Society of Allied Weight Engineers, Incorporated

Serving the Aerospace • Marine • Offshore • Land Vehicle • Allied Industries

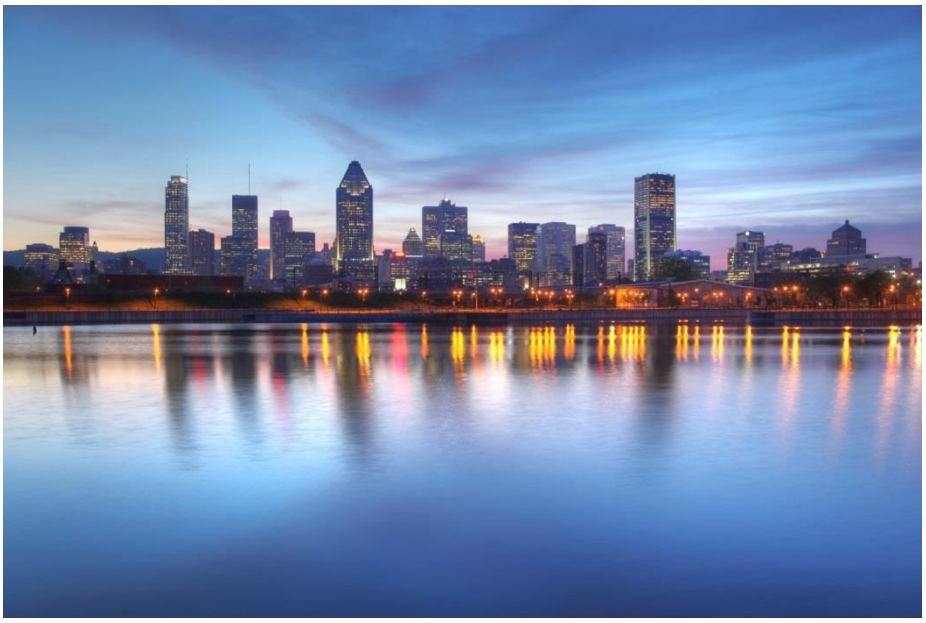
The Canada Chapter of SAWE welcomes members, industry, and academia to the

2016 Canadian Regional Conference on Mass Properties Engineering

November 4-5, 2016

Hotel Omni Mont-Royal

Montreal, Quebec, Canada



Guest Speaker

Marc-Andre Valiquette

Author & Publisher of:

"Destruction of a Dream, the tragedy of Avro Canada and the CF-105"

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Schedule

Thursday Nov.3	Friday Nov.4	Saturday Nov.5
SAWE Board Meeting	**Technical Session**	**Mass Properties Training**
- International Board members and 2016/2017 Conference Planning Team (*by invitation only*)	- **Attendee Registration** - **Guest Speaker** - **Technical Papers/Presentations** - **Vendor Exhibits/Presentations**	- **Mass Balancing of Flight Control Surfaces (2 hr.)** - **Basic Mass Properties Measurement (2 hr.)** - **Aircraft Fuel Calibration (4 hr.)**

Registration & Fees *($US dollars)*

On-line registration and credit card payment option will be available through ***RegOnline***. (click on "**REGISTER NOW**" button below)
The last day for early registration for the conference and to guarantee the special hotel rate is October 12, 2016.

- **Conference Technical Session fee (no fee for presenters):**

  SAWE members = $60 ($30 for retired members)
  Non-members = $140
  Students = $10

- **Full Day Mass Properties Training fee:**

  SAWE members/retirees = $50
  Students = $10

SAWE Membership and renewal is available on-line through SAWE store.

- Additional $20 late fee for all registrations after October 12, 2016

REGISTER NOW

Registration Coordinator: Jerry Ramos (jean.jewry.ramos@aero.bombardier.com)

Hotel and Transportation

Hotel Reservations:

The regional conference will be held at the Hotel Omni Mont-Royal, located on Sherbrooke Street in downtown Montreal.

The hotel is only steps away from some of the best dining in the city of Montreal, fabulous night life, and gift shopping. This hotel reflects a chic, casually elegant ambience from plush beds and soft colors, to marble bathroom counters and modern desk chairs as well as bold styling in all guest rooms. SAWE guests will enjoy free internet service in their guest room with enrollment to the Omni Select Guest program. (*This can be done prior to arrival via the omnihotels.com website or done at check in…a valid email address is required*)
The hotel has an outdoor pool, a spa, and fitness center.
We have provided special rates during your stay. All bookings may be made online to receive your special negotiated rate by clicking the "**BOOK NOW**" button below.

Dates:	**November 3 - 5, 2016**
Additional Dates:	October 30 - November 8, 2016
Group Rate:	Deluxe Rooms: **$169.00** CDN + applicable taxes
Parking:	Self-Parking: **$17.75** CDN/day
	Valet Parking: **$29.00** CDN/24hr period incl. in/out privileges
Book By:	October 12, 2016

BOOK NOW

Hotel Omni Mont-Royal
1050 Sherbrooke Street West.
Montreal, Quebec, Canada H3A-2R6


Hotel Coordinator: Kathy Lacroix (kathy.lacroix@aero.bombardier.com)

Transportation Options: from the airport to hotel

(http://www.admtl.com/en/access/taxis-limousines)

- Taxi service: approximately $40 CAD, flat fee, one way
- Limousine service: approximately $55 CAD + taxes, one way

Be sure to ask the driver for the fixed rate to downtown. Warning: If they turn on the meter, they may expect you to pay that instead at the end of the trip. Just check to be sure that the meter is off. Taxis are now required by law to accommodate electronic payments. This may sound funny, but some taxi drivers may still refuse anything but cash, so be sure to check when you get in that payment by credit card is ok. They are also not allowed to ask for any additional fees for accepting an electronic payment.

- Public transportation: **Express bus 747** - $10 CAD, one way, includes a 24hr pass on the metro system (STM)

The 747 bus runs 24 hr per day on a set schedule between the airport and the bus station downtown, with a number of stops along the route.
If there are just one or two of you and don't mind a short walk when you arrive at the right stop, this is certainly the cheaper of the travel options.
The map of the 747 route is on the inside sides of the bus above the windows, and lists all the hotels and the recommended stations for each one.
Rue Peel is the correct stop for the Omni.

Follow the signs hanging on the ceiling, or the ones all over the floor to where the 747 bus stop is. There are automated machines close to the door to outside for buying the 747 pass. The STM (Montreal's public transit system) has a booth at the airport with people to help visitors pick the right fare and help them with any questions, using the STM machines, etc.

Transportation options: at the hotel

- Car rental: available through hotel concierge service
- 3-minute walk to the Montreal Metro System (Peel station) (http://www.stm.info/en/info/networks/metro)

Transportation Coordinator: Paul Newsham (paul.newsham@aero.bombardier.com)

Technical Session (Friday, Nov.4)

Please contact Whidy Kiskunas (Chapter Director & Technical Program Chairman) at vidas.kiskunas@utas.utc.com if you interested in making a 30 minute technical presentation during the technical session or to refer others.
Please note there will be no training on Friday.

2016 SAWE Canada Regional Conference Technical Presentations (as of 9/7/2016):

A Recommended Weight Margin Approach for Wet Undersea Vehicles
(Presented by: William Boze, Newport News Shipbuilding)

Abstract: Small "wet" undersea vehicles are very sensitive to weight and buoyancy changes. Thus, wet vehicles need the application of both an uncertainty margin for both weight and buoyancy prediction during the design development phase. Classical margin approaches for large dry submersibles vehicles do not address buoyancy uncertainty since the pressure hull (which provides the majority of the buoyancy) is established early in the design. Therefore, margin approaches that address both weight and buoyancy uncertainties are needed.

Aerodynamics Load Measurements on Airfoils
(Presented by: Dr. Hachimi Fellouah, University de Sherbrooke, Department of Mechanical Engineering)

Abstract: This project concerns the design of a three components internal aerodynamic balance. It can be used to measure the lift, drag and pitching moment in static or oscillating airfoils enduring air loads. The end objective is to study the complex unsteady 3 dimensional (3D) air flows interaction with airfoils. This interaction is often characterized by flow recirculation and massive flow separations that lead to reduction of both aerodynamic performance and structure fatigue.
The Computer-aided design (CAD) of the internal balance will be presented. Finite element analysis (FEA), through ANSYS software, is used to assess the design before its construction. The result shows the good response of the balance to simulated air loads.

Aircraft Ditching and Safe Evacuation
(Presented by: Stuart Norris, Bombardier Aerospace)

Abstract: In the unlikely event of landing on water, the evacuation scenarios have to be considered, and the aircraft proven to float for sufficient time to enable safe evacuation of all occupants.

An Error Propagation Analysis of Small Engine Mass Properties Measurements
(Presented by: Anthony Primozich, USAF, President – SAWE International)

Abstract: This paper investigates the impact of measurement error propagation on the accuracy of calculated weights and centers of gravity of small turbofan engines. Three variations of the two-load-cell crane-and-cable weighing technique were explored. The potential sources of measurement error were identified and analytical expressions for calculating the total error in the weight and center of gravity calculations were derived. A generic engine example was used to conduct a sensitivity analysis to illustrate the magnitude of error that could result from various weighing configurations. Results show that incorrect mass properties values can have an effect on modern aircraft flying qualities, such as fuel burn, aircraft handling, and trim.

Weight Control: Idealistic versus Reality
(Presented by: Alan Bird, Fincantieri Marinette Marine)

Abstract: Often, the requirements for determining the mass properties of a ship are contractually established by the customer and design agent. In real life though in the shipyard, many of those requirements physically can't be done, are in themselves not accurate, or fall by the wayside due to cost and/or schedule factors. Even in some of the Recommended Practices, there are "requirements" that are not always obtainable. This paper will discuss several examples that can (and will) deter from what would be an "idealistic" weight control program.

The Secret Life of the Center of Gravity
(Presented by: Robert L. Zimmerman, Retired – Lockheed Martin Corporation)

Abstract: In the world of mass properties, indeed in the world at large, the mass property that gets all the "press" is weight, or more correctly, mass. The unsung "hero" of mass properties, with at least as much influence as mass in the behavior of an object in a force field, is the Center of Gravity.
The Center of Gravity exerts its influence in myriad ways. This paper presents a compendium of manifestations of the effect the CG has on an object's behavior, some of which are surprising even to those who have studied the growing field of mass properties engineering. As a result, the authors put forth the proposition that the Center of Gravity should be raised from secondary importance to primary in the mass properties hierarchy.

Weight Optimization of a Landing Gear Steering Collar using Tosca in Abaqus
(Presented by: Syed (Noman) Husainie, Aventec)

Abstract: The adoption of topology optimization as a tool in the design cycle of a landing gear was tested using Tosca in Abaqus. The optimization process was carried out in collaboration with one of the leading landing gear manufacturers. To test Tosca's capabilities, a landing gear steering collar which was already in production and had previously gone through several phases of design iterations was used as the sample component. The steering collar weighed 35.155 lb before the optimization and there was little room for further material reduction largely due to multiple contact regions and multiple loading conditions. The analysis included multiple loading conditions such as oversteer, maximum spin up, and fatigue. Various manufacturing and geometrical conditions were also taken into consideration. Using a combination of CATIA, Abaqus, and Tosca, an optimized steering collar design was achieved with an approximately 19% reduction in mass when compared to the original design of the steer collar. The final mass of the redesigned steer collar was 28.521 lb. The results highlighted the benefits of optimization early in the design cycle in the aerospace industry.

This page will be updated as presentation titles and abstracts are received…please check the website (www.sawe.org or www.sawe.ca) for updates!

Technical Program Chairman: Whidy Kiskunas (vidas.kiskunas@utas.utc.com)

Training Day (Saturday, Nov.5)

Mass Balancing of Flight Control Surfaces (8am - 10am)

(Instructor: Cviko Vidakovic)

This short course will provide the basic theory behind the balancing of moving surfaces, flutter, and aeroelasticity. Discussion and demonstration of moving surface moment theory, requirements, suggested forms/log sheets, and review of existing SAWE reference material.

Basic Mass Properties Measurement (10:15am – 12:00noon)

(Instructor: Jerry Pierson)

This session will feature weight and balance topics and is intended to be mostly a hands-on class demonstrating basic mass properties measurements. This class is geared for new Engineers or students who have never:

- Measured density of solids and liquids
- Measured center of gravity of vehicles
- Measured moments of inertia
- Measured ship center of gravity and had stability explained

Aircraft Fuel Calibration (1:00 pm – 5:00 pm)

(Instructor: Jerry Pierson)

This class will cover the basic fuel usage process; including fuel quantity per tank measurement, fuel gauge calibration, usable and unusable fuel, and all aspects of fuel usage determined on the ground.

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Training Coordinator: Tony Lyczko (anthony.lyczko@aero.bombardier.com)

Vendor Registration

Vendors and suppliers are invited to participate in our conference. Exhibit space is available on Friday, November 4th to showcase your products, services and new technologies. Time will be allocated during the technical sessions for each vendor to give a brief presentation. Longer presentations may be coordinated through our technical coordinators. Vendor provided training in the use of a particular service or product can also be arranged. Please contact Rod vanDyk for information or to sign up as a vendor and/or sponsor.

Exhibitors:

A $**500 (US$)** Exhibitor fee is required to have a vendor display table at our conference. As an Exhibitor your company's name and logo will be included in our advertisements and Program. You will be provided sufficient space within our Exhibit Area to display your products and/or literature.

Sponsorships:

As a Sponsor, your company's name and logo will be included in our advertisements and Program. Announcements will be made at the conference recognizing your company's sponsorship. Sponsorship opportunities include:

- **Platinum:** Conference level sponsorship **@ $1,500 (US$)**

  Your company's name and logo will be prominently displayed at the entrance to the Conference. Advertisements will include the statement, "2016 Canada Chapter Regional Conference Sponsored By <Your Company Name>." Recognition will be given at the conference opening, including the opportunity to give the keynote address.

- **Gold:** Friday hosted luncheon @ **$1,000 (US$)**

  As the Gold Sponsor, your company will be the sole sponsor of the conference luncheon. Your representative will be publicly recognized and thanked at the beginning of the luncheon. Your company's name and logo will be prominently displayed in the luncheon area.

- **Silver:** Friday morning & afternoon breaks @ **$500 (US$)**

  Your company's name and logo will be prominently displayed in the break areas.

- **Bronze:** Saturday Training breaks @ **$300 (US$)**

  Your company's name and logo will be prominently displayed in the break areas.

VENDOR/SPONSOR = **REGISTER NOW**

Vendor Coordinator: Rod vanDyk (rod.van-dyk@safrangroup.com)