**Appendix A**

*Table A1: Results for the Transfer Policies (TP) and Release Policies (RP) when Controlling the Number of Lots – 2 Lots per Job.*

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Performance measure | Policy | Limit 1‡ | Limit 2 | Limit 3 | Limit 4 | Limit 5 | No Limit |
| *Shop Throughput Time*  *(time units)* | TP1RP1\* | 17.447 | 19.182 | 20.319 | 21.061 | 21.489 | 22.084 |
| TP2RP1\*\* | 17.317 | 19.016 | 20.124 | 20.825 | 21.240 | 21.808 |
| TP3RP1\*\*\* | 16.804 | 18.326 | 19.328 | 19.939 | 20.307 | 20.789 |
| TP1RP2 | 17.169 | 18.928 | 20.152 | 20.939 | 21.416 | 22.084 |
| TP2RP2 | 17.051 | 18.782 | 19.969 | 20.723 | 21.169 | 21.808 |
| TP3RP2 | 16.576 | 18.150 | 19.197 | 19.860 | 20.261 | 20.789 |
| *Total Throughput Time*  *(time units)* | TP1RP1\* | 23.018 | 22.438 | 22.211 | 22.143 | 22.111 | 22.084 |
| TP2RP1\*\* | 22.571 | 22.160 | 21.296 | 21.863 | 21.830 | 21.808 |
| TP3RP1\*\*\* | 21.221 | 20.947 | 20.856 | 20.815 | 20.798 | 20.789 |
| TP1RP2 | 21.471 | 21.526 | 21.769 | 21.882 | 21.966 | 22.084 |
| TP2RP2 | 21.159 | 21.334 | 21.527 | 21.638 | 21.701 | 21.808 |
| TP3RP2 | 20.197 | 20.383 | 20.538 | 20.647 | 20.708 | 20.789 |
| *Tardy*  *(%)* | TP1RP1\* | 7.076 | 7.009 | 7.791 | 7.798 | 9.576 | 10.269 |
| TP2RP1\*\* | 6.772 | 6.801 | 7.526 | 8.517 | 9.234 | 9.907 |
| TP3RP1\*\*\* | 5.636 | 5.560 | 6.303 | 7.165 | 7.819 | 8.397 |
| TP1RP2 | 6.331 | 6.479 | 7.476 | 8.566 | 9.409 | 10.269 |
| TP2RP2 | 6.102 | 6.279 | 7.316 | 8.322 | 9.080 | 9.907 |
| TP3RP2 | 5.119 | 5.256 | 6.070 | 7.025 | 7.718 | 8.397 |
| Tardiness  (time units) | TP1RP1\* | 2.982 | 1.82 | 1.265 | 1.003 | 0.909 | 0.875 |
| TP2RP1\*\* | 2.758 | 1.751 | 1.198 | 0.965 | 0.868 | 0.841 |
| TP3RP1\*\*\* | 2.198 | 1.395 | 0.985 | 0.793 | 0.710 | 0.696 |
| TP1RP2 | 1.913 | 1.311 | 1.037 | 0.884 | 0.845 | 0.875 |
| TP2RP2 | 1.793 | 1.265 | 0.995 | 0.860 | 0.816 | 0.841 |
| TP3RP2 | 1.551 | 1.083 | 0.831 | 0.719 | 0.674 | 0.696 |

*\*Equivalent to TP1RP3; \*\* Equivalent to TP2RP3; \*\*\* Equivalent to TP3RP3;* ‡*Tightest limit level on shop WIP*

*Table A2: Results for the Transfer Policies (TP) and Release Policies (RP) when Controlling the Number of Lots – 3 Lots per Job.*

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Performance measure | Policy | Limit 1‡ | Limit 2 | Limit 3 | Limit 4 | Limit 5 | No Limit |
| *Shop Throughput Time*  *(time units)* | TP1RP1\* | 17.031 | 18.791 | 20.038 | 20.842 | 21.362 | 22.084 |
| TP2RP1\*\* | 16.831 | 18.546 | 19.750 | 20.509 | 20.988 | 21.651 |
| TP3RP1\*\*\* | 16.200 | 17.727 | 18.759 | 19.418 | 19.816 | 20.368 |
| TP1RP2 | 16.931 | 18.732 | 19.987 | 20.825 | 21.342 | 22.084 |
| TP2RP2 | 16.772 | 18.486 | 19.710 | 20.480 | 20.969 | 21.651 |
| TP3RP2 | 16.135 | 17.685 | 18.722 | 19.405 | 19.804 | 20.368 |
| *Total Throughput Time*  *(time units)* | TP1RP1\* | 20.580 | 20.962 | 21.368 | 21.633 | 21.832 | 22.084 |
| TP2RP1\*\* | 20.140 | 20.591 | 21.011 | 21.257 | 21.430 | 21.651 |
| TP3RP1\*\*\* | 18.953 | 19.439 | 19.795 | 20.031 | 20.172 | 20.368 |
| TP1RP2 | 20.214 | 20.808 | 21.275 | 21.604 | 21.802 | 22.084 |
| TP2RP2 | 19.910 | 20.467 | 20.947 | 21.220 | 21.401 | 21.651 |
| TP3RP2 | 18.768 | 19.354 | 19.739 | 20.014 | 20.157 | 20.368 |
| *Tardy*  *(%)* | TP1RP1\* | 5.538 | 5.754 | 6.839 | 8.033 | 9.078 | 10.269 |
| TP2RP1\*\* | 5.178 | 5.462 | 6.530 | 7.682 | 8.572 | 9.727 |
| TP3RP1\*\*\* | 4.078 | 4.310 | 5.179 | 6.153 | 6.961 | 7.883 |
| TP1RP2 | 5.299 | 5.715 | 6.821 | 8.063 | 9.050 | 10.269 |
| TP2RP2 | 5.066 | 5.431 | 6.569 | 7.682 | 8.601 | 9.727 |
| TP3RP2 | 3.969 | 4.293 | 5.173 | 6.175 | 6.959 | 7.883 |
| Tardiness  (time units) | TP1RP1\* | 1.382 | 0.971 | 0.802 | 0.744 | 0.759 | 0.875 |
| TP2RP1\*\* | 1.260 | 0.906 | 0.762 | 0.709 | 0.717 | 0.892 |
| TP3RP1\*\*\* | 0.980 | 0.721 | 0.594 | 0.555 | 0.559 | 0.650 |
| TP1RP2 | 1.179 | 0.898 | 0.770 | 0.737 | 0.752 | 0.875 |
| TP2RP2 | 1.116 | 0.853 | 0.742 | 0.703 | 0.712 | 0.892 |
| TP3RP2 | 0.892 | 0.689 | 0.583 | 0.553 | 0.560 | 0.650 |

*\*Equivalent to TP1RP3; \*\* Equivalent to TP2RP3; \*\*\* Equivalent to TP3RP3;* ‡*Tightest limit level on shop WIP*

*Table A3: Results for the Transfer Policies (TP) and Release Policies (RP) when Controlling the Number of Lots – 4 Lots per Job.*

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Performance measure | Policy | Limit 1‡ | Limit 2 | Limit 3 | Limit 4 | Limit 5 | No Limit |
| *Shop Throughput Time*  *(time units)* | TP1RP1\* | 17.021 | 18.801 | 20.041 | 20.852 | 21.364 | 22.084 |
| TP2RP1\*\* | 16.881 | 18.498 | 19.687 | 20.447 | 20.930 | 21.577 |
| TP3RP1\*\*\* | 16.086 | 17.592 | 18.610 | 19.242 | 19.632 | 20.160 |
| TP1RP2 | 16.924 | 18.729 | 19.988 | 20.828 | 21.335 | 22.084 |
| TP2RP2 | 16.722 | 18.455 | 19.644 | 20.421 | 20.900 | 21.577 |
| TP3RP2 | 16.030 | 17.544 | 18.574 | 19.226 | 19.626 | 20.160 |
| *Total Throughput Time*  *(time units)* | TP1RP1\* | 20.628 | 21.026 | 21.397 | 21.662 | 21.841 | 22.084 |
| TP2RP1\*\* | 20.115 | 20.570 | 20.955 | 21.197 | 21.370 | 21.577 |
| TP3RP1\*\*\* | 18.802 | 19.268 | 19.627 | 19.841 | 19.977 | 20.160 |
| TP1RP2 | 20.234 | 20.846 | 21.301 | 21.624 | 21.799 | 22.084 |
| TP2RP2 | 19.866 | 20.454 | 20.874 | 21.162 | 21.329 | 21.577 |
| TP3RP2 | 18.620 | 19.180 | 19.571 | 19.818 | 19.967 | 20.160 |
| *Tardy*  *(%)* | TP1RP1\* | 5.400 | 5.583 | 6.575 | 7.874 | 8.978 | 10.269 |
| TP2RP1\*\* | 5.001 | 2.239 | 6.255 | 7.431 | 8.453 | 9.615 |
| TP3RP1\*\*\* | 3.919 | 3.996 | 4.813 | 5.793 | 6.648 | 7.635 |
| TP1RP2 | 5.136 | 5.511 | 6.581 | 7.910 | 8.963 | 10.269 |
| TP2RP2 | 4.859 | 5.216 | 6.232 | 7.468 | 8.439 | 9.615 |
| TP3RP2 | 3.782 | 3.995 | 4.788 | 5.802 | 6.652 | 7.635 |
| Tardiness  (time units) | TP1RP1\* | 1.505 | 1.040 | 0.827 | 0.752 | 0.752 | 0.875 |
| TP2RP1\*\* | 1.364 | 0.961 | 0.773 | 0.702 | 0.703 | 0.817 |
| TP3RP1\*\*\* | 1.023 | 0.729 | 0.586 | 0.534 | 0.531 | 0.625 |
| TP1RP2 | 1.268 | 0.956 | 0.794 | 0.746 | 0.746 | 0.875 |
| TP2RP2 | 1.197 | 0.898 | 0.743 | 0.698 | 0.697 | 0.817 |
| TP3RP2 | 0.931 | 0.699 | 0.576 | 0.531 | 0.531 | 0.625 |

*\*Equivalent to TP1RP3; \*\* Equivalent to TP2RP3; \*\*\* Equivalent to TP3RP3;* ‡*Tightest limit level on shop WIP*

*Table A4: Results for the Transfer Policies (TP) and Release Policies (RP) when Controlling the Shop Load – 2 Lots per Job.*

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Performance measure | Policy | Limit 1‡ | Limit 2 | Limit 3 | Limit 4 | Limit 5 | No Limit |
| *Shop Throughput Time*  *(time units)* | TP1RP1 | 15.900 | 17.858 | 19.272 | 20.256 | 20.920 | 22.084 |
| TP2RP1 | 15.811 | 17.709 | 19.087 | 20.052 | 20.698 | 21.808 |
| TP3RP1 | 15.509 | 17.233 | 18.456 | 19.315 | 19.857 | 20.789 |
| TP1RP2 | 15.656 | 17.643 | 19.117 | 20.160 | 20.871 | 22.084 |
| TP2RP2 | 15.571 | 17.523 | 18.965 | 19.965 | 20.663 | 21.808 |
| TP3RP2 | 15.295 | 17.071 | 18.353 | 19.239 | 19.827 | 20.789 |
| TP1RP3 |  |  |  | 19.928 | 20.743 | 22.084 |
| TP2RP3 |  |  | 18.485 | 19.699 | 20.501 | 21.808 |
| TP3RP2 |  |  | 17.711 | 18.989 | 19.692 | 20.789 |
| *Total Throughput Time*  *(time units)* | TP1RP1 | 23.263 | 21.452 | 21.333 | 21.487 | 21.650 | 22.084 |
| TP2RP1 | 22.617 | 21.144 | 21.060 | 21.231 | 21.401 | 21.808 |
| TP3RP1 | 20.539 | 19.982 | 20.070 | 20.282 | 20.438 | 20.789 |
| TP1RP2 | 20.798 | 20.783 | 21.063 | 21.357 | 21.607 | 22.084 |
| TP2RP2 | 20.570 | 20.568 | 20.852 | 21.127 | 21.376 | 21.808 |
| TP3RP2 | 19.416 | 19.602 | 19.922 | 20.186 | 20.413 | 20.789 |
| TP1RP3 |  |  |  | 21.396 | 21.621 | 22.084 |
| TP2RP3 |  |  | 20.699 | 21.042 | 21.323 | 21.808 |
| TP3RP3 |  |  | 19.965 | 20.201 | 20.420 | 20.789 |
| *Tardy*  *(%)* | TP1RP1 | 5.671 | 4.768 | 5.035 | 6.148 | 7.256 | 10.269 |
| TP2RP1 | 5.445 | 4.597 | 4.830 | 5.944 | 7.272 | 9.907 |
| TP3RP1 | 4.445 | 3.755 | 3.955 | 4.975 | 6.174 | 8.397 |
| TP1RP2 | 6.221 | 5.261 | 5.385 | 6.381 | 7.643 | 10.269 |
| TP2RP2 | 6.031 | 5.108 | 5.266 | 6.183 | 7.427 | 9.907 |
| TP3RP2 | 4.863 | 4.111 | 4.268 | 5.129 | 6.288 | 8.397 |
| TP1RP3 |  |  |  | 6.032 | 7.517 | 10.269 |
| TP2RP3 |  |  | 4.476 | 5.716 | 7.217 | 9.907 |
| TP3RP3 |  |  | 3.712 | 4.713 | 6.056 | 8.397 |
| Tardiness  (time units) | TP1RP1 | 5.103 | 2.212 | 1.290 | 0.914 | 0.758 | 0.875 |
| TP2RP1 | 4.606 | 2.094 | 1.231 | 0.872 | 0.732 | 0.841 |
| TP3RP1 | 3.100 | 1.571 | 0.961 | 0.693 | 0.595 | 0.696 |
| TP1RP2 | 2.546 | 1.593 | 1.097 | 0.743 | 0.749 | 0.875 |
| TP2RP2 | 2.467 | 1.529 | 1.062 | 0.818 | 0.728 | 0.841 |
| TP3RP2 | 1.960 | 1.237 | 0.858 | 0.650 | 0.591 | 0.696 |
| TP1RP3 |  |  |  | 0.862 | 0.728 | 0.875 |
| TP2RP3 |  |  | 1.095 | 0.785 | 0.684 | 0.841 |
| TP3RP3 |  |  | 1.044 | 0.723 | 0.602 | 0.696 |

‡*Tightest limit level on shop WIP*

*Table A5: Results for the Transfer Policies (TP) and Release Policies (RP) when Controlling the Shop Load – 3 Lots per Job.*

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Performance measure | Policy | Limit 1‡ | Limit 2 | Limit 3 | Limit 4 | Limit 5 | No Limit |
| *Shop Throughput Time*  *(time units)* | TP1RP1 | 15.902 | 17.859 | 19.267 | 20.256 | 20.937 | 22.084 |
| TP2RP1 | 15.758 | 17.639 | 19.003 | 19.941 | 20.589 | 21.651 |
| TP3RP1 | 15.348 | 17.003 | 18.172 | 18.991 | 19.502 | 20.368 |
| TP1RP2 | 15.652 | 17.647 | 19.121 | 20.165 | 20.872 | 22.084 |
| TP2RP2 | 15.536 | 17.449 | 18.876 | 19.863 | 20.532 | 21.651 |
| TP3RP2 | 15.172 | 16.877 | 18.090 | 18.929 | 19.471 | 20.368 |
| TP1RP3 |  |  |  | 19.838 | 20.682 | 22.084 |
| TP2RP3 |  |  | 18.225 | 19.493 | 20.330 | 21.651 |
| TP3RP2 |  |  | 17.555 | 18.603 | 19.291 | 20.368 |
| *Total Throughput Time*  *(time units)* | TP1RP1 | 23.217 | 21.504 | 21.327 | 21.488 | 21.675 | 22.084 |
| TP2RP1 | 22.260 | 20.999 | 20.942 | 21.094 | 21.282 | 21.651 |
| TP3RP1 | 19.863 | 19.514 | 19.656 | 19.883 | 20.037 | 20.368 |
| TP1RP2 | 20.802 | 20.785 | 21.079 | 21.373 | 21.608 | 22.084 |
| TP2RP2 | 20.408 | 20.439 | 20.736 | 21.009 | 21.225 | 21.651 |
| TP3RP2 | 19.035 | 19.239 | 19.547 | 19.824 | 20.007 | 20.368 |
| TP1RP3 |  |  |  | 21.444 | 21.630 | 22.084 |
| TP2RP3 |  |  | 20.505 | 20.899 | 21.198 | 21.651 |
| TP3RP3 |  |  | 19.598 | 19.838 | 20.036 | 20.368 |
| *Tardy*  *(%)* | TP1RP1 | 5.663 | 4.778 | 5.025 | 6.163 | 7.539 | 10.269 |
| TP2RP1 | 5.296 | 4.500 | 4.781 | 5.866 | 7.191 | 9.727 |
| TP3RP1 | 4.068 | 3.452 | 3.671 | 4.641 | 5.790 | 7.883 |
| TP1RP2 | 6.193 | 5.236 | 5.396 | 6.411 | 7.654 | 10.269 |
| TP2RP2 | 5.916 | 5.004 | 5.172 | 6.105 | 7.296 | 9.727 |
| TP3RP2 | 4.522 | 3.792 | 3.945 | 4.816 | 5.878 | 7.883 |
| TP1RP3 |  |  | 6.068 | 7.504 | 10.269 | 6.068 |
| TP2RP3 |  |  | 4.376 | 5.642 | 7.104 | 9.727 |
| TP3RP3 |  |  | 3.484 | 4.408 | 5.658 | 7.883 |
| Tardiness  (time units) | TP1RP1 | 5.663 | 2.259 | 1.282 | 0.916 | 0.767 | 0.875 |
| TP2RP1 | 4.348 | 2.043 | 1.207 | 0.854 | 0.892 | 0.826 |
| TP3RP1 | 2.692 | 1.400 | 0.867 | 0.633 | 0.547 | 0.650 |
| TP1RP2 | 2.559 | 1.591 | 1.105 | 0.851 | 0.751 | 0.875 |
| TP2RP2 | 2.365 | 1.499 | 1.040 | 0.807 | 0.709 | 0.826 |
| TP3RP2 | 1.821 | 1.141 | 0.786 | 0.612 | 0.539 | 0.650 |
| TP1RP3 |  |  |  | 0.897 | 0.733 | 0.875 |
| TP2RP3 |  |  | 1.050 | 0.769 | 0.678 | 0.826 |
| TP3RP3 |  |  | 1.003 | 0.695 | 0.575 | 0.650 |

‡*Tightest limit level on shop WIP*

*Table A6: Results for the Transfer Policies (TP) and Release Policies (RP) when Controlling the Shop Load – 4 Lots per Job.*

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Performance measure | Policy | Limit 1‡ | Limit 2 | Limit 3 | Limit 4 | Limit 5 | No Limit |
| *Shop Throughput Time*  *(time units)* | TP1RP1 | 15.904 | 17.864 | 19.278 | 20.252 | 20.929 | 22.084 |
| TP2RP1 | 15.734 | 17.603 | 18.941 | 19.873 | 20.529 | 21.577 |
| TP3RP1 | 15.279 | 16.903 | 18.037 | 18.821 | 19.319 | 20.160 |
| TP1RP2 | 15.647 | 17.648 | 19.110 | 20.167 | 20.883 | 22.084 |
| TP2RP2 | 15.505 | 17.419 | 18.828 | 19.813 | 20.458 | 21.577 |
| TP3RP2 | 15.108 | 16.770 | 17.953 | 18.761 | 19.283 | 20.160 |
| TP1RP3 |  |  |  | 19.779 | 20.660 | 22.084 |
| TP2RP3 |  |  | 18.096 | 19.371 | 20.211 | 21.577 |
| TP3RP2 |  |  | 17.368 | 18.423 | 19.097 | 20.160 |
| *Total Throughput Time*  *(time units)* | TP1RP1 | 23.318 | 21.509 | 21.366 | 21.472 | 21.663 | 22.084 |
| TP2RP1 | 22.208 | 20.923 | 20.846 | 21.004 | 21.214 | 21.577 |
| TP3RP1 | 19.578 | 19.325 | 19.478 | 19.678 | 19.834 | 20.160 |
| TP1RP2 | 20.780 | 20.813 | 21.051 | 21.377 | 21.621 | 22.084 |
| TP2RP2 | 20.357 | 20.392 | 20.669 | 20.943 | 21.145 | 21.577 |
| TP3RP2 | 18.845 | 19.059 | 19.355 | 19.614 | 19.799 | 20.160 |
| TP1RP3 |  |  |  | 21.471 | 21.659 | 22.084 |
| TP2RP3 |  |  | 20.411 | 20.811 | 21.100 | 21.577 |
| TP3RP3 |  |  | 19.474 | 19.675 | 19.851 | 20.160 |
| *Tardy*  *(%)* | TP1RP1 | 5.654 | 4.787 | 5.046 | 6.131 | 7.537 | 10.269 |
| TP2RP1 | 5.232 | 4.481 | 4.715 | 5.788 | 7.156 | 9.615 |
| TP3RP1 | 3.911 | 3.322 | 3.543 | 4.456 | 5.605 | 7.635 |
| TP1RP2 | 6.144 | 5.266 | 5.394 | 6.407 | 7.685 | 10.269 |
| TP2RP2 | 5.839 | 4.994 | 5.133 | 6.073 | 7.217 | 9.615 |
| TP3RP2 | 4.357 | 3.678 | 3.785 | 4.650 | 5.659 | 7.635 |
| TP1RP3 |  |  |  | 6.076 | 7.551 | 10.269 |
| TP2RP3 |  |  | 4.338 | 5.576 | 7.209 | 9.615 |
| TP3RP3 |  |  | 3.414 | 4.290 | 5.476 | 7.635 |
| Tardiness  (time units) | TP1RP1 | 5.152 | 2.260 | 1.316 | 0.904 | 0.765 | 0.875 |
| TP2RP1 | 4.339 | 2.009 | 1.180 | 0.836 | 0.716 | 0.817 |
| TP3RP1 | 2.525 | 1.339 | 0.839 | 0.606 | 0.526 | 0.625 |
| TP1RP2 | 2.556 | 1.611 | 1.094 | 0.855 | 0.752 | 0.875 |
| TP2RP2 | 2.375 | 1.491 | 1.030 | 0.796 | 0.701 | 0.817 |
| TP3RP2 | 1.753 | 1.105 | 0.756 | 0.582 | 0.518 | 0.625 |
| TP1RP3 |  |  |  | 0.926 | 0.751 | 0.875 |
| TP2RP3 |  |  | 1.043 | 0.766 | 0.672 | 0.817 |
| TP3RP3 |  |  | 1.028 | 0.691 | 0.563 | 0.625 |

‡*Tightest limit level on shop WIP*

*Table A7: Results for the Transfer Policies (TP) and Release Policies (RP) with a Setup Factor of 5% when Controlling the Number of Lots – 2 Lots per Job.*

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Performance measure | Policy | Limit 1‡ | Limit 2 | Limit 3 | Limit 4 | Limit 5 | No Limit |
| *Shop Throughput Time*  *(time units)* | TP1RP1\* | 15.916 | 16.987 | 17.570 | 17.903 | 18.073 | 18.233 |
| TP2RP1\*\* | 15.746 | 16.789 | 17.375 | 17.675 | 17.837 | 17.991 |
| TP3RP1\*\*\* | 15.175 | 16.095 | 16.608 | 16.869 | 17.021 | 17.144 |
| TP1RP2 | 15.724 | 16.847 | 17.508 | 17.858 | 18.053 | 18.233 |
| TP2RP2 | 15.580 | 16.669 | 17.309 | 17.641 | 17.819 | 17.991 |
| TP3RP2 | 15.038 | 16.014 | 16.556 | 16.845 | 17.003 | 17.144 |
| *Total Throughput Time*  *(time units)* | TP1RP1\* | 18.620 | 18.371 | 18.261 | 18.245 | 18.237 | 18.233 |
| TP2RP1\*\* | 18.289 | 18.102 | 18.040 | 18.001 | 17.989 | 17.991 |
| TP3RP1\*\*\* | 17.316 | 17.197 | 17.165 | 17.143 | 17.148 | 17.144 |
| TP1RP2 | 17.945 | 18.039 | 18.120 | 18.167 | 18.202 | 18.233 |
| TP2RP2 | 17.714 | 17.810 | 17.905 | 17.937 | 17.961 | 17.991 |
| TP3RP2 | 16.889 | 17.009 | 17.067 | 17.096 | 17.122 | 17.144 |
| *Tardy*  *(%)* | TP1RP1\* | 3.788 | 3.394 | 3.568 | 3.917 | 4.179 | 4.349 |
| TP2RP1\*\* | 3.571 | 3.239 | 3.446 | 3.770 | 4.002 | 4.169 |
| TP3RP1\*\*\* | 2.899 | 2.596 | 2.804 | 3.084 | 3.301 | 3.444 |
| TP1RP2 | 3.332 | 3.180 | 3.469 | 3.855 | 4.143 | 4.349 |
| TP2RP2 | 3.197 | 3.037 | 3.353 | 3.698 | 3.974 | 4.169 |
| TP3RP2 | 2.632 | 2.493 | 2.732 | 3.042 | 3.269 | 3.440 |
| Tardiness  (time units) | TP1RP1\* | 1.125 | 0.627 | 0.408 | 0.319 | 0.290 | 0.282 |
| TP2RP1\*\* | 1.034 | 0.589 | 0.390 | 0.306 | 0.274 | 0.271 |
| TP3RP1\*\*\* | 0.824 | 0.473 | 0.315 | 0.245 | 0.220 | 0.219 |
| TP1RP2 | 0.763 | 0.483 | 0.349 | 0.293 | 0.277 | 0.282 |
| TP2RP2 | 0.726 | 0.461 | 0.338 | 0.281 | 0.265 | 0.271 |
| TP3RP2 | 0.615 | 0.391 | 0.279 | 0.228 | 0.213 | 0.219 |

*\*Equivalent to TP1RP3; \*\* Equivalent to TP2RP3; \*\*\* Equivalent to TP3RP3;* ‡*Tightest limit level on shop WIP*

*Table A8: Results for the Transfer Policies (TP) and Release Policies (RP) with a Setup Factor of 5% when Controlling the Number of Lots – 3 Lots per Job.*

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Performance measure | Policy | Limit 1‡ | Limit 2 | Limit 3 | Limit 4 | Limit 5 | No Limit |
| *Shop Throughput Time*  *(time units)* | TP1RP1\* | 15.145 | 16.113 | 16.656 | 16.943 | 17.093 | 17.215 |
| TP2RP1\*\* | 14.903 | 15.816 | 16.335 | 16.609 | 16.747 | 16.854 |
| TP3RP1\*\*\* | 14.115 | 14.895 | 15.326 | 15.548 | 15.658 | 15.753 |
| TP1RP2 | 15.086 | 16.079 | 16.641 | 16.936 | 17.087 | 17.215 |
| TP2RP2 | 14.852 | 15.788 | 16.329 | 16.600 | 16.744 | 16.854 |
| TP3RP2 | 14.077 | 14.879 | 15.313 | 15.544 | 15.656 | 15.753 |
| *Total Throughput Time*  *(time units)* | TP1RP1\* | 16.682 | 16.899 | 17.045 | 17.129 | 17.177 | 17.215 |
| TP2RP1\*\* | 16.336 | 16.548 | 16.695 | 16.783 | 16.824 | 16.854 |
| TP3RP1\*\*\* | 15.265 | 15.479 | 15.611 | 15.681 | 15.717 | 15.753 |
| TP1RP2 | 16.550 | 16.837 | 17.022 | 17.120 | 17.169 | 17.215 |
| TP2RP2 | 16.224 | 16.501 | 16.686 | 16.771 | 16.821 | 16.854 |
| TP3RP2 | 15.195 | 15.450 | 15.591 | 15.676 | 15.715 | 15.753 |
| *Tardy*  *(%)* | TP1RP1\* | 2.318 | 2.206 | 2.477 | 2.781 | 3.013 | 3.202 |
| TP2RP1\*\* | 2.178 | 2.062 | 2.291 | 2.622 | 2.831 | 2.997 |
| TP3RP1\*\*\* | 1.608 | 1.512 | 1.689 | 1.930 | 2.111 | 2.265 |
| TP1RP2 | 2.217 | 2.175 | 2.452 | 2.777 | 3.016 | 3.202 |
| TP2RP2 | 2.082 | 2.055 | 2.317 | 2.617 | 2.833 | 2.997 |
| TP3RP2 | 1.564 | 1.499 | 1.680 | 1.937 | 2.113 | 2.265 |
| Tardiness  (time units) | TP1RP1\* | 0.420 | 0.267 | 0.202 | 0.180 | 0.179 | 0.192 |
| TP2RP1\*\* | 0.386 | 0.248 | 0.187 | 0.170 | 0.168 | 0.180 |
| TP3RP1\*\*\* | 0.288 | 0.185 | 0.137 | 0.122 | 0.122 | 0.133 |
| TP1RP2 | 0.374 | 0.249 | 0.198 | 0.179 | 0.179 | 0.192 |
| TP2RP2 | 0.344 | 0.234 | 0.185 | 0.168 | 0.168 | 0.180 |
| TP3RP2 | 0.268 | 0.177 | 0.134 | 0.122 | 0.122 | 0.133 |

*\*Equivalent to TP1RP3; \*\* Equivalent to TP2RP3; \*\*\* Equivalent to TP3RP3;* ‡*Tightest limit level on shop WIP*

*Table A9: Results for the Transfer Policies (TP) and Release Policies (RP) with a Setup Factor of 5% when Controlling the Number of Lots – 4 Lots per Job.*

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Performance measure | Policy | Limit 1‡ | Limit 2 | Limit 3 | Limit 4 | Limit 5 | No Limit |
| *Shop Throughput Time*  *(time units)* | TP1RP1\* | 14.909 | 15.793 | 16.284 | 16.531 | 16.651 | 16.747 |
| TP2RP1\*\* | 14.592 | 15.425 | 15.883 | 16.115 | 16.219 | 16.306 |
| TP3RP1\*\*\* | 13.685 | 14.374 | 14.730 | 14.914 | 15.007 | 15.074 |
| TP1RP2 | 14.848 | 15.761 | 16.261 | 16.534 | 16.649 | 16.747 |
| TP2RP2 | 14.558 | 15.406 | 15.872 | 16.112 | 16.219 | 16.306 |
| TP3RP2 | 13.651 | 14.367 | 14.725 | 14.908 | 15.009 | 15.074 |
| *Total Throughput Time*  *(time units)* | TP1RP1\* | 16.317 | 16.491 | 16.617 | 16.686 | 16.717 | 16.747 |
| TP2RP1\*\* | 15.873 | 16.059 | 16.189 | 16.254 | 16.280 | 16.306 |
| TP3RP1\*\*\* | 14.676 | 14.863 | 14.963 | 15.019 | 15.052 | 15.074 |
| TP1RP2 | 16.176 | 16.432 | 16.589 | 16.686 | 16.715 | 16.747 |
| TP2RP2 | 15.794 | 16.027 | 16.176 | 16.253 | 16.279 | 16.306 |
| TP3RP2 | 14.612 | 14.852 | 14.957 | 15.013 | 15.054 | 15.074 |
| *Tardy*  *(%)* | TP1RP1\* | 2.090 | 1.898 | 2.093 | 2.369 | 2.568 | 2.735 |
| TP2RP1\*\* | 1.900 | 1.732 | 1.939 | 2.193 | 2.382 | 2.537 |
| TP3RP1\*\*\* | 1.351 | 1.209 | 1.330 | 1.536 | 1.684 | 1.803 |
| TP1RP2 | 1.983 | 1.877 | 2.096 | 2.383 | 2.573 | 2.735 |
| TP2RP2 | 1.846 | 1.736 | 1.951 | 2.213 | 2.388 | 2.537 |
| TP3RP2 | 1.305 | 1.220 | 1.342 | 1.534 | 1.692 | 1.803 |
| Tardiness  (time units) | TP1RP1\* | 0.396 | 0.240 | 0.171 | 0.150 | 0.147 | 0.159 |
| TP2RP1\*\* | 0.354 | 0.214 | 0.158 | 0.137 | 0.135 | 0.147 |
| TP3RP1\*\*\* | 0.251 | 0.155 | 0.110 | 0.095 | 0.095 | 0.103 |
| TP1RP2 | 0.347 | 0.222 | 0.168 | 0.148 | 0.147 | 0.159 |
| TP2RP2 | 0.319 | 0.205 | 0.168 | 0.138 | 0.136 | 0.147 |
| TP3RP2 | 0.234 | 0.151 | 0.109 | 0.095 | 0.095 | 0.103 |

*\*Equivalent to TP1RP3; \*\* Equivalent to TP2RP3; \*\*\* Equivalent to TP3RP3;* ‡*Tightest limit level on shop WIP*

*Table A10: Results for the Transfer Policies (TP) and Release Policies (RP) with a Setup Factor of 5% when Controlling the Shop Load – 2 Lots per Job.*

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Performance measure | Policy | Limit 1‡ | Limit 2 | Limit 3 | Limit 4 | Limit 5 | No Limit |
| *Shop Throughput Time*  *(time units)* | TP1RP1 | 14.789 | 16.109 | 16.987 | 17.519 | 17.838 | 18.233 |
| TP2RP1 | 14.661 | 15.953 | 16.784 | 17.315 | 17.622 | 17.991 |
| TP3RP1 | 14.243 | 15.411 | 16.138 | 16.590 | 16.846 | 17.144 |
| TP1RP2 | 14.603 | 16.006 | 16.919 | 17.486 | 17.817 | 18.233 |
| TP2RP2 | 14.493 | 15.866 | 16.736 | 17.278 | 17.605 | 17.991 |
| TP3RP2 | 14.114 | 15.318 | 16.096 | 16.561 | 16.825 | 17.144 |
| TP1RP3 |  |  | 16.773 | 17.418 | 17.784 | 18.233 |
| TP2RP3 |  | 15.451 | 16.541 | 17.196 | 17.557 | 17.991 |
| TP3RP2 |  | 15.003 | 15.942 | 16.485 | 16.793 | 17.144 |
| *Total Throughput Time*  *(time units)* | TP1RP1 | 18.281 | 17.810 | 17.888 | 17.998 | 18.095 | 18.233 |
| TP2RP1 | 17.947 | 17.566 | 17.637 | 17.771 | 17.868 | 17.991 |
| TP3RP1 | 16.787 | 16.727 | 16.842 | 16.964 | 17.045 | 17.144 |
| TP1RP2 | 17.492 | 17.612 | 17.804 | 17.968 | 18.079 | 18.233 |
| TP2RP2 | 17.297 | 17.412 | 17.582 | 17.736 | 17.853 | 17.991 |
| TP3RP2 | 16.415 | 16.582 | 16.793 | 16.938 | 17.025 | 17.144 |
| TP1RP3 |  |  | 17.875 | 18.006 | 18.098 | 18.233 |
| TP2RP3 |  | 17.295 | 17.535 | 17.740 | 17.852 | 17.991 |
| TP3RP3 |  | 16.747 | 16.855 | 16.967 | 17.047 | 17.144 |
| *Tardy*  *(%)* | TP1RP1 | 3.483 | 2.646 | 2.531 | 2.892 | 3.462 | 4.349 |
| TP2RP1 | 3.336 | 2.516 | 2.410 | 2.799 | 3.314 | 4.169 |
| TP3RP1 | 2.621 | 1.992 | 1.905 | 2.265 | 2.743 | 3.440 |
| TP1RP2 | 3.640 | 2.820 | 2.678 | 3.003 | 3.515 | 4.349 |
| TP2RP2 | 3.520 | 2.720 | 2.586 | 2.879 | 3.362 | 4.169 |
| TP3RP2 | 2.790 | 2.129 | 2.027 | 2.335 | 2.773 | 3.440 |
| TP1RP3 |  |  | 2.474 | 2.924 | 3.491 | 4.349 |
| TP2RP3 |  | 2.281 | 2.267 | 2.757 | 3.335 | 4.169 |
| TP3RP3 |  | 2.003 | 1.873 | 2.229 | 2.754 | 3.440 |
| Tardiness  (time units) | TP1RP1 | 1.906 | 0.834 | 0.471 | 0.318 | 0.265 | 0.282 |
| TP2RP1 | 1.754 | 0.782 | 0.441 | 0.302 | 0.254 | 0.271 |
| TP3RP1 | 1.234 | 0.601 | 0.349 | 0.239 | 0.200 | 0.219 |
| TP1RP2 | 1.127 | 0.653 | 0.415 | 0.305 | 0.263 | 0.282 |
| TP2RP2 | 1.084 | 0.622 | 0.394 | 0.289 | 0.251 | 0.271 |
| TP3RP2 | 0.855 | 0.491 | 0.315 | 0.230 | 0.198 | 0.219 |
| TP1RP3 |  |  | 0.445 | 0.303 | 0.254 | 0.282 |
| TP2RP3 |  | 0.704 | 0.393 | 0.277 | 0.241 | 0.271 |
| TP3RP3 |  | 0.731 | 0.386 | 0.252 | 0.203 | 0.219 |

‡*Tightest limit level on shop WIP*

*Table A11: Results for the Transfer Policies (TP) and Release Policies (RP) with a Setup Factor of 5% when Controlling the Shop Load – 3 Lots per Job.*

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Performance measure | Policy | Limit 1‡ | Limit 2 | Limit 3 | Limit 4 | Limit 5 | No Limit |
| *Shop Throughput Time*  *(time units)* | TP1RP1 | 14.393 | 15.548 | 16.273 | 16.708 | 16.945 | 17.215 |
| TP2RP1 | 14.152 | 15.281 | 15.973 | 16.380 | 16.603 | 16.854 |
| TP3RP1 | 13.548 | 14.491 | 15.054 | 15.375 | 15.560 | 15.753 |
| TP1RP2 | 14.207 | 15.465 | 16.217 | 16.676 | 16.932 | 17.215 |
| TP2RP2 | 14.027 | 15.207 | 15.934 | 16.353 | 16.592 | 16.854 |
| TP3RP2 | 13.451 | 14.442 | 15.023 | 15.354 | 15.553 | 15.753 |
| TP1RP3 |  |  | 16.056 | 16.589 | 16.889 | 17.215 |
| TP2RP3 |  | 14.774 | 15.713 | 16.250 | 16.533 | 16.854 |
| TP3RP2 |  | 14.116 | 14.867 | 15.289 | 15.525 | 15.753 |
| *Total Throughput Time*  *(time units)* | TP1RP1 | 17.176 | 16.892 | 16.949 | 17.064 | 17.122 | 17.215 |
| TP2RP1 | 16.660 | 16.520 | 16.606 | 16.704 | 16.769 | 16.854 |
| TP3RP1 | 15.375 | 15.413 | 15.530 | 15.617 | 15.681 | 15.753 |
| TP1RP2 | 16.604 | 16.747 | 16.890 | 17.029 | 17.112 | 17.215 |
| TP2RP2 | 16.280 | 16.410 | 16.570 | 16.684 | 16.760 | 16.854 |
| TP3RP2 | 15.167 | 15.350 | 15.498 | 15.598 | 15.677 | 15.753 |
| TP1RP3 |  |  | 16.999 | 17.060 | 17.129 | 17.215 |
| TP2RP3 |  | 16.311 | 16.507 | 16.670 | 16.748 | 16.854 |
| TP3RP3 |  | 15.457 | 15.549 | 15.638 | 15.696 | 15.753 |
| *Tardy*  *(%)* | TP1RP1 | 2.918 | 2.131 | 1.937 | 2.242 | 2.611 | 3.202 |
| TP2RP1 | 2.656 | 1.958 | 1.817 | 2.070 | 2.459 | 2.997 |
| TP3RP1 | 1.932 | 1.377 | 1.294 | 1.514 | 1.820 | 2.265 |
| TP1RP2 | 3.018 | 2.258 | 2.057 | 2.288 | 2.647 | 3.202 |
| TP2RP2 | 2.826 | 2.113 | 1.951 | 2.151 | 2.479 | 2.997 |
| TP3RP2 | 2.029 | 1.493 | 1.372 | 1.561 | 1.846 | 2.265 |
| TP1RP3 |  |  | 1.932 | 2.239 | 2.650 | 3.202 |
| TP2RP3 |  | 1.781 | 1.708 | 2.063 | 2.467 | 2.997 |
| TP3RP3 |  | 1.472 | 1.290 | 1.519 | 1.853 | 2.265 |
| Tardiness  (time units) | TP1RP1 | 1.393 | 0.611 | 0.329 | 0.227 | 0.182 | 0.192 |
| TP2RP1 | 1.212 | 0.555 | 0.308 | 0.206 | 0.170 | 0.180 |
| TP3RP1 | 0.783 | 0.379 | 0.217 | 0.145 | 0.120 | 0.133 |
| TP1RP2 | 0.862 | 0.482 | 0.295 | 0.214 | 0.181 | 0.192 |
| TP2RP2 | 0.795 | 0.446 | 0.278 | 0.200 | 0.168 | 0.180 |
| TP3RP2 | 0.579 | 0.323 | 0.199 | 0.140 | 0.121 | 0.133 |
| TP1RP3 |  |  | 0.349 | 0.216 | 0.177 | 0.192 |
| TP2RP3 |  | 0.513 | 0.270 | 0.188 | 0.160 | 0.180 |
| TP3RP3 |  | 0.490 | 0.257 | 0.162 | 0.125 | 0.133 |

‡*Tightest limit level on shop WIP*

*Table A12: Results for the Transfer Policies (TP) and Release Policies (RP) with a Setup Factor of 5% when Controlling the Shop Load – 4 Lots per Job.*

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Performance measure | Policy | Limit 1‡ | Limit 2 | Limit 3 | Limit 4 | Limit 5 | No Limit |
| *Shop Throughput Time*  *(time units)* | TP1RP1 | 14.181 | 15.271 | 15.933 | 16.317 | 16.527 | 16.747 |
| TP2RP1 | 13.900 | 14.925 | 15.552 | 15.909 | 16.109 | 16.306 |
| TP3RP1 | 13.164 | 14.005 | 14.498 | 14.775 | 14.924 | 15.074 |
| TP1RP2 | 14.034 | 15.184 | 15.887 | 16.288 | 16.516 | 16.747 |
| TP2RP2 | 13.783 | 14.869 | 15.512 | 15.889 | 16.095 | 16.306 |
| TP3RP2 | 13.089 | 13.968 | 14.481 | 14.766 | 14.918 | 15.074 |
| TP1RP3 |  |  | 15.715 | 16.212 | 16.481 | 16.747 |
| TP2RP3 |  | 14.447 | 15.313 | 15.794 | 16.053 | 16.306 |
| TP3RP2 |  | 13.664 | 14.340 | 14.698 | 14.887 | 15.074 |
| *Total Throughput Time*  *(time units)* | TP1RP1 | 16.669 | 16.467 | 16.534 | 16.617 | 16.676 | 16.747 |
| TP2RP1 | 16.087 | 15.990 | 16.091 | 16.182 | 16.243 | 16.306 |
| TP3RP1 | 14.694 | 14.775 | 14.885 | 14.972 | 15.019 | 15.074 |
| TP1RP2 | 16.210 | 16.319 | 16.478 | 16.588 | 16.665 | 16.747 |
| TP2RP2 | 15.800 | 15.918 | 16.055 | 16.170 | 16.233 | 16.306 |
| TP3RP2 | 14.552 | 14.729 | 14.872 | 14.963 | 15.015 | 15.074 |
| TP1RP3 |  |  | 16.566 | 16.634 | 16.687 | 16.747 |
| TP2RP3 |  | 15.839 | 16.031 | 16.166 | 16.239 | 16.306 |
| TP3RP3 |  | 14.850 | 14.928 | 14.993 | 15.027 | 15.074 |
| *Tardy*  *(%)* | TP1RP1 | 2.664 | 1.889 | 1.737 | 1.937 | 2.271 | 2.735 |
| TP2RP1 | 2.371 | 1.695 | 1.571 | 1.794 | 2.091 | 2.537 |
| TP3RP1 | 1.632 | 1.158 | 1.064 | 1.237 | 1.478 | 1.803 |
| TP1RP2 | 2.698 | 1.984 | 1.829 | 1.988 | 2.292 | 2.735 |
| TP2RP2 | 2.496 | 1.825 | 1.676 | 1.861 | 2.122 | 2.537 |
| TP3RP2 | 1.700 | 1.228 | 1.122 | 1.264 | 1.494 | 1.803 |
| TP1RP3 |  |  | 1.712 | 1.980 | 2.312 | 2.735 |
| TP2RP3 |  | 1.577 | 1.508 | 1.775 | 2.116 | 2.537 |
| TP3RP3 |  | 1.265 | 1.081 | 1.240 | 1.495 | 1.803 |
| Tardiness  (time units) | TP1RP1 | 1.188 | 0.526 | 0.287 | 0.187 | 0.152 | 0.159 |
| TP2RP1 | 0.996 | 0.453 | 0.252 | 0.170 | 0.138 | 0.147 |
| TP3RP1 | 0.610 | 0.301 | 0.169 | 0.114 | 0.094 | 0.103 |
| TP1RP2 | 0.748 | 0.410 | 0.251 | 0.177 | 0.150 | 0.159 |
| TP2RP2 | 0.678 | 0.372 | 0.229 | 0.166 | 0.138 | 0.147 |
| TP3RP2 | 0.469 | 0.259 | 0.157 | 0.109 | 0.093 | 0.103 |
| TP1RP3 |  |  | 0.292 | 0.181 | 0.147 | 0.159 |
| TP2RP3 |  | 0.428 | 0.230 | 0.159 | 0.133 | 0.147 |
| TP3RP3 |  | 0.411 | 0.211 | 0.129 | 0.098 | 0.103 |

‡*Tightest limit level on shop WIP*