



Ministerio de Transportes y Comunicaciones  
Dirección General de Caminos y Ferrocarriles  
"Dirección de Equipo Mecánico"

## Costo Referencial de Posesión y Operación de Equipo Mecánico del MTC - Septiembre 2007 -

### Maquinaria

| N°                                       | Unidad base para el Cálculo             | Potencia (HP) | Capacidad                 | Peso (Kg.) | Costo de Posesión |              |           | Costo de Operación |                        |                |         |         |          | Costo Horario de Posesión y Operación (a+b) |           |
|--|---|---------------|---------------------------|------------|-------------------|--------------|-----------|--------------------|------------------------|----------------|---------|---------|----------|---|-----------|
|  |   |               |                           |            | Depreciación      | Seguro 0.46% | Total (a) | Mant. y Rep.       | Consumo de Combustible | Lubr. + Grasas | Filtros | Llantas | Operador |   | Total (b) |
| <b>Equipos para Perforación</b>          |   |               |                           |            |                   |              |           |                    |                        |                |         |         |          |   |           |
| 1  |   | 76            | 125-175 PCM               | 2,000      | 4.2               | 0.0          | 4.2       | 3.3                | 22.5                   | 2.7            | 1.1     | 0.0     | 8.3      | 37.9  | 42.1      |
| 2  |   | 87            | 250-330 PCM               | 2,000      | 9.9               | 0.0          | 9.9       | 7.7                | 28.8                   | 2.7            | 1.1     | 0.0     | 8.3      | 48.6  | 58.5      |
| 3  | Compresoras Neumáticas                  | 93            | 335-375 PCM               | 2,500      | 13.4              | 0.3          | 13.7      | 10.5               | 45.0                   | 3.1            | 1.2     | 0.0     | 8.3      | 68.1  | 81.8      |
| 4  |   | 150           | 380-590 PCM               | 3,500      | 18.2              | 0.4          | 18.6      | 14.2               | 47.5                   | 3.7            | 1.5     | 0.0     | 8.3      | 75.3  | 93.9      |
| 5  |   | 196           | 600-690 PCM               | 5,000      | 14.0              | 0.3          | 14.3      | 11.0               | 91.3                   | 5.7            | 2.3     | 0.0     | 8.3      | 118.6                                       | 132.9     |
| 6  |   | 240           | 700-800 PCM               | 6,500      | 15.5              | 0.3          | 15.8      | 12.1               | 108.8                  | 7.1            | 2.8     | 0.0     | 8.3      | 139.2                                       | 155.0     |
| 7  | Martillos Neumáticos                    |               | 24 Kg                     | 24         | 3.3               | 0.0          | 3.4       | 2.6                | 0.0                    | 0.0            | 0.0     | 0.0     | 0.0      | 2.6   | 6.0       |
| 8  |   |               | 29 Kg                     | 29         | 4.3               | 0.1          | 4.4       | 3.4                | 0.0                    | 0.0            | 0.0     | 0.0     | 0.0      | 3.4   | 7.7       |
| 9  | Motoperforadora                         | 1400 RPM      | 185 CC                    | 26         | 5.3               | 0.1          | 5.3       | 1.7                | 0.0                    | 0.0            | 0.0     | 0.0     | 0.0      | 1.7   | 7.0       |
| 10                                       | Perforadora sobre Orugas                |               | 660-690 PCM               | 6,000      | 21.5              | 0.5          | 22.0      | 17.2               | 0.0                    | 0.0            | 0.0     | 0.0     | 0.0      | 17.2  | 39.2      |
| <b>Equipos para Movimiento de Tierra</b> |   |               |                           |            |                   |              |           |                    |                        |                |         |         |          |   |           |
| 11                                       |   | 50-79         | 0.7-1.3 Yd <sup>3</sup>   | 10,000     | 21.3              | 0.5          | 21.7      | 14.2               | 41.3                   | 3.4            | 1.4     | 0.0     | 8.3      | 68.5  | 90.2      |
| 12                                       |   | 80-105        | 1.5-1.75 Yd <sup>3</sup>  | 12,967     | 25.2              | 0.5          | 25.8      | 16.8               | 45.0                   | 4.4            | 1.8     | 0.0     | 8.3      | 76.2  | 102.0     |
| 13                                       | Cargador sobre Oruga                    | 110-135       | 2.0-2.25 Yd <sup>3</sup>  | 16,275     | 43.5              | 0.9          | 44.4      | 29.0               | 45.0                   | 5.1            | 2.0     | 0.0     | 8.3      | 89.4  | 133.7     |
| 14                                       |   | 150-180       | 2.5-2.75 Yd <sup>3</sup>  | 18,387     | 52.8              | 1.1          | 53.9      | 35.2               | 70.0                   | 5.4            | 2.2     | 0.0     | 8.3      | 121.1                                       | 175.0     |
| 15                                       |   | 190-225       | 3.2-3.75 Yd <sup>3</sup>  | 25,173     | 93.5              | 2.0          | 95.5      | 37.4               | 77.5                   | 7.1            | 2.8     | 0.0     | 8.3      | 133.1                                       | 228.6     |
| 16                                       |   | 245           | 4.0-6.0 Yd <sup>3</sup>   | 28,000     | 97.3              | 2.1          | 99.4      | 38.9               | 87.5                   | 7.4            | 3.0     | 0.0     | 8.3      | 145.1                                       | 244.5     |
| 17                                       | Cargador Retroexcavador                 | 62            | 1 Yd <sup>3</sup>         | 8,000      | 23.2              | 0.4          | 23.6      | 13.0               | 38.8                   | 3.5            | 1.4     | 0.1     | 8.3      | 65.1  | 88.7      |
| 18                                       |   | 80-95         | 1.5-1.75 Yd <sup>3</sup>  | 9,031      | 31.4              | 0.6          | 31.9      | 20.8               | 25.0                   | 3.1            | 1.2     | 1.2     | 8.3      | 59.6  | 91.5      |
| 19                                       |   | 100-115       | 2.0-2.35 Yd <sup>3</sup>  | 10,308     | 28.5              | 0.5          | 29.0      | 18.9               | 35.0                   | 4.0            | 1.6     | 1.2     | 8.3      | 69.0  | 98.0      |
| 20                                       |   | 100-125       | 2.50 Yd <sup>3</sup>      | 11,500     | 42.1              | 0.8          | 42.9      | 28.0               | 35.0                   | 4.7            | 1.9     | 0.9     | 8.3      | 78.8  | 121.7     |
| 21                                       | Cargador sobre Llantas                  | 125-155       | 3.0 Yd <sup>3</sup>       | 16,584     | 42.1              | 0.8          | 42.9      | 28.0               | 56.3                   | 4.7            | 1.9     | 1.0     | 8.3      | 100.1                                       | 143.0     |
| 22                                       |   | 160-195       | 3.5 Yd <sup>3</sup>       | 18,585     | 54.8              | 1.0          | 55.8      | 36.4               | 60.0                   | 5.1            | 2.0     | 1.7     | 8.3      | 113.5                                       | 169.3     |
| 23                                       |   | 200-250       | 4.0 - 4.1 Yd <sup>3</sup> | 20,826     | 61.2              | 1.3          | 62.5      | 40.7               | 62.5                   | 5.7            | 2.3     | 2.3     | 8.3      | 121.8                                       | 184.3     |
| 24                                       |   | 200-250       | 4.6 Yd <sup>3</sup>       | 22,000     | 63.5              | 1.4          | 64.9      | 42.2               | 66.3                   | 7.4            | 3.0     | 2.3     | 8.3      | 129.4                                       | 194.3     |
| 25                                       |   | 260-300       | 5.0-5.50 Yd <sup>3</sup>  | 31,105     | 88.0              | 1.9          | 89.9      | 58.5               | 68.8                   | 8.4            | 3.4     | 2.3     | 8.3      | 149.7                                       | 239.6     |
| 26                                       |   | 375           | 8.0 Yd <sup>3</sup>       | 49,738     | 127.1             | 2.7          | 129.8     | 84.5               | 87.5                   | 10.4           | 4.2     | 3.1     | 8.3      | 198.0                                       | 327.8     |
| 27                                       |   | 140-200       | 11.0 Yd <sup>3</sup>      | 14,200     | 65.6              | 1.2          | 66.9      | 21.8               | 66.3                   | 5.8            | 2.3     | 2.4     | 8.3      | 106.9                                       | 173.7     |
| 28                                       | Mototrallas Autocargable                | 210-300       | 16.0 Yd <sup>3</sup>      | 20,600     | 99.3              | 1.8          | 101.1     | 32.9               | 93.8                   | 8.4            | 3.4     | 3.0     | 8.3      | 149.8                                       | 250.9     |
| 29                                       |   | 310-350       | 23.0 Yd <sup>3</sup>      | 32,800     | 96.3              | 2.1          | 98.3      | 32.0               | 120.0                  | 10.1           | 4.0     | 2.2     | 8.3      | 176.6                                       | 274.9     |
| 30                                       |   | 310-400       | 14-20 Yd <sup>3</sup>     | 20,000     | 93.5              | 2.0          | 95.5      | 31.1               | 125.0                  | 11.1           | 4.4     | 2.3     | 8.3      | 182.2                                       | 277.8     |
| 31                                       |   | 405-480       | 21-31 Yd <sup>3</sup>     | 15,500     | 148.6             | 3.2          | 151.8     | 49.4               | 165.0                  | 13.4           | 5.4     | 3.3     | 8.3      | 244.8                                       | 396.6     |
| 32                                       | Retroexcavadora sobre Llantas           | 58            | 1 Yd <sup>3</sup>         | 9,000      | 19.1              | 0.4          | 19.5      | 8.3                | 25.0                   | 2.4            | 1.0     | 0.2     | 8.3      | 45.2  | 64.7      |
| 33                                       |   | 80-110        | 0.50-1.3 Yd <sup>3</sup>  | 17,300     | 52.0              | 1.0          | 52.9      | 20.8               | 41.3                   | 8.2            | 3.3     | 0.0     | 8.3      | 81.8  | 134.7     |
| 34                                       | Retroexcavadora sobre Oruga             | 115-165       | 0.75-1.60 Yd <sup>3</sup> | 23,400     | 72.3              | 1.3          | 73.6      | 28.9               | 62.5                   | 8.3            | 3.3     | 0.0     | 8.3      | 111.3                                       | 184.9     |
| 35                                       |   | 170-250       | 1.10-2.75 Yd <sup>3</sup> | 33,800     | 119.9             | 2.2          | 122.1     | 47.9               | 87.5                   | 9.3            | 3.7     | 0.0     | 8.3      | 156.8                                       | 278.9     |
| 36                                       |   | 325           | 2.0-3.8 Yd <sup>3</sup>   | 61,600     | 200.5             | 3.7          | 204.2     | 80.2               | 112.5                  | 9.5            | 3.8     | 0.0     | 8.3      | 214.3                                       | 418.5     |
| 37                                       | Ripper (Potencia 150 HP)                |               |                           | 2,000      | 3.7               | 0.1          | 3.8       | 2.1                | 0.0                    | 0.0            | 0.0     | 0.0     | 0.0      | 2.1   | 5.9       |
| 38                                       | Ripper (Potencia 250 HP)                |               |                           | 2,600      | 6.2               | 0.1          | 6.3       | 3.4                | 0.0                    | 0.0            | 0.0     | 0.0     | 0.0      | 3.4   | 9.7       |
| 39                                       | Ripper (Potencia 300 HP)                |               |                           | 4,400      | 10.8              | 0.2          | 11.0      | 6.0                | 0.0                    | 0.0            | 0.0     | 0.0     | 0.0      | 6.0   | 16.9      |
| 40                                       | Ripper (Potencia 470 HP)                |               |                           | 6,600      | 14.0              | 0.3          | 14.3      | 7.8                | 0.0                    | 0.0            | 0.0     | 0.0     | 0.0      | 7.8   | 22.1      |
| 41                                       |   | 60-70         |                           | 6,711      | 22.2              | 0.4          | 22.6      | 11.8               | 30.0                   | 2.4            | 1.0     | 0.0     | 8.3      | 53.5  | 76.1      |
| 42                                       |   | 75-100        |                           | 9,090      | 34.0              | 0.6          | 34.6      | 18.1               | 31.3                   | 2.7            | 1.1     | 0.0     | 8.3      | 61.4  | 96.0      |
| 43                                       |   | 105-135       |                           | 12,300     | 47.9              | 0.9          | 48.8      | 25.6               | 37.5                   | 4.4            | 1.8     | 0.0     | 8.3      | 77.5  | 126.3     |
| 44                                       |   | 140-160       |                           | 14,900     | 41.9              | 0.8          | 42.7      | 22.3               | 62.5                   | 5.1            | 2.0     | 0.0     | 8.3      | 100.2                                       | 142.9     |
| 45                                       |   | 190-240       |                           | 20,520     | 80.3              | 1.7          | 82.1      | 42.8               | 68.8                   | 6.8            | 2.7     | 0.0     | 8.3      | 129.4                                       | 211.4     |
| 46                                       | Tractor sobre Orugas                    | 270-295       |                           | 21,863     | 77.6              | 2.0          | 79.7      | 41.4               | 87.5                   | 7.4            | 3.0     | 0.0     | 8.3      | 147.6                                       | 227.2     |
| 47                                       |   | 300-330       |                           | 31,980     | 77.3              | 2.0          | 79.3      | 51.5               | 128.8                  | 8.1            | 3.2     | 0.0     | 8.3      | 200.0                                       | 279.3     |
| 48                                       |   | 335-410       |                           | 37,170     | 85.1              | 2.2          | 87.3      | 56.7               | 137.5                  | 9.8            | 3.9     | 0.0     | 8.3      | 216.2                                       | 303.5     |
| 49                                       |   | 410-470       |                           | 52,007     | 116.8             | 3.0          | 119.8     | 62.3               | 163.8                  | 12.1           | 4.8     | 0.0     | 8.3      | 251.2                                       | 371.0     |
| 50                                       |   | 510           |                           | 54,760     | 147.9             | 3.9          | 151.8     | 78.9               | 163.8                  | 13.7           | 5.5     | 0.0     | 8.3      | 270.2                                       | 422.0     |
| 51                                       |   | 650           |                           | 70,320     | 190.3             | 5.0          | 195.3     | 126.9              | 206.3                  | 29.5           | 11.8    | 0.0     | 8.3      | 382.8                                       | 578.0     |
| 52                                       | Tractor sobre Llantas                   | 200-250       |                           | 20,500     | 44.7              | 0.8          | 45.5      | 29.6               | 102.5                  | 10.0           | 4.0     | 2.3     | 8.3      | 156.7                                       | 202.2     |
| 53                                       |   | 300-350       |                           | 30,380     | 58.7              | 1.1          | 59.8      | 38.8               | 148.8                  | 13.3           | 5.3     | 4.5     | 8.3      | 219.1                                       | 278.8     |
| 54                                       |   | 400-500       |                           | 46,355     | 125.9             | 2.3          | 128.2     | 83.6               | 150.0                  | 16.6           | 6.6     | 4.9     | 8.3      | 270.1                                       | 398.3     |
| 55                                       | Pala Frontal                            | 195           | 3.0 Yd <sup>3</sup>       | 38,380     | 155.7             | 2.9          | 158.6     | 124.6              | 136.3                  | 6.8            | 2.7     | 0.0     | 8.3      | 278.6                                       | 437.2     |
| <b>Equipos de Compactación</b>           |   |               |                           |            |                   |              |           |                    |                        |                |         |         |          |   |           |
| 56                                       | Vibrador de Concreto                    | 4             | 1.25 Pulg.                |            | 2.9               | 0.0          | 2.9       | 1.6                | 0.0                    | 0.0            | 0.0     | 0.0     | 0.0      | 1.6   | 4.5       |
| 57                                       |   | 4             | 1.50 Pulg.                |            | 3.0               | 0.0          | 3.1       | 1.6                | 0.0                    | 0.0            | 0.0     | 0.0     | 0.0      | 1.6   | 4.7       |
| 58                                       |   | 4             | 2.40 Pulg.                |            | 3.6               | 0.1          | 3.7       | 2.0                | 0.0                    | 0.0            | 0.0     | 0.0     | 0.0      | 2.0   | 5.6       |
| 59                                       |   |               |                           | 95         | 2.1               | 0.0          | 2.1       | 0.9                | 3.4                    | 0.4            | 0.2     | 0.0     | 8.3      | 13.1  | 15.2      |
| 60                                       | Compactador Vibrador Tipo Plancha       | 5.8           |                           | 145        | 2.6               | 0.0          | 2.6       | 1.1                | 3.9                    | 0.7            | 0.3     | 0.0     | 8.3      | 14.3  | 16.9      |
| 61                                       |   | 7             |                           | 160        | 3.9               | 0.0          | 3.9       | 1.2                | 4.1                    | 1.1            | 0.4     | 0.0     | 8.3      | 15.2  | 19.1      |
| 62                                       | Rodillo Liso Vibratorio Manual          | 10.8          | 0.8 - 1.1 Ton.            | 800        | 4.0               | 0.1          | 4.1       | 3.2                | 5.6                    | 1.7            | 0.7     | 0.0     | 8.3      | 19.6  | 23.7      |
| 63                                       |   | 70-100        | 7-9 Ton.                  | 7,300      | 16.3              | 0.3          | 16.6      | 8.6                | 26.3                   | 3.1            | 1.2     | 0.8     | 8.3      | 48.2  | 64.7      |
| 64                                       | Rodillo Liso Vibratorio Autopropulsado  | 101-135       | 10-12 Ton.                | 11,100     | 17.4              | 0.3          | 17.7      | 9.2                | 43.8                   | 4.7            | 1.9     | 0.8     | 8.3      | 68.5  | 86.2      |
| 65                                       |   | 136-170       | 15-17 Ton.                | 13,700     | 21.3              | 0.4          | 21.7      | 11.3               | 46.3                   | 5.1            | 2.0     | 0.8     | 8.3      | 73.7  | 95.3      |
| 66                                       |   | 210           | 19-23 Ton.                | 19,600     | 24.4              | 0.5          | 24.9      | 12.9               | 69.9                   | 6.8            | 2.7     | 1.1     | 8.3      | 101.7                                       | 126.5     |
| 67                                       | Rodillo Liso Vibratorio de Tiro         | 50-80         | 4-5.5 Ton.                | 5,500      | 6.1               | 0.1          | 6.2       | 3.3                | 23.8                   | 2.7            | 1.1     | 0.0     | 8.3      | 39.2  | 45.4      |
| 68                                       |   | 60-80         | 3.0-5.0 Ton.              | 3,700      | 12.5              | 0.3          | 12.8      | 5.0                | 21.3                   | 2.7            | 1.1     | 0.2     | 8.3      | 38.6  | 51.4      |
| 69                                       | Rodillo Neumático Autopropulsado        | 81-100        | 5.5-20 Ton.               | 5,500      | 16.8              | 0.4          | 17.1      | 4.5                | 25.0                   | 3.1            | 1.2     | 0.2     | 8.3      | 42.3  | 59.4      |
| 70                                       |   | 127           | 8.23 Ton.                 | 8,000      | 12.7              | 0.3          | 13.0      | 6.7                | 38.8                   | 4.4            | 1.8     | 0.2     | 8.3      | 60.2  | 73.1      |
| 71                                       |   | 135           | 9.26 Ton.                 | 9,000      | 13.0              | 0.3          | 13.2      | 6.9                | 38.3                   | 4.4            | 1.8     | 0.2     | 8.3      | 59.8  | 73.1      |
| 72                                       |   | 84            | 8.1 Ton.                  | 8,200      | 9.7               | 0.2          | 9.9       | 7.7                | 28.3                   | 2.7            | 1.1     | 0.7     | 8.3      | 48.8  | 58.7      |
| 73                                       | Pata de Cabra Vibratorio Autopropulsado | 100-135       | 11-13 Ton.                | 11,300     | 17.0              | 0.4          | 17.3      | 9.0                | 37.9                   | 4.4            | 1.8     | 0.7     |          |   |           |



## Costo Referencial de Posesión y Operación de Equipo Mecánico del MTC - Septiembre 2007 -

### Maquinaria

| N°                                    | Unidad base para el Cálculo                     | Potencia (HP) | Capacidad                 | Peso (Kg.) | Costo de Posesión |              |           | Costo de Operación |                        |                |         |         |          | Costo Horario de Posesión y Operación (a+b) |           |
|---------------------------------------|---|---------------|---------------------------|------------|-------------------|--------------|-----------|--------------------|------------------------|----------------|---------|---------|----------|---|-----------|
|                                       |   |               |                           |            | Depreciación      | Seguro 0.46% | Total (a) | Mant. y Rep.       | Consumo de Combustible | Lubr. + Grasas | Filtros | Llantas | Operador |   | Total (b) |
| 97                                    | Chancadora Secundaria 24"S                      | M.E. 30       | 46-70 Ton/Hr.             | 22,000     | 19.4              | 0.6          | 20.1      | 9.7                | 0.0                    | 1.5            | 0.6     | 0.1     | 8.3      | 20.3  | 40.3      |
| 98                                    | Chancadora Secundaria 36"S                      | M.E. 75       | 46-70 Ton/Hr.             | 23,000     | 33.7              | 1.1          | 34.7      | 16.8               | 0.0                    | 1.5            | 0.6     | 0.1     | 8.3      | 27.4  | 62.1      |
| 99                                    | Chancadora Primaria-Secundaria (Incluye 5 faja) | M.E. 75       | 46-70 Ton/Hr.             | 39,000     | 68.2              | 2.3          | 70.5      | 36.4               | 112.5                  | 1.6            | 0.6     | 0.1     | 8.3      | 159.5                                       | 230.0     |
| 100                                   | Chancadora Primaria - Secundaria (Azteca)       |               | 40-80 Ton/Hr.             |            | 29.2              | 1.9          | 31.1      | 11.7               | 0.0                    | 0.0            | 0.0     | 0.0     | 9.3      | 21.0  | 52.0      |
| 101                                   | Chancadora Primaria - Secundaria (Escorpión)    |               | 60-120 Ton/Hr.            |            | 36.5              | 2.4          | 38.8      | 14.6               | 0.0                    | 0.0            | 0.0     | 0.0     | 10.3     | 24.9  | 63.7      |
| 102                                   | Zaranda Vibratoria 4"x6"x14"                    | M.E. 15       | 11 Kw                     | 7,000      | 10.1              | 0.3          | 10.4      | 6.7                | 0.0                    | 1.2            | 0.5     | 0.1     | 8.3      | 16.6  | 27.3      |
| <b>Equipos para Obras de Concreto</b> |   |               |                           |            |                   |              |           |                    |                        |                |         |         |          |   |           |
| 103                                   |   | M.E. 40       | 50 M <sup>3</sup> /Hr.    | 17,000     | 27.6              | 0.9          | 28.6      | 22.1               | 0.0                    | 1.8            | 0.7     | 0.0     | 8.3      | 33.0  | 61.5      |
| 104                                   | Dosificadora de Concreto                        | M.E. 45       | 50-90 M <sup>3</sup> /Hr. | 20,000     | 32.8              | 1.1          | 33.9      | 26.3               | 0.0                    | 1.8            | 0.7     | 0.0     | 8.3      | 37.1  | 71.1      |
| 105                                   |   | M.E. 60       | 120 M <sup>3</sup> /Hr.   | 23,000     | 37.0              | 1.3          | 38.2      | 29.6               | 0.0                    | 1.8            | 0.7     | 0.0     | 8.3      | 40.4  | 78.7      |
| 106                                   | Mezcladora de Concreto Tipo Trompo              | 8             | 9 Pie <sup>3</sup>        | 500        | 2.9               | 0.1          | 3.0       | 2.1                | 0.0                    | 0.0            | 0.0     | 0.1     | 0.0      | 2.2   | 5.2       |
| 107                                   |   | 18            | 7 Pie <sup>3</sup>        | 1,500      | 7.3               | 0.2          | 7.4       | 5.2                | 0.0                    | 0.0            | 0.0     | 0.1     | 0.0      | 5.3   | 12.7      |
| 108                                   | Mezcladora de Concreto Tipo Tambor              | 23            | 11-12 Pie <sup>3</sup>    | 2,200      | 11.9              | 0.3          | 12.2      | 8.6                | 0.0                    | 0.0            | 0.0     | 0.1     | 0.0      | 8.7   | 20.9      |
| 109                                   |   | 20-35         | 16 Pie <sup>3</sup>       | 2,700      | 15.4              | 0.3          | 15.7      | 11.1               | 0.0                    | 0.0            | 0.0     | 0.1     | 0.0      | 11.2  | 26.9      |
| <b>Equipos para Refine y Afirmado</b> |   |               |                           |            |                   |              |           |                    |                        |                |         |         |          |   |           |
| 110                                   |   | 65-80         |                           | 6,000      | 17.3              | 0.5          | 17.8      | 11.5               | 27.5                   | 2.7            | 1.1     | 0.2     | 8.3      | 51.4  | 69.2      |
| 111                                   |   | 85-120        |                           | 9,100      | 23.4              | 0.6          | 24.0      | 15.6               | 40.0                   | 4.3            | 1.7     | 0.2     | 8.3      | 70.2  | 94.2      |
| 112                                   | Motoniveladora                                  | 125           |                           | 11,515     | 24.8              | 0.7          | 25.5      | 16.5               | 53.8                   | 4.4            | 1.8     | 0.2     | 8.3      | 84.9  | 110.4     |
| 113                                   |   | 130-135       |                           | 12,365     | 33.0              | 0.9          | 33.9      | 22.0               | 53.8                   | 4.7            | 1.9     | 0.2     | 8.3      | 90.9  | 124.8     |
| 114                                   |   | 145-150       |                           | 13,540     | 32.8              | 0.9          | 33.6      | 21.8               | 62.5                   | 5.5            | 2.2     | 0.2     | 8.3      | 100.6                                       | 134.2     |
| 115                                   |   | 180-200       |                           | 18,370     | 54.9              | 1.4          | 56.4      | 36.6               | 68.8                   | 5.8            | 2.3     | 0.6     | 8.3      | 122.4                                       | 178.7     |
| <b>Equipos para Pavimentación</b>     |   |               |                           |            |                   |              |           |                    |                        |                |         |         |          |   |           |
| 116                                   | Amasadora de Asfalto                            | 23.5          | 5.4 M <sup>3</sup>        | 9,500      | 27.7              | 0.5          | 28.2      | 22.2               | 62.5                   | 1.9            | 0.8     | 0.1     | 8.3      | 95.7  | 123.9     |
| 117                                   | Barredora Mecánica                              | 10-20         | 7 Pulg. LON               | 1,000      | 6.0               | 0.1          | 6.1       | 4.3                | 12.5                   | 1.3            | 0.5     | 0.1     | 8.3      | 27.0  | 33.1      |
| 118                                   | Calentador de Aceite 48-S                       | 5             | 468 P <sup>3</sup>        | 5,700      | 10.7              | 0.2          | 10.9      | 6.5                | 0.0                    | 0.0            | 0.0     | 0.0     | 8.3      | 14.8  | 25.7      |
| 119                                   | Cocina de Asfalto                               |               | 320 Gln                   | 2,100      | 9.5               | 0.2          | 9.6       | 3.4                | 5.0                    | 1.3            | 0.5     | 0.1     | 8.3      | 18.5  | 28.2      |
| 120                                   | Planta de Asfalto en frío                       | M.E. 30       | 30-60 Ton/Hr.             | 9,000      | 21.0              | 0.7          | 21.7      | 16.8               | 0.0                    | 1.5            | 0.6     | 0.2     | 8.3      | 27.3  | 48.9      |
| 121                                   | Secador de Áridos                               | M.E. 50       | 30-64 Ton/Hr.             | 8,000      | 13.9              | 0.5          | 14.4      | 11.1               | 0.0                    | 0.0            | 0.0     | 0.0     | 8.3      | 19.4  | 33.8      |
| 122                                   | Planta de Asfalto en frío                       | M.E. 50       | 60-115 Ton/Hr.            | 9,000      | 30.0              | 1.0          | 31.0      | 23.9               | 0.0                    | 1.5            | 0.6     | 0.2     | 8.3      | 34.5  | 65.4      |
| 123                                   | Planta de Asfalto en Caliente (CYBER)           |               | 60 Ton/Hr.                | 32,350     | 70.9              | 2.2          | 73.1      | 0.0                | 1,237.5                | 5.0            | 2.0     | 0.0     | 8.3      | 1,252.7                                     | 1,325.9   |
| 124                                   | Planta de Asfalto en Caliente (CIFALLI)         |               | 90-120 Ton/Hr.            | 46,800     | 68.6              | 2.2          | 70.8      | 0.0                | 1,987.5                | 5.0            | 2.0     | 0.0     | 8.3      | 2,002.7                                     | 2,073.5   |
| 125                                   | Secador de Áridos                               | M.E. 70       | 60-115 Ton/Hr.            | 8,500      | 18.2              | 0.6          | 18.8      | 9.7                | 0.0                    | 6.0            | 2.4     | 0.0     | 8.3      | 26.4  | 45.2      |
| 126                                   | Pavimentadora sobre oruga                       | 69            | 10 Pulg.                  | 12,000     | 33.1              | 1.1          | 34.3      | 22.1               | 23.3                   | 3.7            | 1.5     | 0.0     | 8.3      | 58.8  | 93.1      |

### Vehículos y Camiones

| N° | Unidad base para el Cálculo       | Potencia (HP) | Capacidad         | Peso (Kg.) | Costo de Posesión |              |           | Costo de Operación |                        |                |         |         |          | Costo Horario de Posesión y Operación (a+b) |           |
|----|-----------------------------------|---------------|-------------------|------------|-------------------|--------------|-----------|--------------------|------------------------|----------------|---------|---------|----------|---|-----------|
|    |                                   |               |                   |            | Depreciación      | Seguro 2.19% | Total (a) | Mant. y Rep.       | Consumo de Combustible | Lubr. + Grasas | Filtros | Llantas | Operador |   | Total (b) |
| 1  | Camioneta Pick-Up 4X2 - C. Simple | 90            | 1,000 Kg          | 2,100      | 5.1               | 0.4          | 5.5       | 4.1                | 20.8                   | 4.0            | 1.6     | 0.2     | 7.8      | 38.5  | 44.0      |
| 2  |                                   | 90            | 2,000 Kg          | 3,000      | 6.6               | 0.5          | 7.1       | 5.3                | 22.1                   | 4.3            | 1.7     | 0.3     | 7.8      | 41.5  | 48.6      |
| 3  | Camioneta Pick-Up 4X4 - C. Simple | 107           | 1,000 Kg          | 2,450      | 5.7               | 0.4          | 6.1       | 4.5                | 26.0                   | 4.0            | 1.6     | 0.2     | 7.8      | 44.2  | 50.3      |
| 4  | Camioneta Pick-Up 4X2 - C. Doble  | 90            | 750 Kg            | 1,850      | 6.2               | 0.5          | 6.6       | 4.9                | 20.8                   | 4.0            | 1.6     | 0.3     | 7.8      | 39.4  | 46.0      |
| 5  |                                   | 118           | 5 Pas.            | 1,850      | 5.9               | 0.4          | 6.3       | 4.7                | 23.4                   | 4.0            | 1.6     | 0.3     | 7.8      | 41.8  | 48.1      |
| 6  | Camioneta Rural 4X4               | 135           | 5 Pas.            | 1,882      | 7.8               | 0.6          | 8.4       | 6.2                | 34.5                   | 4.0            | 1.6     | 0.3     | 7.8      | 54.4  | 62.7      |
| 7  | Camioneta Station Wagon 4x2       | 100           | 6 Pas.            | 1,800      | 4.9               | 0.4          | 5.3       | 3.9                | 26.0                   | 4.0            | 1.6     | 0.3     | 7.8      | 43.6  | 48.9      |
| 8  |                                   | 122           | 1,500 Gln         | 9,900      | 16.7              | 1.6          | 18.3      | 12.5               | 48.8                   | 4.4            | 1.8     | 0.4     | 7.8      | 75.5  | 93.8      |
| 9  | Cisterna de Agua 4X2              | 145-165       | 2,000 Gln         | 13,000     | 19.1              | 1.8          | 21.0      | 14.3               | 50.0                   | 4.4            | 1.8     | 0.4     | 7.8      | 78.6  | 99.6      |
| 10 |                                   | 178-210       | 3,000 Gln         | 19,000     | 23.5              | 2.3          | 25.8      | 14.7               | 70.0                   | 6.8            | 2.7     | 0.6     | 7.8      | 102.5                                       | 128.3     |
| 11 | Cisterna de Combustible 4X2       | 122           | 2,000 Gln         | 13,000     | 20.0              | 1.9          | 22.0      | 12.5               | 41.3                   | 4.4            | 1.8     | 0.4     | 7.8      | 68.1  | 90.0      |
| 12 | Cisterna de Asfalto 4X2           | 178-210       | 2,000 Gln         | 13,000     | 23.1              | 2.2          | 25.3      | 14.4               | 69.9                   | 6.8            | 2.7     | 0.5     | 7.8      | 102.1                                       | 127.3     |
| 13 | Concreteo 4X2                     | 178-210       | 4 M <sup>3</sup>  | 19,000     | 46.1              | 4.4          | 50.5      | 28.8               | 69.9                   | 8.4            | 3.3     | 0.5     | 7.8      | 118.7                                       | 169.2     |
| 14 | Concreteo 6X4                     | 300           | 6 M <sup>3</sup>  | 26,000     | 53.1              | 5.1          | 58.1      | 33.1               | 100.0                  | 10.0           | 4.0     | 0.5     | 7.8      | 155.5                                       | 213.7     |
| 15 | Dumper 6X4                        | 146-240       | 12 M <sup>3</sup> | 32,200     | 47.8              | 4.6          | 52.4      | 29.8               | 48.3                   | 4.7            | 1.9     | 1.0     | 7.8      | 93.4  | 145.7     |
| 16 | Dumper 6x6                        | 146-240       | 13 M <sup>3</sup> | 38,400     | 57.2              | 5.5          | 62.7      | 35.6               | 69.9                   | 6.8            | 2.7     | 1.5     | 7.8      | 124.3                                       | 187.0     |
| 17 | Camión Imprimador 6X2             | 178-210       | 1,800 Gln         | 16,475     | 23.2              | 2.2          | 25.4      | 14.5               | 69.9                   | 10.0           | 4.0     | 0.2     | 7.8      | 106.4                                       | 131.8     |
| 18 | Plataforma 4X2                    | 122           | 8 Ton.            | 13,000     | 25.2              | 2.4          | 27.6      | 15.7               | 32.5                   | 9.8            | 3.9     | 0.4     | 7.8      | 70.1  | 97.7      |
| 19 |                                   | 178-210       | 12 Ton.           | 19,000     | 31.8              | 3.1          | 34.9      | 19.9               | 35.0                   | 9.8            | 3.9     | 0.4     | 7.8      | 76.8  | 111.6     |
| 20 | Plataforma 6X4                    | 300           | 19 Ton.           | 26,000     | 63.7              | 6.1          | 69.8      | 39.8               | 81.3                   | 16.5           | 6.6     | 0.5     | 7.8      | 152.5                                       | 222.3     |
| 21 | Semitrayler 6X4                   | 330           | 35 Ton.           | 42,600     | 46.8              | 4.5          | 51.3      | 35.1               | 97.4                   | 16.7           | 6.7     | 0.4     | 7.8      | 164.0                                       | 215.3     |
| 22 |                                   | 330           | 40 Ton.           | 54,420     | 47.8              | 4.6          | 52.3      | 35.8               | 97.4                   | 16.7           | 6.7     | 0.5     | 7.8      | 164.9                                       | 217.2     |
| 23 |                                   | 120-140       | 4 M <sup>3</sup>  | 11,500     | 13.3              | 1.3          | 14.6      | 13.3               | 60.0                   | 6.8            | 2.7     | 0.4     | 7.8      | 90.9  | 105.5     |
| 24 | Volquete 4X2                      | 140-210       | 6 M <sup>3</sup>  | 15,000     | 18.0              | 1.7          | 19.7      | 17.9               | 69.9                   | 10.0           | 4.0     | 0.5     | 7.8      | 110.1                                       | 129.8     |
| 25 |                                   | 210-280       | 8 M <sup>3</sup>  | 19,000     | 24.8              | 2.4          | 27.2      | 24.7               | 93.3                   | 13.3           | 5.3     | 1.0     | 7.8      | 145.4                                       | 172.6     |
| 26 | Volquete 6X4                      | 330           | 10 M <sup>3</sup> | 26,000     | 25.3              | 2.4          | 27.8      | 25.2               | 109.9                  | 16.7           | 6.7     | 1.0     | 7.8      | 167.3                                       | 195.1     |

### Equipos Diversos

| N° | Unidad base para el Cálculo    | Potencia (HP) | Capacidad       | Peso (Kg.) | Costo de Posesión |              |           | Costo de Operación |                        |                |         |         |          | Costo Horario de Posesión y Operación (a+b) |           |
|----|--------------------------------|---------------|-----------------|------------|-------------------|--------------|-----------|--------------------|------------------------|----------------|---------|---------|----------|---|-----------|
|    |                                |               |                 |            | Depreciación      | Seguro 0.46% | Total (a) | Mant. y Rep.       | Consumo de Combustible | Lubr. + Grasas | Filtros | Llantas | Operador |   | Total (b) |
| 1  | Faja Transportadora 18"X40'    | M.E. 3        | 150 Ton/Hr.     | 4,000      | 5.9               | 0.5          | 6.4       | 3.9                | 0.0                    | 0.2            | 0.1     | 0.0     | 0.0      | 4.2   | 10.5      |
| 2  | Faja Transportadora 18"X50'    | M.E. 3        | 150 Ton/Hr.     | 4,000      | 6.3               | 0.6          | 6.9       | 4.2                | 0.0                    | 0.2            | 0.1     | 0.0     | 0.0      | 4.5   | 11.3      |
| 3  | Faja Transportadora 30"X40'    | M.E. 5        | 550 Ton/Hr.     | 7,800      | 6.6               | 0.6          | 7.2       | 4.4                | 0.0                    | 0.2            | 0.1     | 0.0     | 0.0      | 4.7   | 11.9      |
| 4  | Faja Transportadora 30"X50'    | M.E. 5        | 800 Ton/Hr.     | 12,000     | 7.5               | 0.7          | 8.2       | 5.0                | 0.0                    | 0.2            | 0.1     | 0.0     | 0.0      | 5.2   | 13.4      |
| 5  | Faja Transportadora 30"X60'    | M.E. 7        | 800 Ton/Hr.     | 15,000     | 10.0              | 0.9          | 10.9      | 6.7                | 0.0                    | 0.2            | 0.1     | 0.0     | 0.0      | 6.9   | 17.8      |
| 6  |                                | 38            | 20 Kw           | 500        | 3.7               | 0.4          | 4.0       | 3.4                | 0.0                    | 0.0            | 0.0     | 0.0     | 0.0      | 3.4   | 7.4       |
| 7  |                                | 56            | 37.5 Kw         | 720        | 4.2               | 0.4          | 4.6       | 3.9                | 0.0                    | 0.0            | 0.0     | 0.0     | 0.0      | 3.9   | 8.5       |
| 8  |                                | 89            | 50 Kw           | 1,150      | 5.0               | 0.5          | 5.5       | 4.7                | 0.0                    | 0.0            | 0.0     | 0.0     | 0.0      | 4.7   | 10.2      |
| 9  | Grupo Electrónico              | 116           | 75 Kw           | 1,500      | 5.9               | 0.6          | 6.5       | 5.5                | 0.0                    | 0.0            | 0.0     | 0.0     | 0.0      | 5.5   | 12.1      |
| 10 |                                | 140           | 90 Kw           | 1,700      | 7.5               | 0.8          | 8.3       | 7.0                | 0.0                    | 0.0            | 0.0     | 0.0     | 0.0      | 7.0   | 15.3      |
| 11 |                                | 230           | 150 Kw          | 2,000      | 17.7              | 1.8          | 19.5      | 16.5               | 0.0                    | 0.0            | 0.0     | 0.0     | 0.0      | 16.5  | 36.1      |
| 12 |                                | 380           | 250 Kw          | 2,700      | 25.1              | 2.6          | 27.7      | 23.4               | 0.0                    | 0.0            | 0.0     | 0.0     | 0.0      | 23.4  | 51.1      |
| 13 |                                | 460           | 300 Kw          | 3,500      | 27.0              | 2.8          | 29.8      | 25.2               | 0.0                    | 0.0            | 0.0     | 0.0     | 0.0      | 25.2  | 55.0      |
| 14 |                                | 68            | 3,000 Kg        | 5,200      | 10.2              | 0.9          | 11.1      | 2.7                | 15.0                   | 2.4            | 1.0     | 0.0     | 8.3      | 29.4  | 40.4      |
| 15 | Montacargas                    | 80            | 5,000 Kg        | 8,150      | 18.3              | 1.6          | 19.9      | 12.2               | 26.6                   | 2.7            | 1.1     | 0.0     | 8.3      | 51.0  | 70.9      |
| 16 |                                | 94            | 7,500 Kg        | 9,150      | 19.7              | 1.7          | 21.4      | 13.1               | 31.6                   | 3.1            | 1.2     | 0.0     | 8.3      | 57.4  | 78.8      |
| 17 | Grúa Hidráulica Telescópica    | 127           | 18 Ton - 9 mt   | 20,000     | 45.5              | 4.7          | 50.2      | 36.3               | 43.3                   | 4.4            | 1.8     | 0.5     | 8.3      | 94.5  | 144.7     |
| 18 | Grúa Hidráulica Telescópica    | 155           | 35 Ton - 9.6 mt | 36,000     | 46.9              | 6.2          | 53.1      | 37.4               | 66.6                   | 4.7            | 1.9     | 0.5     | 8.3      | 119.5                                       | 172.5     |
| 19 | Grúa Hidráulica Telescópica    | 225           | 50 Ton corta    | 39,000     | 83.0              | 10.9         | 93.9      | 66.3               | 106.5                  | 7.1            | 2.8     | 0.2     | 8.3      | 191.3                                       | 285.2     |
| 20 | Grúa Tipo Fricción-PLMA CELOSI | 335           | 70 Ton corta    | 50,150     | 95.6              | 12.6         | 108.2     | 76.5               | 111.5                  | 9.8            | 3.9     | 0.0     | 8.3      | 210.0                                       | 318.2     |
| 21 | Grúa Tipo Fricción-PLMA CELOSI | 350           | 90 Ton corta    | 58,796     | 125.6             | 16.5         |           |                    |                        |                |         |         |          |   |           |