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ESCUELA TÉCNICA SUPERIOR
DE INGENIEROS DE CAMINOS,
CANALES Y PUERTOS



APPENDIX 4. HONG KONG CONSTRUCTION TRADES RANKS

**Study on improving labor productivity in the construction
industry. The cases of Europe and Hong Kong.**

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Table 1. Hong Kong infrastructure critical construction trades rank

| Criticality Rank | Trades | RII | Labor Cost Average | Construction Time Average | Total Cost Average |
|-------------------------|---|------------|---------------------------|----------------------------------|---------------------------|
| 1 | Bar Bender and Fixer | 0,755 | 4,18 | 3,95 | 3,77 |
| 2 | Piling Operative | 0,731 | 3,89 | 3,82 | 3,66 |
| 3 | Tunnel Worker | 0,724 | 3,87 | 3,74 | 3,62 |
| 4 | Concrete and Grouting Worker | 0,718 | 3,85 | 3,74 | 3,59 |
| 5 | Diver (construction work) | 0,715 | 3,84 | 3,71 | 3,57 |
| 6 | Metal-steel Worker | 0,698 | 3,82 | 3,67 | 3,49 |
| 7 | Electrician | 0,684 | 3,82 | 3,66 | 3,42 |
| 8 | Welder | 0,679 | 3,81 | 3,64 | 3,39 |
| 9 | Blasting Worker | 0,676 | 3,57 | 3,62 | 3,38 |
| 10 | Prestressing Operative | 0,675 | 3,53 | 3,53 | 3,38 |
| 11 | Plant and Equipment Operator | 0,670 | 3,51 | 3,49 | 3,35 |
| 12 | Rigger/Metal Formwork Erector | 0,670 | 3,44 | 3,31 | 3,35 |
| 13 | Electronic Equipment Mechanic | 0,653 | 3,38 | 3,22 | 3,26 |
| 14 | Scaffolder | 0,648 | 3,20 | 3,13 | 3,24 |
| 15 | Cement Sand Mortar Worker | 0,647 | 3,18 | 3,13 | 3,23 |
| 16 | Floor Layer | 0,641 | 3,15 | 3,12 | 3,21 |
| 17 | Leveller | 0,637 | 3,14 | 3,06 | 3,18 |
| 18 | Curtain Wall and Glass Panes Installer | 0,636 | 3,11 | 3,05 | 3,18 |
| 19 | Painter and Decorator | 0,633 | 3,03 | 3,00 | 3,17 |
| 20 | Woodworker | 0,627 | 3,03 | 2,97 | 3,14 |
| 21 | Plant and Equipment Mechanic | 0,623 | 2,97 | 2,94 | 3,11 |
| 22 | Demolition Worker | 0,621 | 2,97 | 2,85 | 3,11 |
| 23 | Window Frame Installer | 0,618 | 2,88 | 2,82 | 3,09 |
| 24 | Drain and Pipe Layer | 0,596 | 2,85 | 2,75 | 2,98 |
| 25 | Marine Construction Plant Operator (Lifting) | 0,595 | 2,80 | 2,69 | 2,98 |
| 26 | Construction Goods Vehicle Driver | 0,593 | 2,75 | 2,69 | 2,97 |
| 27 | Hand-dug Caisson Worker | 0,586 | 2,74 | 2,68 | 2,93 |
| 28 | Trackworker | 0,576 | 2,69 | 2,66 | 2,88 |
| 29 | Gas Installer | 0,576 | 2,66 | 2,63 | 2,88 |
| 30 | Asphalter (Road Construction) | 0,573 | 2,65 | 2,60 | 2,87 |
| 31 | Asbestos Abatement Worker | 0,562 | 2,64 | 2,58 | 2,81 |
| 32 | Marble Worker | 0,560 | 2,64 | 2,57 | 2,80 |
| 33 | Fire Service Mechanic | 0,546 | 2,63 | 2,55 | 2,73 |
| 34 | Waterproofing Worker | 0,540 | 2,61 | 2,54 | 2,70 |
| 35 | Paving Block Layer | 0,535 | 2,54 | 2,47 | 2,68 |
| 36 | Lift and Escalator Mechanic | 0,521 | 2,44 | 2,41 | 2,61 |
| 37 | Refrigeration/Air-conditioning/Ventilation Mechanic | 0,494 | 2,18 | 2,18 | 2,47 |

Table 2. Hong Kong building critical construction trades rank

| Criticality Rank | Trades | RII | Labor Cost Average | Construction Time Average | Total Cost Average |
|------------------|---|-------|--------------------|---------------------------|--------------------|
| 1 | Bar Bender and Fixer | 0,839 | 3,78 | 3,31 | 4,19 |
| 2 | Concrete and Grouting Worker | 0,786 | 2,21 | 2,55 | 3,93 |
| 3 | Rigger/Metal Formwork Erector | 0,760 | 2,92 | 2,97 | 3,80 |
| 4 | Woodworker | 0,725 | 3,55 | 3,61 | 3,63 |
| 5 | Welder | 0,725 | 2,96 | 2,71 | 3,63 |
| 6 | Metal-steel Worker | 0,723 | 3,02 | 3,06 | 3,62 |
| 7 | Scaffolder | 0,723 | 2,57 | 2,86 | 3,61 |
| 8 | Piling Operative | 0,717 | 3,33 | 3,06 | 3,58 |
| 9 | Plant and Equipment Operator | 0,709 | 2,61 | 2,91 | 3,55 |
| 10 | Curtain Wall and Glass Panes Installer | 0,681 | 3,69 | 3,51 | 3,41 |
| 11 | Cement Sand Mortar Worker | 0,650 | 2,63 | 2,43 | 3,25 |
| 12 | Lift and Escalator Mechanic | 0,641 | 3,74 | 3,88 | 3,21 |
| 13 | Electrician | 0,619 | 2,67 | 2,67 | 3,09 |
| 14 | Plant and Equipment Mechanic | 0,614 | 3,20 | 2,63 | 3,07 |
| 15 | Drain and Pipe Layer | 0,614 | 3,63 | 3,54 | 3,07 |
| 16 | Prestressing Operative | 0,597 | 4,10 | 3,69 | 2,98 |
| 17 | Marble Worker | 0,595 | 2,94 | 3,09 | 2,98 |
| 18 | Asbestos Abatement Worker | 0,595 | 3,09 | 2,82 | 2,97 |
| 19 | Window Frame Installer | 0,591 | 3,75 | 3,43 | 2,95 |
| 20 | Gas Installer | 0,589 | 3,06 | 2,91 | 2,95 |
| 21 | Blasting Worker | 0,589 | 3,52 | 3,21 | 2,94 |
| 22 | Painter and Decorator | 0,588 | 2,66 | 2,71 | 2,94 |
| 23 | Leveller | 0,586 | 2,61 | 2,82 | 2,93 |
| 24 | Fire Service Mechanic | 0,583 | 2,61 | 2,54 | 2,91 |
| 25 | Waterproofing Worker | 0,571 | 2,61 | 2,71 | 2,86 |
| 26 | Refrigeration/Air-conditioning/Ventilation Mechanic | 0,565 | 3,61 | 3,46 | 2,83 |
| 27 | Asphalter (Road Construction) | 0,554 | 4,33 | 3,94 | 2,77 |
| 28 | Demolition Worker | 0,554 | 3,06 | 2,82 | 2,77 |
| 29 | Electronic Equipment Mechanic | 0,553 | 2,82 | 2,69 | 2,76 |
| 30 | Floor Layer | 0,544 | 2,93 | 2,96 | 2,72 |
| 31 | Paving Block Layer | 0,543 | 3,27 | 3,19 | 2,71 |
| 32 | Diver (construction work) | 0,536 | 2,88 | 2,75 | 2,68 |
| 33 | Marine Construction Plant Operator (Lifting) | 0,534 | 2,92 | 2,91 | 2,67 |
| 34 | Tunnel Worker | 0,531 | 3,02 | 2,83 | 2,65 |
| 35 | Trackworker | 0,517 | 3,06 | 3,15 | 2,58 |
| 36 | Construction Goods Vehicle Driver | 0,514 | 2,69 | 2,88 | 2,57 |
| 37 | Hand-dug Caisson Worker | 0,468 | 3,14 | 2,97 | 2,34 |

Table 3. Hong Kong infrastructure labor shortage criticality construction trades rank

| Criticality Rank | Trades | RII | Labor Shortage Average |
|------------------|---|-------|------------------------|
| 1 | Refrigeration/Air-conditioning/Ventilation Mechanic | 0,753 | 3,76 |
| 2 | Paving Block Layer | 0,746 | 3,73 |
| 3 | Scaffolder | 0,714 | 3,57 |
| 4 | Lift and Escalator Mechanic | 0,711 | 3,55 |
| 5 | Prestressing Operative | 0,708 | 3,54 |
| 6 | Diver (construction work) | 0,703 | 3,51 |
| 7 | Window Frame Installer | 0,692 | 3,46 |
| 8 | Hand-dug Caisson Worker | 0,689 | 3,44 |
| 9 | Asphalter (Road Construction) | 0,688 | 3,44 |
| 10 | Painter and Decorator | 0,686 | 3,43 |
| 11 | Cement Sand Mortar Worker | 0,681 | 3,41 |
| 12 | Electrician | 0,674 | 3,37 |
| 13 | Drain and Pipe Layer | 0,672 | 3,36 |
| 14 | Demolition Worker | 0,655 | 3,27 |
| 15 | Woodworker | 0,637 | 3,18 |
| 16 | Construction Goods Vehicle Driver | 0,611 | 3,06 |
| 17 | Tunnel Worker | 0,606 | 3,03 |
| 18 | Bar Bender and Fixer | 0,595 | 2,97 |
| 19 | Floor Layer | 0,594 | 2,97 |
| 20 | Leveller | 0,594 | 2,97 |
| 21 | Plant and Equipment Operator | 0,579 | 2,89 |
| 22 | Concrete and Grouting Worker | 0,574 | 2,87 |
| 23 | Welder | 0,574 | 2,87 |
| 24 | Waterproofing Worker | 0,571 | 2,85 |
| 25 | Asbestos Abatement Worker | 0,571 | 2,85 |
| 26 | Metal-steel Worker | 0,558 | 2,79 |
| 27 | Rigger/Metal Formwork Erector | 0,553 | 2,76 |
| 28 | Blasting Worker | 0,538 | 2,69 |
| 29 | Piling Operative | 0,537 | 2,69 |
| 30 | Marble Worker | 0,527 | 2,64 |
| 31 | Marine Construction Plant Operator (Lifting) | 0,524 | 2,62 |
| 32 | Fire Service Mechanic | 0,521 | 2,61 |
| 33 | Curtain Wall and Glass Panes Installer | 0,511 | 2,55 |
| 34 | Trackworker | 0,509 | 2,55 |
| 35 | Plant and Equipment Mechanic | 0,509 | 2,54 |
| 36 | Electronic Equipment Mechanic | 0,479 | 2,39 |
| 37 | Gas Installer | 0,450 | 2,25 |

Table 4. Hong Kong building labor shortage criticality construction trades rank

| Criticality Rank | Trades | RII | Labor Shortage Average |
|------------------|---|-------|------------------------|
| 1 | Bar Bender and Fixer | 0,777 | 3,89 |
| 2 | Scaffolder | 0,726 | 3,63 |
| 3 | Concrete and Grouting Worker | 0,709 | 3,54 |
| 4 | Woodworker | 0,680 | 3,40 |
| 5 | Metal-steel Worker | 0,680 | 3,40 |
| 6 | Welder | 0,680 | 3,40 |
| 7 | Rigger/Metal Formwork Erector | 0,665 | 3,32 |
| 8 | Plant and Equipment Operator | 0,663 | 3,31 |
| 9 | Blasting Worker | 0,650 | 3,25 |
| 10 | Lift and Escalator Mechanic | 0,644 | 3,22 |
| 11 | Curtain Wall and Glass Panes Installer | 0,641 | 3,21 |
| 12 | Cement Sand Mortar Worker | 0,623 | 3,11 |
| 13 | Drain and Pipe Layer | 0,611 | 3,06 |
| 14 | Plant and Equipment Mechanic | 0,600 | 3,00 |
| 15 | Painter and Decorator | 0,594 | 2,97 |
| 16 | Prestressing Operative | 0,594 | 2,97 |
| 17 | Piling Operative | 0,588 | 2,94 |
| 18 | Electronic Equipment Mechanic | 0,581 | 2,91 |
| 19 | Hand-dug Caisson Worker | 0,581 | 2,90 |
| 20 | Electrician | 0,571 | 2,85 |
| 21 | Marble Worker | 0,564 | 2,82 |
| 22 | Diver (construction work) | 0,561 | 2,81 |
| 23 | Marine Construction Plant Operator (Lifting) | 0,560 | 2,80 |
| 24 | Leveller | 0,554 | 2,77 |
| 25 | Asphalter (Road Construction) | 0,552 | 2,76 |
| 26 | Window Frame Installer | 0,552 | 2,76 |
| 27 | Paving Block Layer | 0,549 | 2,74 |
| 28 | Floor Layer | 0,545 | 2,73 |
| 29 | Demolition Worker | 0,541 | 2,71 |
| 30 | Refrigeration/Air-conditioning/Ventilation Mechanic | 0,538 | 2,69 |
| 31 | Trackworker | 0,536 | 2,68 |
| 32 | Gas Installer | 0,531 | 2,66 |
| 33 | Waterproofing Worker | 0,529 | 2,65 |
| 34 | Fire Service Mechanic | 0,525 | 2,63 |
| 35 | Tunnel Worker | 0,521 | 2,61 |
| 36 | Asbestos Abatement Worker | 0,487 | 2,43 |
| 37 | Construction Goods Vehicle Driver | 0,474 | 2,37 |

Table 5. Hong Kong infrastructure construction trades automation level rank

| Level Rank | Trades | RII | Automation Level Average |
|------------|---|-------|--------------------------|
| 1 | Tunnel Worker | 0,700 | 3,50 |
| 2 | Asphalter (Road Construction) | 0,659 | 3,29 |
| 3 | Blasting Worker | 0,651 | 3,26 |
| 4 | Plant and Equipment Operator | 0,642 | 3,21 |
| 5 | Trackworker | 0,630 | 3,15 |
| 6 | Piling Operative | 0,615 | 3,08 |
| 7 | Electrician | 0,595 | 2,97 |
| 8 | Electronic Equipment Mechanic | 0,589 | 2,94 |
| 9 | Plant and Equipment Mechanic | 0,583 | 2,92 |
| 10 | Concrete and Grouting Worker | 0,579 | 2,89 |
| 11 | Curtain Wall and Glass Panes Installer | 0,559 | 2,79 |
| 12 | Welder | 0,558 | 2,79 |
| 13 | Bar Bender and Fixer | 0,547 | 2,74 |
| 14 | Prestressing Operative | 0,544 | 2,72 |
| 15 | Demolition Worker | 0,540 | 2,70 |
| 16 | Fire Service Mechanic | 0,537 | 2,69 |
| 17 | Gas Installer | 0,535 | 2,68 |
| 18 | Scaffolder | 0,535 | 2,68 |
| 19 | Floor Layer | 0,503 | 2,51 |
| 20 | Construction Goods Vehicle Driver | 0,503 | 2,51 |
| 21 | Painter and Decorator | 0,494 | 2,47 |
| 22 | Metal-steel Worker | 0,492 | 2,46 |
| 23 | Refrigeration/Air-conditioning/Ventilation Mechanic | 0,491 | 2,45 |
| 24 | Window Frame Installer | 0,479 | 2,39 |
| 25 | Lift and Escalator Mechanic | 0,476 | 2,38 |
| 26 | Leveller | 0,472 | 2,36 |
| 27 | Diver (construction work) | 0,467 | 2,33 |
| 28 | Rigger/Metal Formwork Erector | 0,463 | 2,32 |
| 29 | Cement Sand Mortar Worker | 0,451 | 2,26 |
| 30 | Drain and Pipe Layer | 0,446 | 2,23 |
| 31 | Marine Construction Plant Operator (Lifting) | 0,438 | 2,19 |
| 32 | Woodworker | 0,436 | 2,18 |
| 33 | Asbestos Abatement Worker | 0,429 | 2,15 |
| 34 | Marble Worker | 0,428 | 2,14 |
| 35 | Hand-dug Caisson Worker | 0,400 | 2,00 |
| 36 | Waterproofing Worker | 0,390 | 1,95 |
| 37 | Paving Block Layer | 0,379 | 1,90 |

Table 6. Hong Kong infrastructure construction trades automation level rank

| Level Rank | Trades | RII | Automation Level Average |
|------------|---|-------|--------------------------|
| 1 | Plant and Equipment Operator | 0,634 | 3,17 |
| 2 | Plant and Equipment Mechanic | 0,594 | 2,97 |
| 3 | Blasting Worker | 0,593 | 2,96 |
| 4 | Electronic Equipment Mechanic | 0,588 | 2,94 |
| 5 | Trackworker | 0,579 | 2,89 |
| 6 | Concrete and Grouting Worker | 0,577 | 2,89 |
| 7 | Electrician | 0,576 | 2,88 |
| 8 | Piling Operative | 0,576 | 2,88 |
| 9 | Prestressing Operative | 0,575 | 2,88 |
| 10 | Asphalter (Road Construction) | 0,572 | 2,86 |
| 11 | Bar Bender and Fixer | 0,571 | 2,86 |
| 12 | Welder | 0,566 | 2,83 |
| 13 | Curtain Wall and Glass Panes Installer | 0,559 | 2,79 |
| 14 | Demolition Worker | 0,553 | 2,76 |
| 15 | Tunnel Worker | 0,550 | 2,75 |
| 16 | Lift and Escalator Mechanic | 0,550 | 2,75 |
| 17 | Refrigeration/Air-conditioning/Ventilation Mechanic | 0,538 | 2,69 |
| 18 | Window Frame Installer | 0,533 | 2,67 |
| 19 | Gas Installer | 0,524 | 2,62 |
| 20 | Fire Service Mechanic | 0,513 | 2,56 |
| 21 | Metal-steel Worker | 0,509 | 2,54 |
| 22 | Scaffolder | 0,491 | 2,46 |
| 23 | Floor Layer | 0,479 | 2,39 |
| 24 | Marble Worker | 0,473 | 2,36 |
| 25 | Painter and Decorator | 0,473 | 2,36 |
| 26 | Rigger/Metal Formwork Erector | 0,459 | 2,29 |
| 27 | Woodworker | 0,457 | 2,29 |
| 28 | Asbestos Abatement Worker | 0,453 | 2,27 |
| 29 | Cement Sand Mortar Worker | 0,451 | 2,26 |
| 30 | Leveller | 0,446 | 2,23 |
| 31 | Drain and Pipe Layer | 0,434 | 2,17 |
| 32 | Construction Goods Vehicle Driver | 0,434 | 2,17 |
| 33 | Marine Construction Plant Operator (Lifting) | 0,420 | 2,10 |
| 34 | Diver (construction work) | 0,400 | 2,00 |
| 35 | Waterproofing Worker | 0,382 | 1,91 |
| 36 | Paving Block Layer | 0,366 | 1,83 |
| 37 | Hand-dug Caisson Worker | 0,335 | 1,68 |