 | -2.8813 |
| | 1 | 5 | 126 | 20 | 30 | 0.5774 | 0.7687 | 5.6207 | 4.3205 | 12.3491 | -11.4127 | 0.1587 | 0.0446 | 2.7336 | 0.6175 | 2.1971 | -2.0305 |
| | 1 | 6 | 126 | 20 | 30 | 0.5774 | 0.7735 | 6.7120 | 5.1921 | 19.2938 | -12.9711 | 0.1587 | 0.0533 | 2.5015 | 0.9647 | 2.8745 | -1.9325 |
| | 1.1 | 4 | 132 | 20 | 30 | 0.5774 | 0.7642 | 5.0026 | 3.8231 | 8.7464 | -10.9772 | 0.1515 | 0.0379 | 2.9657 | 0.4373 | 1.7484 | -2.1943 |
| | 1.1 | 5 | 132 | 20 | 30 | 0.5774 | 0.7508 | 6.9921 | 5.2493 | 13.4629 | -9.6177 | 0.1515 | 0.0530 | 2.5085 | 0.6731 | 1.9254 | -1.3755 |
| | 1.1 | 6 | 132 | 20 | 30 | 0.5774 | 0.7546 | 6.5189 | 4.9188 | 16.3783 | -17.3925 | 0.1515 | 0.0494 | 2.5980 | 0.8189 | 2.5125 | -2.6680 |
| | 1.2 | 4 | 154 | 20 | 30 | 0.5774 | 0.7504 | 5.3213 | 3.9932 | 10.1242 | -9.1788 | 0.1299 | 0.0346 | 3.1059 | 0.5062 | 1.9026 | -1.7249 |
| | 1.2 | 5 | 154 | 20 | 30 | 0.5774 | 0.7432 | 5.7585 | 4.2796 | 13.4629 | -10.9772 | 0.1299 | 0.0374 | 2.9857 | 0.6731 | 2.3379 | -1.9063 |
| | 1.2 | 6 | 154 | 20 | 30 | 0.5774 | 0.7452 | 6.4572 | 4.8116 | 15.6924 | -13.2098 | 0.1299 | 0.0419 | 2.8195 | 0.7846 | 2.4302 | -2.0458 |

TABEL ANALISA DATA MODEL KEKASARAN DENGAN BALOK UKURAN 1 CM X 1 CM

| MODEL | Periode (T) (detik) | Stoke | L (cm) | d (cm) | Sudut (θ) ($^{\circ}$) | $\tan \theta$ | Kr | Hi (cm) | Hr (Cm) | Ru (Cm) | Rd (Cm) | d/l | HI/L | $\frac{\tan \theta}{\sqrt{Hi/L}}$ | Ru/d | Ru/Hi | Rd/Hi |
|-------|---------------------|-------|--------|--------|-----------------------------------|---------------|--------|---------|---------|---------|----------|--------|--------|-----------------------------------|--------|--------|---------|
| K111 | 1 | 4 | 126 | 20 | 30 | 0.5774 | 0.8197 | 5.2441 | 4.2987 | 8.7464 | -8.0623 | 0.1587 | 0.0416 | 2.8300 | 0.4373 | 1.6679 | -1.5374 |
| | 1 | 5 | 126 | 20 | 30 | 0.5774 | 0.8207 | 5.6593 | 4.6447 | 11.9269 | -10.2956 | 0.1587 | 0.0449 | 2.7242 | 0.5963 | 2.1075 | -1.8192 |
| | 1 | 6 | 126 | 20 | 30 | 0.5774 | 0.8116 | 6.4513 | 5.2359 | 12.7769 | -12.5300 | 0.1587 | 0.0512 | 2.5515 | 0.6388 | 1.9805 | -1.9422 |
| | 1.1 | 4 | 132 | 20 | 30 | 0.5774 | 0.8047 | 4.6550 | 3.7459 | 8.3217 | -9.6177 | 0.1515 | 0.0353 | 3.0745 | 0.4161 | 1.7877 | -2.0661 |
| | 1.1 | 5 | 132 | 20 | 30 | 0.5774 | 0.7944 | 5.4855 | 4.3579 | 11.6619 | -10.9772 | 0.1515 | 0.0416 | 2.8322 | 0.5831 | 2.1260 | -2.0011 |
| | 1.1 | 6 | 132 | 20 | 30 | 0.5774 | 0.7992 | 6.0843 | 4.8625 | 12.2066 | -11.8533 | 0.1515 | 0.0461 | 2.6892 | 0.6103 | 2.0062 | -1.9482 |
| | 1.2 | 4 | 154 | 20 | 30 | 0.5774 | 0.7928 | 4.0465 | 3.2082 | 8.0623 | -9.6177 | 0.1299 | 0.0263 | 3.5617 | 0.4031 | 1.9924 | -2.3768 |
| | 1.2 | 5 | 154 | 20 | 30 | 0.5774 | 0.7914 | 4.7612 | 3.7679 | 10.5475 | -10.2956 | 0.1299 | 0.0309 | 3.2835 | 0.5274 | 2.2153 | -2.1624 |
| | 1.2 | 6 | 154 | 20 | 30 | 0.5774 | 0.7888 | 5.3213 | 4.1976 | 12.7769 | -12.0934 | 0.1299 | 0.0346 | 3.1059 | 0.6388 | 2.4011 | -2.2726 |
| K112 | 1 | 4 | 126 | 20 | 30 | 0.5774 | 0.8433 | 3.4574 | 2.9157 | 8.3815 | -9.6177 | 0.1587 | 0.0274 | 3.4854 | 0.4191 | 2.4242 | -2.7818 |
| | 1 | 5 | 126 | 20 | 30 | 0.5774 | 0.8466 | 4.3556 | 3.6876 | 12.1758 | -11.4127 | 0.1587 | 0.0346 | 3.1053 | 0.6088 | 2.7954 | -2.6203 |
| | 1 | 6 | 126 | 20 | 30 | 0.5774 | 0.8570 | 5.3696 | 4.6017 | 11.4127 | -12.5300 | 0.1587 | 0.0426 | 2.7967 | 0.5706 | 2.1254 | -2.3335 |
| | 1.1 | 4 | 132 | 20 | 30 | 0.5774 | 0.8424 | 3.5637 | 3.0021 | 6.2650 | -7.8262 | 0.1515 | 0.0270 | 3.5138 | 0.3132 | 1.7580 | -2.1961 |
| | 1.1 | 5 | 132 | 20 | 30 | 0.5774 | 0.8449 | 3.2932 | 2.7825 | 7.8262 | -9.6177 | 0.1515 | 0.0249 | 3.6552 | 0.3913 | 2.3765 | -2.9204 |
| | 1.1 | 6 | 132 | 20 | 30 | 0.5774 | 0.8398 | 4.2590 | 3.5766 | 9.6177 | -11.4127 | 0.1515 | 0.0323 | 3.2142 | 0.4809 | 2.2582 | -2.6797 |
| | 1.2 | 4 | 154 | 20 | 30 | 0.5774 | 0.8387 | 3.7858 | 3.1750 | 5.5902 | -8.0623 | 0.1299 | 0.0246 | 3.6823 | 0.2795 | 1.4766 | -2.1296 |
| | 1.2 | 5 | 154 | 20 | 30 | 0.5774 | 0.8441 | 4.0369 | 3.4073 | 8.5000 | -9.1788 | 0.1299 | 0.0262 | 3.5660 | 0.4250 | 2.1056 | -2.2737 |
| | 1.2 | 6 | 154 | 20 | 30 | 0.5774 | 0.8379 | 4.5198 | 3.7870 | 10.7355 | -10.2956 | 0.1299 | 0.0293 | 3.3701 | 0.5368 | 2.3752 | -2.2779 |
| K114 | 1 | 4 | 126 | 20 | 30 | 0.5774 | 0.8857 | 3.7085 | 3.2846 | 6.5192 | -6.9462 | 0.1587 | 0.0294 | 3.3653 | 0.3260 | 1.7579 | -1.8730 |
| | 1 | 5 | 126 | 20 | 30 | 0.5774 | 0.8990 | 4.3169 | 3.8811 | 7.7464 | -9.1788 | 0.1587 | 0.0343 | 3.1192 | 0.3873 | 1.7944 | -2.1262 |
| | 1 | 6 | 126 | 20 | 30 | 0.5774 | 0.8942 | 5.5048 | 4.9226 | 8.9772 | -10.2956 | 0.1587 | 0.0437 | 2.7622 | 0.4489 | 1.6308 | -1.8703 |
| | 1.1 | 4 | 132 | 20 | 30 | 0.5774 | 0.8913 | 3.2836 | 2.9266 | 6.7170 | -5.1478 | 0.1515 | 0.0249 | 3.6606 | 0.3358 | 2.0456 | -1.5677 |
| | 1.1 | 5 | 132 | 20 | 30 | 0.5774 | 0.8885 | 3.9403 | 3.5011 | 7.9462 | -6.9462 | 0.1515 | 0.0299 | 3.3417 | 0.3973 | 2.0167 | -1.7629 |
| | 1.1 | 6 | 132 | 20 | 30 | 0.5774 | 0.8948 | 4.1624 | 3.7243 | 8.8615 | -8.0623 | 0.1515 | 0.0315 | 3.2513 | 0.4431 | 2.1289 | -1.9369 |
| | 1.2 | 4 | 154 | 20 | 30 | 0.5774 | 0.8901 | 3.4188 | 3.0431 | 6.1478 | -6.2650 | 0.1299 | 0.0222 | 3.8749 | 0.3074 | 1.7982 | -1.8325 |
| | 1.2 | 5 | 154 | 20 | 30 | 0.5774 | 0.8890 | 4.0369 | 3.5888 | 7.6322 | -8.0623 | 0.1299 | 0.0262 | 3.5660 | 0.3816 | 1.8906 | -1.9972 |
| | 1.2 | 6 | 154 | 20 | 30 | 0.5774 | 0.8929 | 4.5874 | 4.0961 | 8.7464 | -9.8615 | 0.1299 | 0.0298 | 3.3452 | 0.4373 | 1.9066 | -2.1497 |

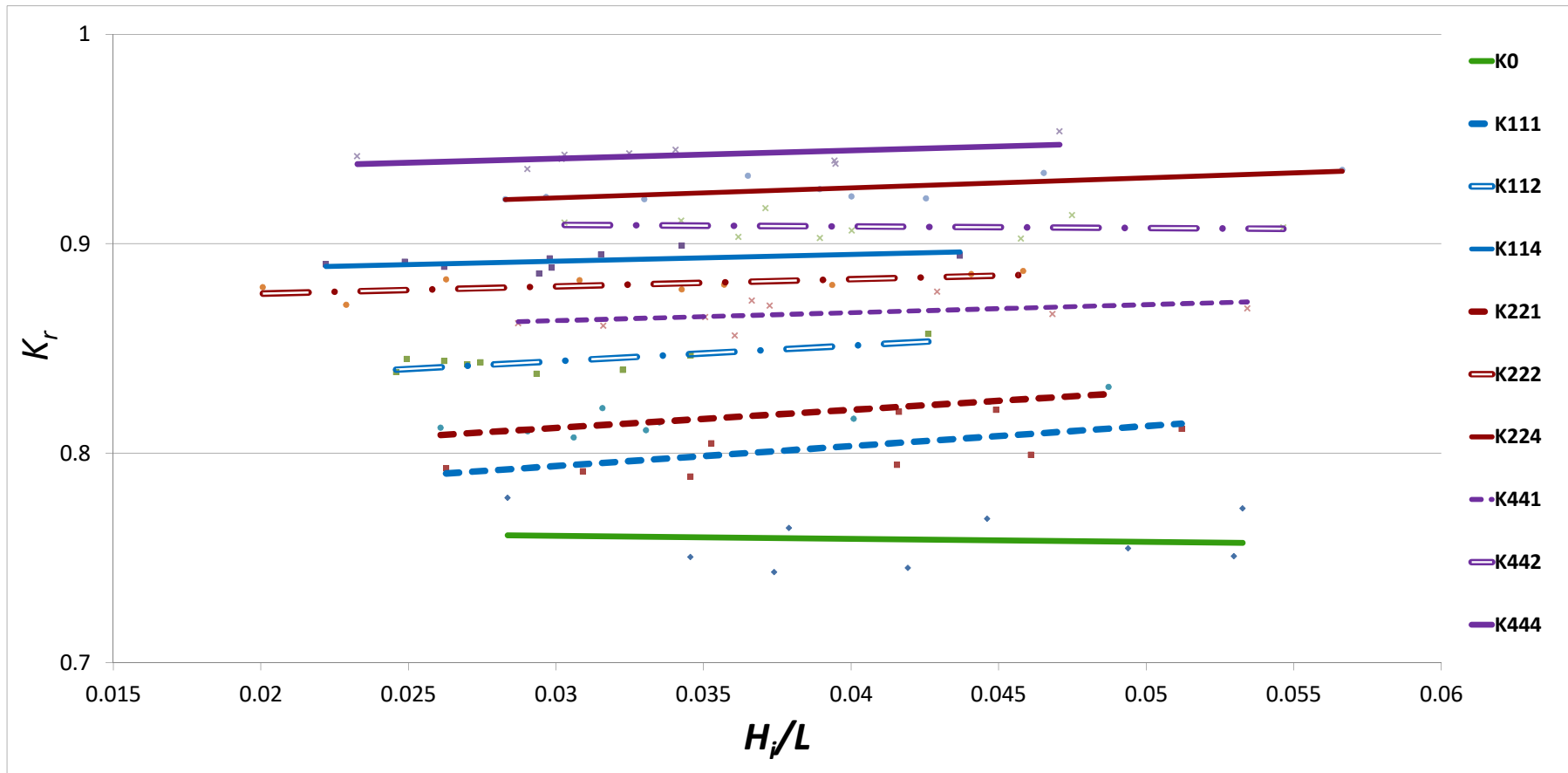
TABEL ANALISA DATA MODEL KEKASARAN DENGAN BALOK UKURAN 2 CM X 2 CM

| MODEL | Periode (T) (detik) | Stoke | L (cm) | d (cm) | Sudut (θ) ($^{\circ}$) | $\tan \theta$ | Kr | Hi (cm) | Hr (Cm) | Ru (Cm) | Rd (Cm) | d/l | HI/L | $\frac{\tan \theta}{\sqrt{Hi/L}}$ | Ru/d | Ru/Hi | Rd/Hi |
|-------|---------------------|-------|--------|--------|-----------------------------------|---------------|--------|---------|---------|---------|----------|--------|--------|-----------------------------------|--------|--------|---------|
| K221 | 1 | 4 | 126 | 20 | 30 | 0.5774 | 0.8214 | 3.9789 | 3.2683 | 6.2111 | -9.1788 | 0.1587 | 0.0316 | 3.2489 | 0.3106 | 1.5610 | -2.3068 |
| | 1 | 5 | 126 | 20 | 30 | 0.5774 | 0.8246 | 5.6304 | 4.6428 | 10.1242 | -10.2956 | 0.1587 | 0.0447 | 2.7312 | 0.5062 | 1.7981 | -1.8286 |
| | 1 | 6 | 126 | 20 | 30 | 0.5774 | 0.8316 | 6.1390 | 5.1051 | 11.4629 | -12.0934 | 0.1587 | 0.0487 | 2.6156 | 0.5731 | 1.8672 | -1.9699 |
| | 1.1 | 4 | 132 | 20 | 30 | 0.5774 | 0.8104 | 3.8341 | 3.1072 | 6.4031 | -7.3824 | 0.1515 | 0.0290 | 3.3876 | 0.3202 | 1.6701 | -1.9255 |
| | 1.1 | 5 | 132 | 20 | 30 | 0.5774 | 0.8146 | 4.4232 | 3.6032 | 8.7464 | -9.6177 | 0.1515 | 0.0335 | 3.1540 | 0.4373 | 1.9774 | -2.1744 |
| | 1.1 | 6 | 132 | 20 | 30 | 0.5774 | 0.8164 | 5.2924 | 4.3205 | 11.6619 | -10.2956 | 0.1515 | 0.0401 | 2.8834 | 0.5831 | 2.2035 | -1.9454 |
| | 1.2 | 4 | 154 | 20 | 30 | 0.5774 | 0.8121 | 4.0176 | 3.2628 | 6.5192 | -9.1788 | 0.1299 | 0.0261 | 3.5745 | 0.3260 | 1.6227 | -2.2847 |
| | 1.2 | 5 | 154 | 20 | 30 | 0.5774 | 0.8075 | 4.7129 | 3.8056 | 8.7464 | -10.2956 | 0.1299 | 0.0306 | 3.3003 | 0.4373 | 1.8558 | -2.1846 |
| | 1.2 | 6 | 154 | 20 | 30 | 0.5774 | 0.8110 | 5.0896 | 4.1275 | 11.6619 | -12.0934 | 0.1299 | 0.0330 | 3.1758 | 0.5831 | 2.2913 | -2.3761 |
| K222 | 1 | 4 | 126 | 20 | 30 | 0.5774 | 0.8782 | 4.3169 | 3.7911 | 6.7268 | -7.4721 | 0.1587 | 0.0343 | 3.1192 | 0.3363 | 1.5582 | -1.7309 |
| | 1 | 5 | 126 | 20 | 30 | 0.5774 | 0.8854 | 5.5531 | 4.9169 | 7.6047 | -8.7009 | 0.1587 | 0.0441 | 2.7501 | 0.3802 | 1.3694 | -1.5668 |
| | 1 | 6 | 126 | 20 | 30 | 0.5774 | 0.8869 | 5.7752 | 5.1223 | 10.8004 | -9.6322 | 0.1587 | 0.0458 | 2.6967 | 0.5400 | 1.8701 | -1.6678 |
| | 1.1 | 4 | 132 | 20 | 30 | 0.5774 | 0.8825 | 4.0658 | 3.5882 | 6.7268 | -7.3012 | 0.1515 | 0.0308 | 3.2897 | 0.3363 | 1.6545 | -1.7957 |
| | 1.1 | 5 | 132 | 20 | 30 | 0.5774 | 0.8805 | 4.7129 | 4.1496 | 7.9022 | -8.6322 | 0.1515 | 0.0357 | 3.0555 | 0.3951 | 1.6767 | -1.8316 |
| | 1.1 | 6 | 132 | 20 | 30 | 0.5774 | 0.8802 | 5.1958 | 4.5735 | 10.1018 | -9.7464 | 0.1515 | 0.0394 | 2.9101 | 0.5051 | 1.9442 | -1.8758 |
| | 1.2 | 4 | 154 | 20 | 30 | 0.5774 | 0.8793 | 3.0904 | 2.7173 | 6.0208 | -7.1478 | 0.1299 | 0.0201 | 4.0756 | 0.3010 | 1.9482 | -2.3129 |
| | 1.2 | 5 | 154 | 20 | 30 | 0.5774 | 0.8708 | 3.5250 | 3.0694 | 7.5147 | -8.5192 | 0.1299 | 0.0229 | 3.8161 | 0.3757 | 2.1318 | -2.4168 |
| | 1.2 | 6 | 154 | 20 | 30 | 0.5774 | 0.8830 | 4.0465 | 3.5731 | 9.4340 | -9.7464 | 0.1299 | 0.0263 | 3.5617 | 0.4717 | 2.3314 | -2.4086 |
| K224 | 1 | 4 | 126 | 20 | 30 | 0.5774 | 0.9260 | 4.9061 | 4.5433 | 4.9244 | -7.3012 | 0.1587 | 0.0389 | 2.9259 | 0.2462 | 1.0037 | -1.4882 |
| | 1 | 5 | 126 | 20 | 30 | 0.5774 | 0.9216 | 5.3600 | 4.9397 | 6.9462 | -8.8310 | 0.1587 | 0.0425 | 2.7993 | 0.3473 | 1.2959 | -1.6476 |
| | 1 | 6 | 126 | 20 | 30 | 0.5774 | 0.9352 | 7.1370 | 6.6742 | 9.6177 | -9.9057 | 0.1587 | 0.0566 | 2.4259 | 0.4809 | 1.3476 | -1.3879 |
| | 1.1 | 4 | 132 | 20 | 30 | 0.5774 | 0.9212 | 4.3556 | 4.0125 | 5.1478 | -6.7170 | 0.1515 | 0.0330 | 3.1784 | 0.2574 | 1.1819 | -1.5422 |
| | 1.1 | 5 | 132 | 20 | 30 | 0.5774 | 0.9325 | 4.8191 | 4.4936 | 6.7082 | -6.8310 | 0.1515 | 0.0365 | 3.0216 | 0.3354 | 1.3920 | -1.4175 |
| | 1.1 | 6 | 132 | 20 | 30 | 0.5774 | 0.9337 | 6.1422 | 5.7350 | 8.5000 | -7.9462 | 0.1515 | 0.0465 | 2.6765 | 0.4250 | 1.3839 | -1.2937 |
| | 1.2 | 4 | 154 | 20 | 30 | 0.5774 | 0.9212 | 4.3556 | 4.0125 | 3.6056 | -5.4083 | 0.1299 | 0.0283 | 3.4330 | 0.1803 | 0.8278 | -1.2417 |
| | 1.2 | 5 | 154 | 20 | 30 | 0.5774 | 0.9223 | 4.5680 | 4.2132 | 5.5902 | -6.1033 | 0.1299 | 0.0297 | 3.3522 | 0.2795 | 1.2238 | -1.3361 |
| | 1.2 | 6 | 154 | 20 | 30 | 0.5774 | 0.9226 | 6.1615 | 5.6844 | 7.3824 | -7.2111 | 0.1299 | 0.0400 | 2.8864 | 0.3691 | 1.1981 | -1.1703 |

TABEL ANALISA DATA MODEL KEKASARAN DENGAN BALOK UKURAN 4 CM X 4 CM

| MODEL | Periode (T) (detik) | Stoke | L (cm) | d (cm) | Sudut (θ) ($^{\circ}$) | $\tan \theta$ | Kr | Hi (cm) | Hr (Cm) | Ru (Cm) | Rd (Cm) | d/l | HI/L | $\frac{\tan \theta}{\sqrt{Hi/L}}$ | Ru/d | Ru/Hi | Rd/Hi |
|-------|---------------------|-------|--------|--------|-----------------------------------|---------------|--------|---------|---------|---------|----------|--------|--------|-----------------------------------|--------|--------|---------|
| K441 | 1 | 4 | 126 | 20 | 30 | 0.5774 | 0.8728 | 4.6163 | 4.0290 | 6.9462 | -7.1924 | 0.1587 | 0.0366 | 3.0163 | 0.3473 | 1.5047 | -1.5580 |
| | 1 | 5 | 126 | 20 | 30 | 0.5774 | 0.8771 | 5.4083 | 4.7434 | 9.4340 | -8.9659 | 0.1587 | 0.0429 | 2.7867 | 0.4717 | 1.7444 | -1.6578 |
| | 1 | 6 | 126 | 20 | 30 | 0.5774 | 0.8691 | 6.7313 | 5.8502 | 11.6619 | -10.6565 | 0.1587 | 0.0534 | 2.4979 | 0.5831 | 1.7325 | -1.5831 |
| | 1.1 | 4 | 132 | 20 | 30 | 0.5774 | 0.8608 | 4.1721 | 3.5915 | 6.9462 | -7.6566 | 0.1515 | 0.0316 | 3.2475 | 0.3473 | 1.6649 | -1.8352 |
| | 1.1 | 5 | 132 | 20 | 30 | 0.5774 | 0.8703 | 4.9157 | 4.2784 | 8.7464 | -8.9659 | 0.1515 | 0.0372 | 2.9918 | 0.4373 | 1.7793 | -1.8239 |
| | 1.1 | 6 | 132 | 20 | 30 | 0.5774 | 0.8664 | 6.1809 | 5.3552 | 10.9772 | -10.0830 | 0.1515 | 0.0468 | 2.6681 | 0.5489 | 1.7760 | -1.6313 |
| | 1.2 | 4 | 154 | 20 | 30 | 0.5774 | 0.8620 | 4.4232 | 3.8127 | 5.4083 | -7.8489 | 0.1299 | 0.0287 | 3.4067 | 0.2704 | 1.2227 | -1.7745 |
| | 1.2 | 5 | 154 | 20 | 30 | 0.5774 | 0.8649 | 5.3986 | 4.6691 | 6.9462 | -8.9659 | 0.1299 | 0.0351 | 3.0836 | 0.3473 | 1.2867 | -1.6608 |
| | 1.2 | 6 | 154 | 20 | 30 | 0.5774 | 0.8561 | 5.5531 | 4.7543 | 9.4340 | -10.7475 | 0.1299 | 0.0361 | 3.0404 | 0.4717 | 1.6989 | -1.9354 |
| K442 | 1 | 4 | 126 | 20 | 30 | 0.5774 | 0.9170 | 4.6743 | 4.2861 | 6.1788 | -6.1033 | 0.1587 | 0.0371 | 2.9976 | 0.3089 | 1.3219 | -1.3057 |
| | 1 | 5 | 126 | 20 | 30 | 0.5774 | 0.9025 | 5.7656 | 5.2032 | 7.5300 | -7.6322 | 0.1587 | 0.0458 | 2.6990 | 0.3765 | 1.3060 | -1.3237 |
| | 1 | 6 | 126 | 20 | 30 | 0.5774 | 0.9077 | 6.8859 | 6.2503 | 8.8824 | -10.1242 | 0.1587 | 0.0546 | 2.4697 | 0.4441 | 1.2899 | -1.4703 |
| | 1.1 | 4 | 132 | 20 | 30 | 0.5774 | 0.9109 | 4.5198 | 4.1172 | 6.6177 | -6.1033 | 0.1515 | 0.0342 | 3.1201 | 0.3309 | 1.4642 | -1.3504 |
| | 1.1 | 5 | 132 | 20 | 30 | 0.5774 | 0.9063 | 5.2827 | 4.7879 | 7.7355 | -7.6322 | 0.1515 | 0.0400 | 2.8860 | 0.3868 | 1.4643 | -1.4447 |
| | 1.1 | 6 | 132 | 20 | 30 | 0.5774 | 0.9136 | 6.2678 | 5.7264 | 8.6473 | -9.4340 | 0.1515 | 0.0475 | 2.6495 | 0.4324 | 1.3797 | -1.5052 |
| | 1.2 | 4 | 154 | 20 | 30 | 0.5774 | 0.9101 | 4.6646 | 4.2451 | 6.5000 | -5.8310 | 0.1299 | 0.0303 | 3.3174 | 0.3250 | 1.3935 | -1.2500 |
| | 1.2 | 5 | 154 | 20 | 30 | 0.5774 | 0.9032 | 5.5724 | 5.0333 | 7.7355 | -7.6322 | 0.1299 | 0.0362 | 3.0351 | 0.3868 | 1.3882 | -1.3696 |
| | 1.2 | 6 | 154 | 20 | 30 | 0.5774 | 0.9026 | 5.9974 | 5.4134 | 8.7464 | -9.4340 | 0.1299 | 0.0389 | 2.9256 | 0.4373 | 1.4584 | -1.5730 |
| K444 | 1 | 4 | 126 | 20 | 30 | 0.5774 | 0.9404 | 3.8051 | 3.5783 | 4.7170 | -4.9244 | 0.1587 | 0.0302 | 3.3223 | 0.2358 | 1.2396 | -1.2942 |
| | 1 | 5 | 126 | 20 | 30 | 0.5774 | 0.9382 | 4.9737 | 4.6661 | 6.5192 | -6.2650 | 0.1587 | 0.0395 | 2.9059 | 0.3260 | 1.3107 | -1.2596 |
| | 1 | 6 | 126 | 20 | 30 | 0.5774 | 0.9536 | 5.9298 | 5.6548 | 8.7464 | -7.3824 | 0.1587 | 0.0471 | 2.6614 | 0.4373 | 1.4750 | -1.2450 |
| | 1.1 | 4 | 132 | 20 | 30 | 0.5774 | 0.9425 | 3.9983 | 3.7682 | 3.2016 | -4.4721 | 0.1515 | 0.0303 | 3.3174 | 0.1601 | 0.8007 | -1.1185 |
| | 1.1 | 5 | 132 | 20 | 30 | 0.5774 | 0.9431 | 4.2880 | 4.0440 | 5.4083 | -5.5902 | 0.1515 | 0.0325 | 3.2033 | 0.2704 | 1.2613 | -1.3037 |
| | 1.1 | 6 | 132 | 20 | 30 | 0.5774 | 0.9396 | 5.2055 | 4.8913 | 6.9462 | -7.1589 | 0.1515 | 0.0394 | 2.9073 | 0.3473 | 1.3344 | -1.3753 |
| | 1.2 | 4 | 154 | 20 | 30 | 0.5774 | 0.9417 | 3.5830 | 3.3742 | 2.5000 | -3.8079 | 0.1299 | 0.0233 | 3.7851 | 0.1250 | 0.6977 | -1.0628 |
| | 1.2 | 5 | 154 | 20 | 30 | 0.5774 | 0.9356 | 4.4715 | 4.1834 | 4.7170 | -5.5902 | 0.1299 | 0.0290 | 3.3882 | 0.2358 | 1.0549 | -1.2502 |
| | 1.2 | 6 | 154 | 20 | 30 | 0.5774 | 0.9448 | 5.2441 | 4.9546 | 5.4083 | -6.2650 | 0.1299 | 0.0341 | 3.1287 | 0.2704 | 1.0313 | -1.1947 |

LAMPIRAN 2
GRAFIK HASIL PENELITIAN



Grafik Hubungan H_i/L terhadap Koefisien Refleksi (K_r)

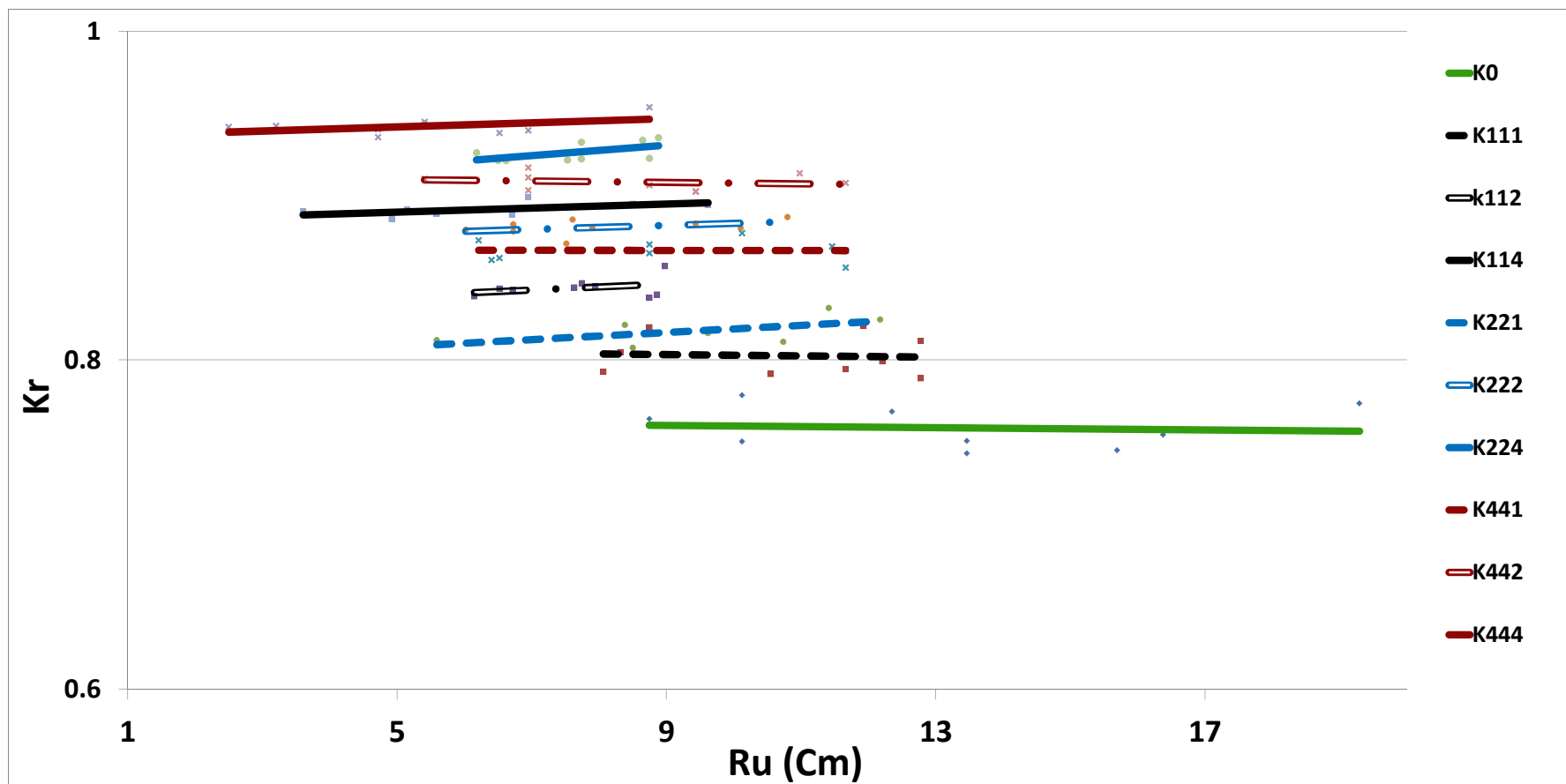
| Model | K_r Min | K_r Max | K_r Rata2 | H_i/L Min | H_i/L Max | H_i/L rata2 |
|-------|-----------|-----------|-------------|-------------|-------------|---------------|
| K0 | 0.7432 | 0.7786 | 0.7588 | 0.0284 | 0.0533 | 0.0423 |
| K111 | 0.7888 | 0.8207 | 0.8026 | 0.0263 | 0.0512 | 0.0392 |
| K112 | 0.8379 | 0.8570 | 0.8438 | 0.0246 | 0.0426 | 0.0299 |
| K114 | 0.8857 | 0.8990 | 0.8917 | 0.0222 | 0.0437 | 0.0302 |
| K221 | 0.8075 | 0.8316 | 0.8166 | 0.0261 | 0.0487 | 0.0353 |
| K222 | 0.8708 | 0.8869 | 0.8808 | 0.0201 | 0.0437 | 0.0302 |
| K224 | 0.9212 | 0.9352 | 0.9263 | 0.0283 | 0.0566 | 0.0391 |

| Model | K_r Min | K_r Max | K_r Rata2 | H_i/L Min | H_i/L max | H_i/L rata2 |
|-------|-----------|-----------|-------------|-------------|-------------|---------------|
| k441 | 0.8561 | 0.8771 | 0.8666 | 0.02872 | 0.05342 | 0.0387 |
| k442 | 0.9025 | 0.9170 | 0.9082 | 0.03029 | 0.05465 | 0.0405 |
| k444 | 0.9356 | 0.9536 | 0.9422 | 0.02327 | 0.04706 | 0.0339 |

Note

| | | |
|-----------|--------|------|
| K_r Min | 0.7432 | K0 |
| K_r Max | 0.9536 | K444 |

| | | |
|-------------|--------|------|
| H_i/L Min | 0.0201 | K222 |
| H_i/L MAX | 0.0566 | K224 |



Grafik Hubungan Ru terhadap Koefisien Refleksi (K_r)

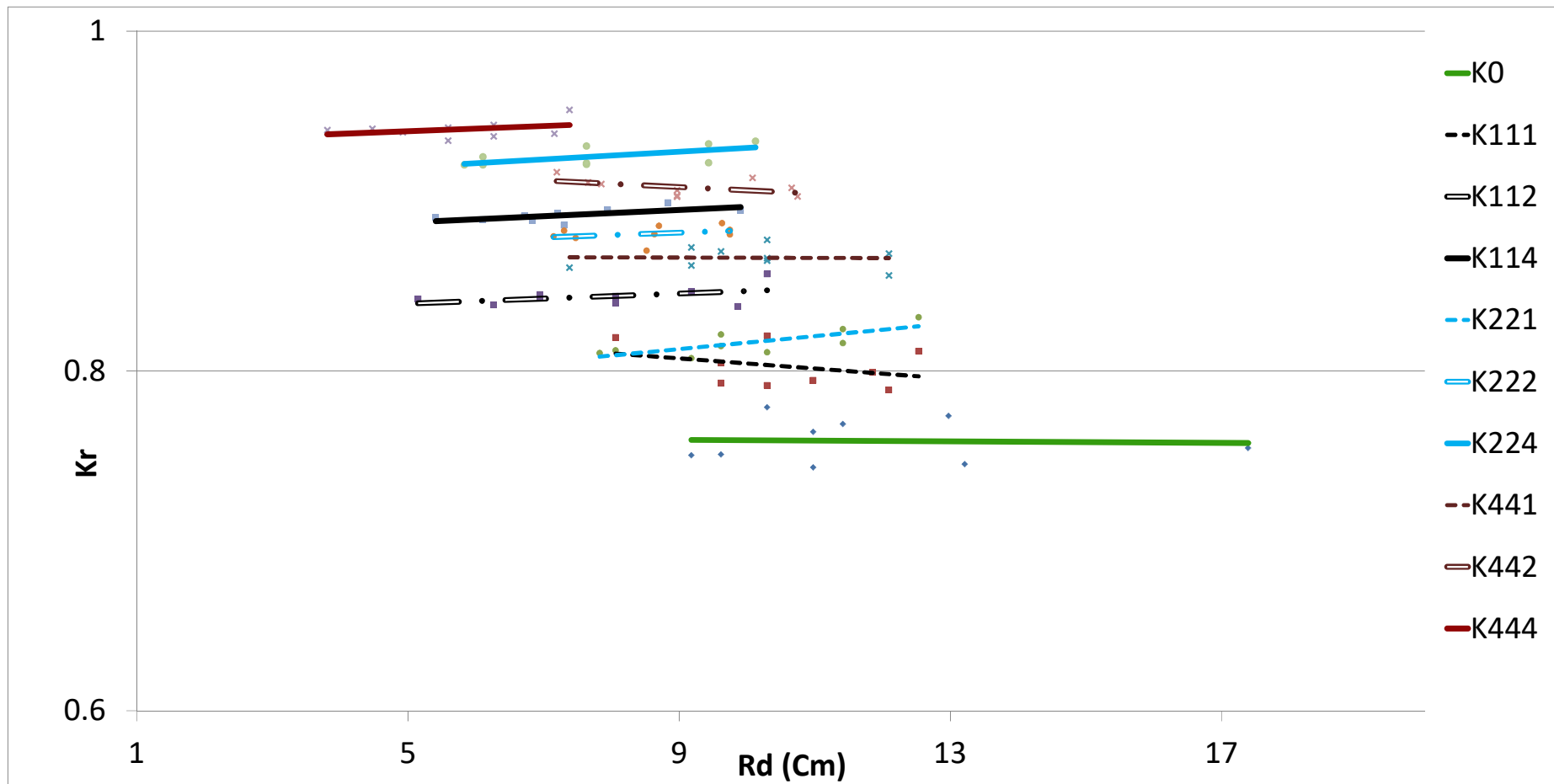
| Model | K_r Min | K_r Max | K_r Rata2 | Ru Min | Ru Max | Ru rata2 |
|-------|-----------|-----------|-------------|----------|----------|------------|
| K0 | 0.7432 | 0.7786 | 0.7588 | 8.7464 | 19.2938 | 13.2927 |
| K111 | 0.7888 | 0.8207 | 0.8026 | 8.0623 | 12.7769 | 10.7808 |
| K112 | 0.8379 | 0.8570 | 0.8438 | 5.5902 | 12.1758 | 8.9450 |
| K114 | 0.8857 | 0.8990 | 0.8917 | 6.1478 | 8.9772 | 7.6993 |
| K221 | 0.8075 | 0.8316 | 0.8166 | 6.2111 | 11.6619 | 9.0597 |
| K222 | 0.8708 | 0.8869 | 0.8808 | 6.0208 | 10.8004 | 8.0925 |
| K224 | 0.9212 | 0.9352 | 0.9263 | 3.6056 | 9.6177 | 6.4914 |

| Model | K_r Min | K_r Max | K_r Rata2 | Ru Min | Ru Max | Ru rata2 |
|-------|-----------|-----------|-------------|----------|----------|------------|
| k441 | 0.8561 | 0.8771 | 0.8666 | 5.4083 | 11.6619 | 8.5001 |
| k442 | 0.9025 | 0.9170 | 0.9082 | 6.1788 | 8.88238 | 7.6193 |
| k444 | 0.9356 | 0.9536 | 0.9422 | 2.5000 | 8.74643 | 5.3516 |

Note

| | | |
|-----------|--------|------|
| K_r Min | 0.7432 | K0 |
| K_r Max | 0.9536 | K444 |

| | | |
|----------|---------|------|
| Ru Min | 2.5000 | K444 |
| Ru MAX | 19.2938 | K0 |



Grafik Hubungan R_d terhadap Koefisien Refleksi (K_r)

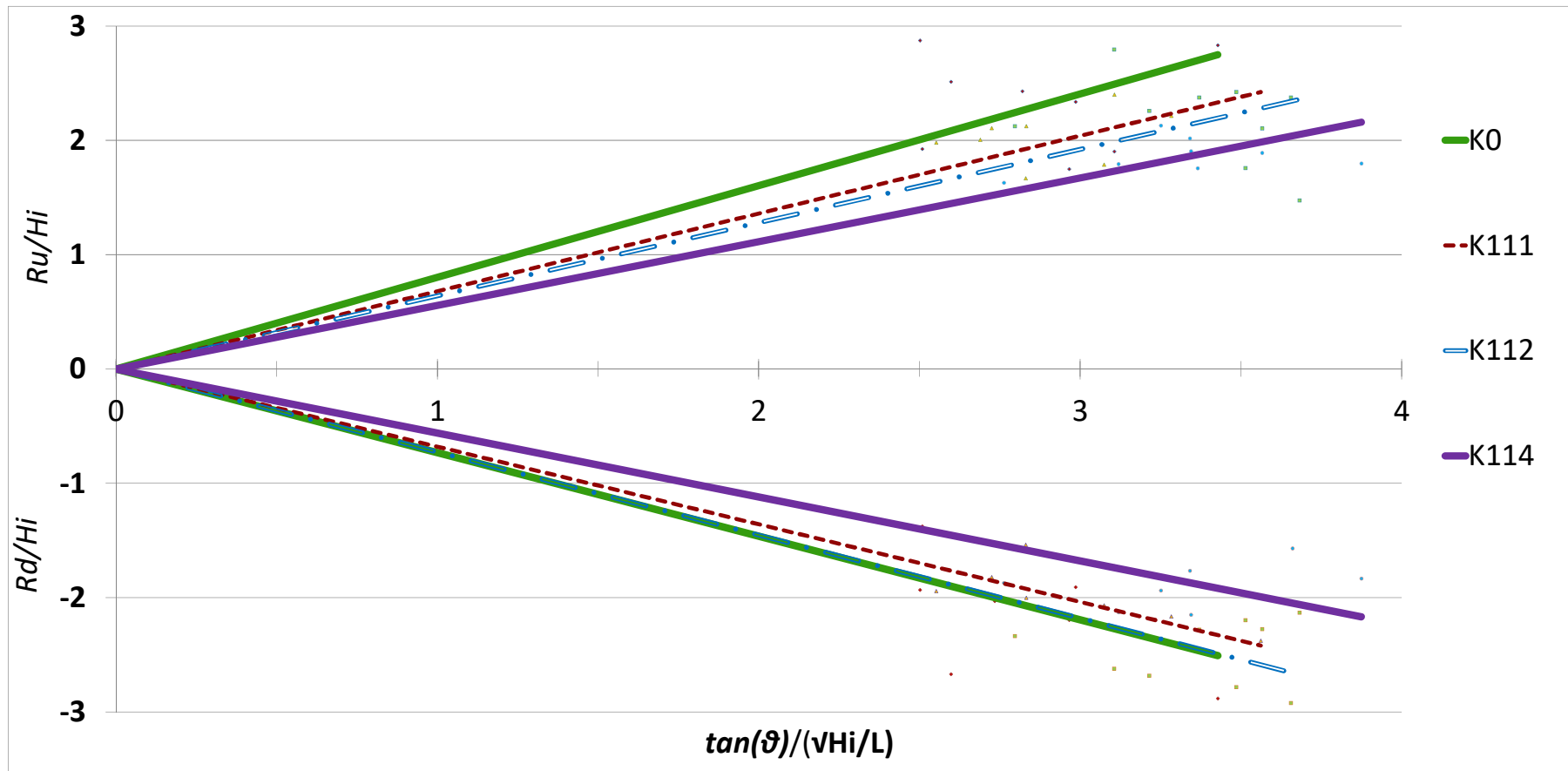
| Model | K_r Min | K_r Max | K_r Rata2 | R_d Min | R_d Max | R_d rata2 |
|-------|-----------|-----------|-------------|-----------|-----------|-------------|
| K0 | 0.7432 | 0.7786 | 0.7588 | -17.393 | -9.179 | -11.781 |
| K111 | 0.7888 | 0.8207 | 0.8026 | -12.530 | -8.062 | -10.594 |
| K112 | 0.8379 | 0.8570 | 0.8438 | -12.530 | -7.826 | -9.995 |
| K114 | 0.8857 | 0.8990 | 0.8917 | -10.296 | -5.148 | -7.863 |
| K221 | 0.8075 | 0.8316 | 0.8166 | -12.093 | -7.382 | -10.048 |
| K222 | 0.8708 | 0.8869 | 0.8808 | -9.746 | -7.148 | -8.544 |
| K224 | 0.9212 | 0.9352 | 0.9263 | -9.906 | -5.408 | -7.362 |

| Model | K_r Min | K_r Max | K_r Rata2 | R_d Min | R_d Max | R_d rata2 |
|-------|-----------|-----------|-------------|-----------|-----------|-------------|
| k441 | 0.8561 | 0.8771 | 0.8666 | -10.748 | -7.192 | -9.009 |
| k442 | 0.9025 | 0.9170 | 0.9082 | -10.124 | -5.831 | -7.770 |
| k444 | 0.9356 | 0.9536 | 0.9422 | -7.382 | -3.808 | -5.717 |

Note

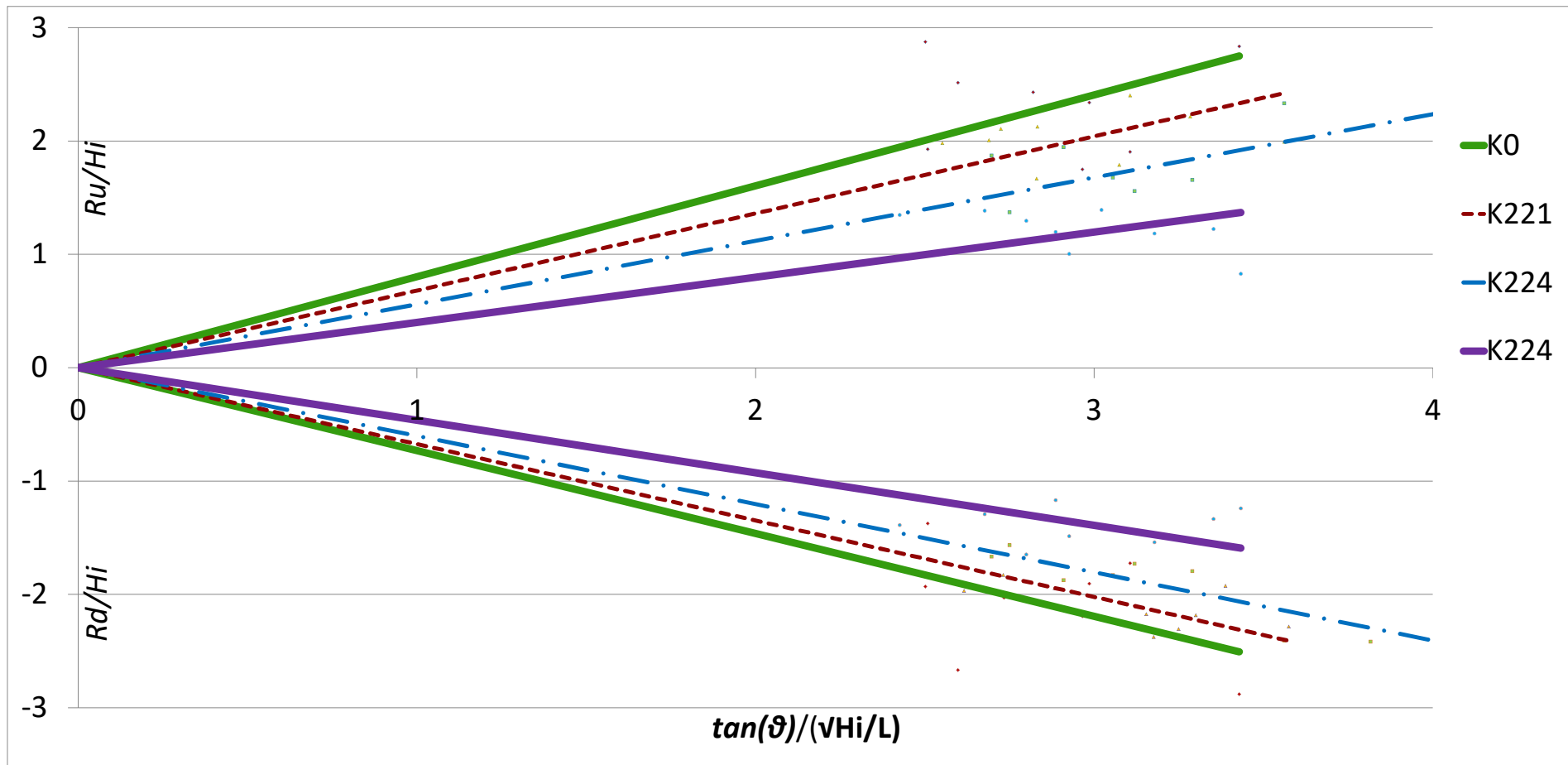
| | | |
|-----------|--------|------|
| K_r Min | 0.7432 | K0 |
| K_r Max | 0.9536 | K444 |

| | | |
|-----------|---------|------|
| R_d Min | -17.393 | K0 |
| R_d MAX | -3.808 | K444 |



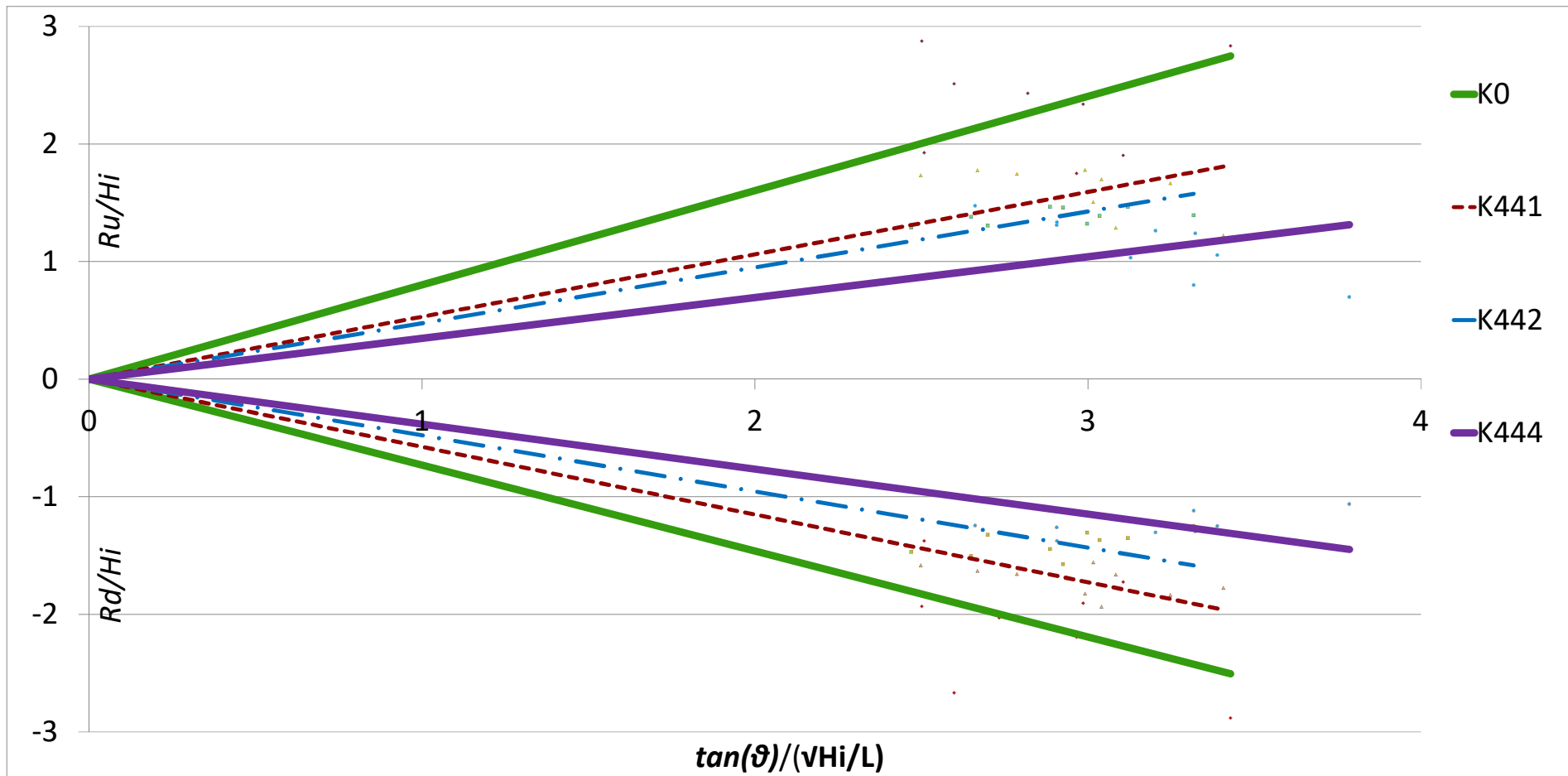
Grafik Hubungan l_r terhadap R_u/H_i dan R_d/H_i Pada Model revetmen dengan ukuran Balok 1X1

| Model | l_r | | | R_u/H_i | | | R_d/H_i | | |
|-------|-----------|-----------|-------------|---------------|---------------|-----------------|---------------|---------------|-----------------|
| | l_r Min | l_r Max | l_r rata2 | R_u/H_i Min | R_u/H_i Max | R_u/H_i rata2 | R_d/H_i Min | R_d/H_i Max | R_d/H_i rata2 |
| K0 | 2.5015 | 3.4284 | 2.8496 | 1.748 | 2.875 | 2.307 | -2.881 | -1.376 | -2.084 |
| K111 | 2.5515 | 3.5617 | 2.9614 | 1.668 | 2.401 | 2.032 | -2.377 | -1.537 | -2.014 |
| K112 | 2.7967 | 3.6823 | 3.3766 | 1.477 | 2.795 | 2.188 | -2.920 | -2.130 | -2.468 |
| K114 | 2.7622 | 3.8749 | 3.3651 | 1.631 | 2.129 | 1.886 | -2.150 | -1.568 | -1.902 |



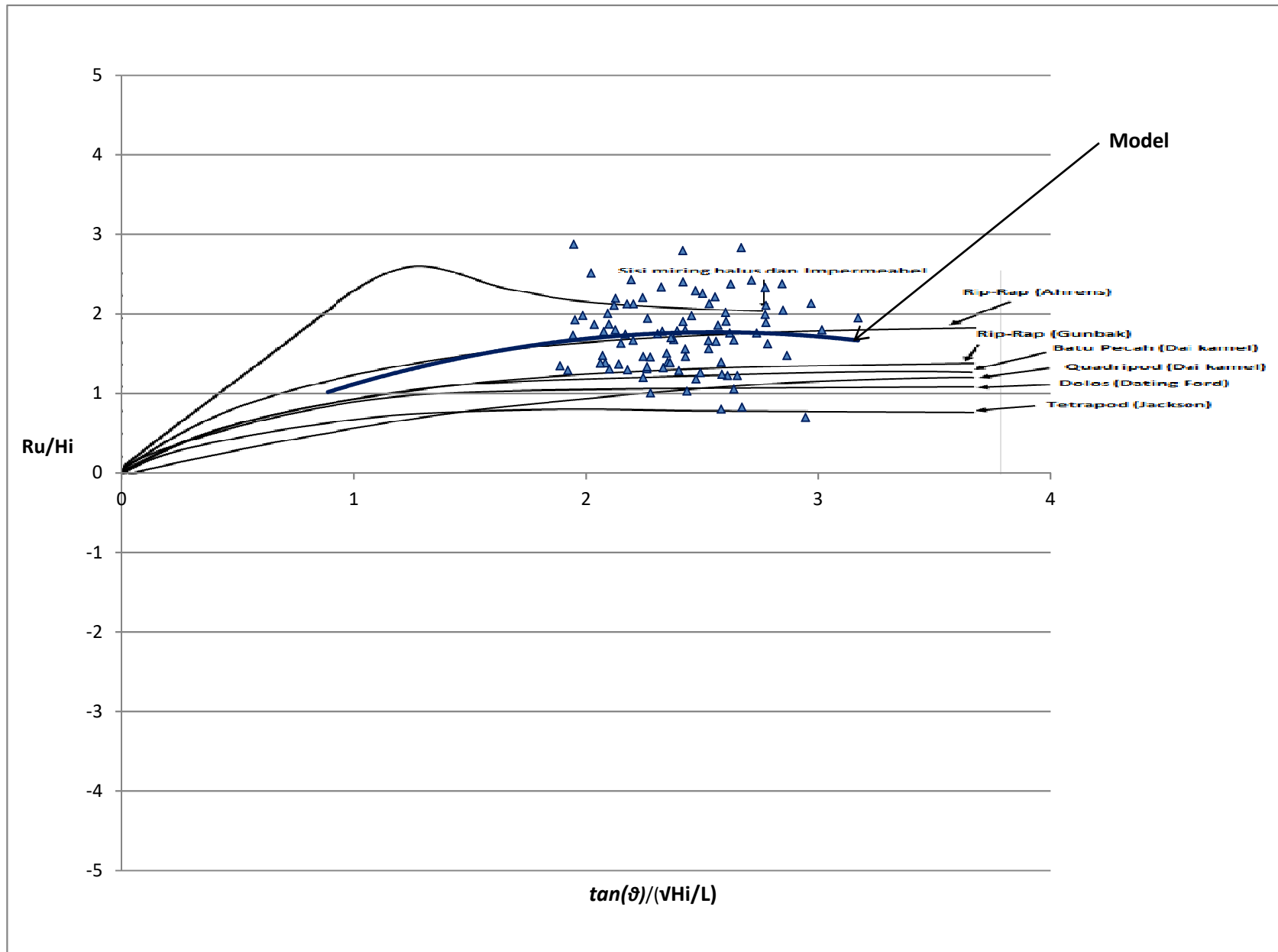
Grafik Hubungan I_r terhadap R_u/H_i dan R_d/H_i Pada Model revetmen dengan ukuran Balok 2x2

| Model | I_r | | | R_u/H_i | | | R_d/H_i | | |
|-------|-----------|-----------|-------------|---------------|---------------|-----------------|---------------|---------------|-----------------|
| | I_r Min | I_r Max | I_r rata2 | R_u/H_i Min | R_u/H_i Max | R_u/H_i rata2 | R_d/H_i Min | R_d/H_i Max | R_d/H_i rata2 |
| K0 | 2.5015 | 3.4284 | 2.8496 | 1.748 | 2.875 | 2.307 | -2.881 | -1.376 | -2.084 |
| K221 | 2.6156 | 3.5745 | 3.1191 | 1.561 | 2.291 | 1.872 | -2.376 | -1.829 | -2.086 |
| K222 | 2.6967 | 4.0756 | 3.2527 | 1.369 | 2.331 | 1.832 | -2.417 | -1.567 | -1.956 |
| K224 | 2.4259 | 3.4330 | 2.9666 | 0.828 | 1.392 | 1.206 | -1.648 | -1.170 | -1.392 |



Grafik Hubungan *Ir* terhadap *Ru/Hi* dan *Rd/Hi* Pada Model revetmen dengan ukuran Balok 4X4

| Model | Ir | | | Ru/Hi | | | Rd/Hi | | |
|-------|--------|--------|----------|------------|-----------|-------------|------------|-----------|-------------|
| | Ir Min | Ir Max | Ir rata2 | Ru /Hi Min | Ru/Hi Max | Ru/Hi rata2 | Rd /Hi Min | Rd/Hi Max | Rd/Hi rata2 |
| K0 | 2.5015 | 3.4284 | 2.8496 | 1.748 | 2.875 | 2.307 | -2.881 | -1.376 | -2.084 |
| K441 | 2.4979 | 3.4067 | 2.9710 | 1.223 | 1.779 | 1.601 | -1.935 | -1.558 | -1.718 |
| K442 | 2.4697 | 3.3174 | 2.9000 | 1.290 | 1.464 | 1.385 | -1.573 | -1.250 | -1.399 |
| K444 | 2.6614 | 3.7851 | 3.1800 | 0.698 | 1.475 | 1.134 | -1.375 | -1.063 | -1.234 |



Grafik Hubungan I_r terhadap Ru/Hi dan RU/Rd Pada Model revetmen dengan ukuran Balok 4X4

TABEL NILAI KEKASARAN MODEL REVETMEN

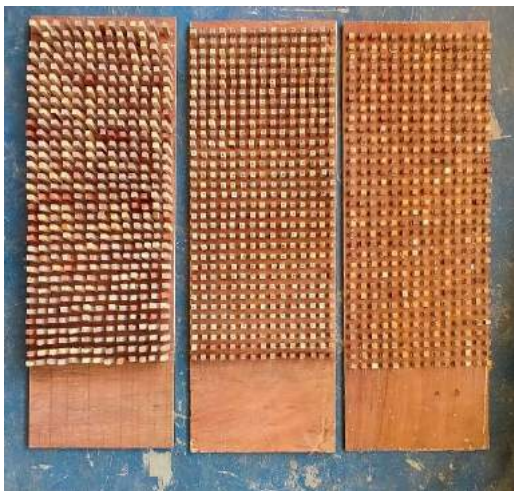
| Model | Dimensi (cm) | | | Vol Cm3 | Dimensi kekasaran (cm) | | | Jumlah (n) buah | Besarnya Volume Model | kekasaran |
|-------|--------------|-----|-----|------------|---------------------------|-----|-----|-----------------------|-----------------------------|-----------|
| | P | L | T | | P | L | T | | | |
| (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) | (11) |
| K0 | 0 | 0 | 0 | - | 0 | 0 | 0 | 0 | 0 | 0 |
| K111 | 62 | 30 | 1 | 1,860 | 1 | 1 | 1 | 450 | 450 | 0.06048 |
| k112 | 62 | 30 | 2 | 3,720 | 1 | 1 | 2 | 450 | 900 | 0.12097 |
| k114 | 62 | 30 | 4 | 7,440 | 1 | 1 | 4 | 450 | 1800 | 0.24194 |
| k221 | 62 | 30 | 1 | 1,860 | 2 | 2 | 1 | 200 | 800 | 0.10753 |
| k222 | 62 | 30 | 2 | 3,720 | 2 | 2 | 2 | 200 | 1600 | 0.21505 |
| k224 | 62 | 30 | 4 | 7,440 | 2 | 2 | 4 | 200 | 3200 | 0.43011 |
| k441 | 62 | 30 | 1 | 1,860 | 4 | 4 | 1 | 72 | 1152 | 0.15484 |
| k442 | 62 | 30 | 2 | 3,720 | 4 | 4 | 2 | 72 | 2304 | 0.30968 |
| k444 | 62 | 30 | 4 | 7,440 | 4 | 4 | 4 | 72 | 4608 | 0.61935 |

(5) = (2) X (3) X (4)

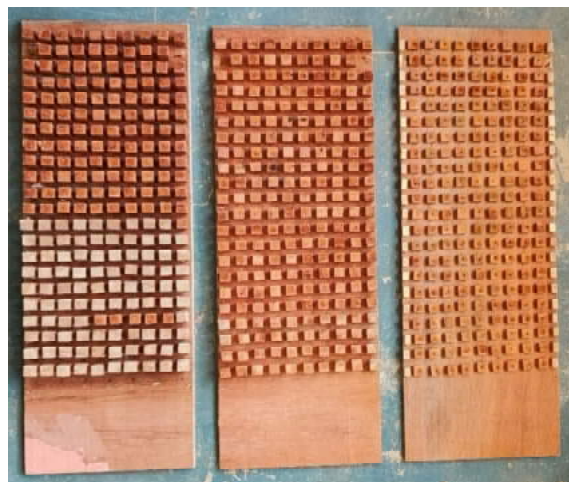
(10) = (6) X (7) X (8) X (9)

(11) = (10)/(5_c)

Model Dengan Kekasaran menggunakan Balok 1x1 Cm



Model Dengan Kekasaran menggunakan Balok 2x2 Cm



Model Dengan Kekasaran menggunakan Balok 1x1 Cm



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