**METRO**

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Transportation
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SUBJECT: PRODUCTIVITY IMPROVEMENTS IN
DIRECTLY OPERATED BUS SERVICE

## ISSUE

Until recently, the assignment of bus trips to vehicles was a manual process involving numerous labor-intensive tasks. These tasks, known as Blocking, recently became viable targets for automation because of enhancements to MTA's bus scheduling software. This spring, consultants from the software vendor, Giro Inc., and the consultants who assist MTA in planning Rapid Bus, TMD Inc., assisted staff in the transition from the manual process to an automated process. Through automation, staff is able to reduce unproductive Layover Hours and Deadhead Hours. The result is a 2.3% increase in productivity for directly operated bus services. The improved productivity is reflected in the June 2003 Service Change.

## DISCUSSION

Layover Time occurs when a bus is idle between the end of one bus trip and the beginning of its next trip. Manually performing the Blocking tasks necessarily limits options to very simple solutions. Often these simple solutions result in excessive Layover Time. In contrast, the computer can process very complex relationships in its solution set. One example of such increased complexity is the use of a single bus on multiple routes. This practice, called Interlining, is transparent to passengers yet it can significantly reduce Layover Time. The June Service Change, as an example, will increase Interlining from 3% to 9%. Interlining, together with a few other changes, resulted in 11.4% fewer Layover Hours, compared with the manually blocked December 2002 Service Change.

Deadhead Time is required to move a bus between the bus division and service locations. It is also the time needed to move a bus from one route to another. Again, the computer was able to consider a wide range of options for dealing with these unproductive bus movements. The automated solution reduced Deadhead Time almost 7.9% as compared to manually produced solutions. As shown on this chart, the combined reductions in Layover and Deadhead Time will save 2.3% of Vehicle Hours on an annual basis.

| June 03 Manual* | Hours | Ratio |
|---|---|---|
| Service Hours | 5,798,007 | 76.8% |
| Layover Hours | 1,081,296 | 14.3% |
| Revenue Hours | 6,879,303 | 91.2% |
| Deahead Hours | 666,779 | 8.8% |
| Vehicle Hours | 7,546,082 | 100.0% |

| June 03 Automated | Hours | Ratio |
|---|---|---|
| Service Hours | 5,798,007 | 78.7% |
| Layover Hours | 958,263 | 13.0% |
| Revenue Hours | 6,756,270 | 91.7% |
| Deahead Hours | 614,047 | 8.3% |
| Vehicle Hours | 7,370,317 | 100.0% |

| Difference | Hours | % Change |
|---|---|---|
| Service Hours | 0 | 0.0% |
| Layover Hours | -123,033 | -11.4% |
| Revenue Hours | -123,033 | -1.8% |
| Deahead Hours | -52,732 | -7.9% |
| Vehicle Hours | -175,765 | -2.3% |

* Estimated based on ratios experienced with the Dec. 02 Service Change

Beyond the savings in Vehicle Hours, automation of the Blocking tasks provides many other benefits to MTA staff. First and foremost, it releases staff from the tedious and time consuming activity of manually Blocking Bus Trips each time a change is made to a any route. Staff will now have more time to identify and correct problems with service. Correcting these problems will lead to improvements in On-Time performance. Moreover, the automation of Blocking Bus Trips results in improved consistency in the application of business rules. Automation assures strict enforcement of these business rules, whether mandated by Government Code, the Labor Agreement, or MTA policy.

## NEXT STEPS

Staff gained considerable experience through the implementation process and the initial use of the new bus scheduling software. The new knowledge is expected to lead to the discovery of additional productivity improvements. Such additional improvements will be implemented in December 2003 Service Change.

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