

Resource Planning and Scheduling at Maintenance, Repair and Operations (MRO) Centers

Postdoctoral position

Background: The effective planning of resources when scheduling maintenance tasks and repair jobs is an enormous challenge, especially for heavy industries such as aerospace and transportation manufacturers. In such industries, because of the product complexity and variety, not to mention continuous technological improvements, a broad range of maintenance tasks and high-performance services should be done over the course of a year to guarantee the safety and reliability of the products.

This project is to construct the mathematical models and develop the appropriate solving algorithms to schedule (determining the sequence of) the maintenance work orders of different airplanes assigned to a given MRO facility, considering the available limited resources. The work orders vary in arrival time, duration and due date. The objective is to schedule the work orders in such a way that all work orders completed before associated due dates while the open (unused) capacity should be minimized. The work order durations are prone to uncertainty and may be predicted using the historical data. The limited resources in an MRO center usually include the skilled-workforce, tools/equipment, space/slot, and spare parts. However, the workforce is considered the highest priority resource, because maintenance tasks are labour intensive, and the workforce performing the tasks is highly-paid and extremely skilled in their individual areas.

A proven history of driving research and development, algorithms and optimization is needed to be successful in this position. The qualified candidate will have experience implementing mathematical models and numerical optimization methods; preferably, designed for machine/maintenance scheduling problems.

BASIC QUALIFICATIONS

- Ph.D. in Operations Research, Industrial Engineering, Computer Science or Applied Mathematics
- Experience communicating with both technical and business people. Ability to speak at a level appropriate for the audience.
- Experience implementing models and analysis tools through the use of high-level modeling languages (e.g. AMPL, R, Cplex, GAMS, LINGO).
- Experience prototyping and developing software in traditional programming languages (C++/ Java/ Python)

PREFERRED QUALIFICATIONS

- Proficient with SQL and experience with large-scale data,
- Demonstrated experience designing data visualization tools (e.g., D3, Google toolkit, ...),
- Demonstrated experience building forecasting models.

Interested applicants send resume and cover letter to Dr. Nima Safaei at

Nima.Safaei@aero.bombardier.com