1026-49-220 **Michael Zabarankin*** (mzabaran@stevens.edu), Department of Mathematical Sciences, Stevens Institute of Technology, Castle Point on Hudson, Hoboken, NJ 07030, and **Ilona Murynets** and **Jeffery Nickerson**. *Optimal Security Inspection with a Single-server Queue.*

A problem for optimizing a security-inspection system with a single-server first-come-first-served queue subject to a constraint on the average time spent in the system has been formulated. A version of the Pollaczek-Khinchin formula for the steady-state waiting-time distribution for the M/G/1/FCFS queue has been derived by reducing a Wiener-Hopf integral equation to a Riemann boundary-value problem for the characteristic function of the distribution. The system-stability condition plays a crucial role in application of Rouche's theorem to establish the analyticity of an auxiliary function in the factorization of the coefficient in the Riemann problem. With the Pollaczek-Khinchin mean formula for the M/G/1/FCFS queue, the optimal security-inspection problem has been simplified and analyzed. As an illustration, the problem has been solved for two specific performance functionals for exponential, shifted-exponential and triangular inspection-time distributions. The work has practical implications for the design of airport passenger security, as well as container inspection systems. (Received February 27, 2007)