

## 5<sup>th</sup> Annual BSA Composite Materials Merit Badge Workshop – September 12, 2015



Behind the scenes at the 2015 Bell Helicopter Alliance Air Show, hidden inside the walls of the Tarrant County College Aviation building, 18 volunteers helped 60 local Boy Scouts earn this exciting merit badge.

In addition to being classified as a STEM merit badge, this is one of the more challenging badges to earn because the scouts must build two projects using composite materials. Introduced in 2006, [this merit badge](#) was one of the least earned badges for a number of years. Not because the scouts weren't interested, but because the average Troop didn't have the resources or a qualified counselor to teach it. In 2011 the DFW chapter of SAMPE® (Society for the Advancement of Material and Process Engineering) and Bell Helicopter teamed up to end that limitation by putting together this workshop. This year Tarrant County College joined our team by hosting us in their Aviation Center of Excellence building at Alliance Airport. This workshop gives the scouts a hands-on experience to an exciting high tech field and a look into a possible career choice for their future.

The workshop began in a classroom setting where the scouts were introduced to composite materials. The scouts discussed fiberglass, carbon, Kevlar®, resins, where each material is best used, manufacturing techniques and some of the many industries using composites. They compared the strength, weight and corrosion properties of composites to other construction materials. Once the basics were covered, the scouts learned about personal and environmental safety when working with composites. For this they studied the MSDS for each material they would use in their projects.

Once the classroom portion was complete, the scouts broke into small groups and rotated between three more activities. One was a tour of the aviation hangar where the scouts could see composite parts on the aircraft and learn how some of the composite repair is accomplished.



The other two activities were building their composite projects. The first consisted of making a casting using a quick cure resin along with some powdered fillers (similar to cultured marble production).



The second project was the premier activity and involved building their own hiking staff using their choice of carbon, Kevlar® or 50/50 hybrid braided sleeves. This project required the scouts to do a wet layup using room temperature curing resin. They formed the sleeves over a PVC mandrel and covered it with shrink wrap to complete the cure. The scouts were sent home with a finishing kit (end caps, grip, lanyard and small compass) to complete the hiking staff once it was fully cured.



As an added bonus, Bell Helicopter invited all the scouts and their families to enjoy lunch in the Bell tent at the air show as our special guests.

Thank you to all the volunteers who made this a success.

Tony Bergerson	Jim Fleischman	Richard Lamkin	Mike Marvin	Jason Ramos
Noah Bergerson	Barbra Fleischman	Marie Lamkin	Rick Willardson	Rusty Branch
Monty Copeland	Tom Chiang	Daniel Lamkin	Sebastian Hill	
Todd Boyles	Tracy Chiang	Constance Lamkin	Sam Hill	

And a special thanks to our sponsors for this exciting workshop;

- Bell Helicopter, for coordinating the workshop, providing volunteers and shop supplies.
- Tarrant County College Aviation COE for use of their facility.
- Stiles Machinery, for providing the hardware used in the projects.
- Huntsman, for providing the resins used for both projects.
- A&P Technologies, for providing the braided sleeves.
- [SAMPE DFW](#) for providing volunteers, supplies and support.



Some feedback from the workshop:

I want to thank you for the outstanding efforts and presentation of the Composite Merit Badge on Saturday. Our son thoroughly enjoyed the hands on work that made the badge come alive applying real world applications and seeing how it impacts his community. He enjoyed his lunch at the Bell Helicopter tent and seeing the Blue Angels up close. What an amazing opportunity for the Boy Scouts! I know it takes a lot of effort and coordination to put on such a big event.

I really enjoyed the Composite Merit Badge Class. I learned a lot about what composites are and what they are used for. I did not realize how much stronger and lighter composites are compared to metals. It was a really cool experience to make the Resin cast and the Hybrid Graphite Kevlar walking Staff. Thank you for teaching this awesome class, I learned a lot!

The one comment that was repeated the most is "How cool it was to actually build something". Last Tuesday night at our Troop meeting one of my Scouts brought his completed hiking staff. Everyone wanted to know where he got it from. He was very popular during the meeting.

Thank you for putting this workshop together. The kids had a blast and they are all anxiously waiting for Tuesday so they can finish their walking sticks. We even have a few of them talking about becoming engineers. Thanks for all your efforts and hard work,

I really appreciate the opportunity you afforded me today. The class was one of my favorite merit badges ever. I have 42 and am a life scout. Making the walking stick and seeing the cockpit of the helicopter were my favorite activities. Thank you.

My son enjoyed today's workshop very much, it was the highlight of our visit to the air show. I met some of the parents and scouts from our troop who attended the morning workshop (who also enjoyed it very much) and they thanked Bell Helicopter for hosting them at the Bell tent. Thank you to you and all of your volunteers, I will repeat that it was the highlight of the air show for my son. When I asked him what he liked best, he said it was definitely the hands on activities, making the Boy Scout emblem mold and the walking stick. Then he proceeded to launch into the retelling of the history of composites in the car on the way home.

They had a great time. Thanks to all of you for all your time spent in making this a successful merit badge class. I will be trying to drum up some scouts for y'all for next year. Thanks, again for all y'all do for scouting.

Thank you for all the work that went into planning this MB class. It was interesting and fun, and a good experience for our boys.

You put on an excellent program... All of our scouts that attended last year have highly recommended it to our other scouts.

Thank You,