

Toronto Metropolitan University
Bio-engineering Competition 2024: Fall
Abstract

Background:

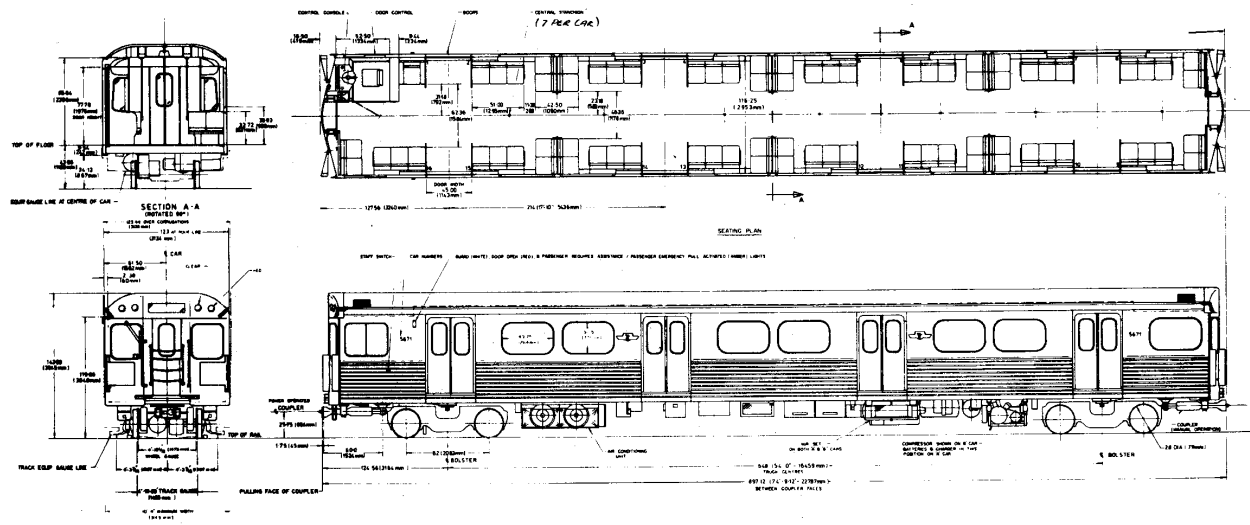
The subway is an integral system in the Toronto Transit Commission (TTC), and many people use it because of its speed and relative location to populous sectors in the city. The current design of the subway layout can make it difficult for users with disabilities and impairments to navigate through with ease.

Challenge:

Redesign the TTC subway system to improve safety, sustainability, and accessibility while addressing the needs of commuters, particularly those with physical disabilities and health considerations. Competitors are required to propose innovations for the train design, platform layout, and station environment to create a safer, more comfortable, and efficient transit experience.

Your design must consider preemptive safety measures, such as collision-prevention technologies, enhanced platform edge safety systems, and improved passenger flow to reduce congestion. Accessibility improvements are critical and should ensure that passengers with disabilities or impairments can navigate the system with ease, using features like ergonomically designed spaces, improved signage, and wheelchair-friendly infrastructure.

In addition, incorporate biomedical engineering principles to address passenger health, such as integrating air quality monitoring systems to reduce exposure to pollutants within the subway system. Your design should also work on reducing the subway system's carbon footprint by integrating energy-efficient technologies. Focus on how the subway system can provide a healthier and safer environment for all passengers, ensuring that health monitoring is integrated with safety and comfort.



CLASS H-5 CAR

Fig 1. Layout of Class H-5 TTC Subway Car

Deliverables:

As engineers, you need to complete:

One (1) report with a maximum of ten (10) pages for the provided case. This report must be emailed to the provided email address by the end of the design phase.

The report must consider the following:

- Biomedical, environmental and economically related factors
- Technical feasibility and potential for innovation
- Real-world applicability

A 15-minute presentation which you will present in front of a panel of judges. At the end of your presentation, there will also be a maximum 10-minute question period where the panel will ask you any questions they may have.

Judging Matrix

Solution	<ul style="list-style-type: none"> → Deliverable Compliance with Expectations → Environmental, Biomedical and Economic Consideration → Technical Feasibility/Innovation → Real-world Applicability 	/60
Report	<ul style="list-style-type: none"> → Clarity → Writing Style → Professionalism → Design Justification 	/15
Presentation	<ul style="list-style-type: none"> → Voice → Articulation and Timing → Visual Aids → Response to Questions 	/25
Penalties	<ul style="list-style-type: none"> → Plagiarism → Insufficient Citation → Documents Received After Deadline → Absent Team Member → Verbal Disclosure of School During Presentation → Disclosure of School in Presentation Files/Documents → Disclosure of School by Supporting Audience Members 	-50 -50 -50 -25 -10 -10 -10
Total		/100