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Sustainability

The vital role of sustainability across additive manufacturing



Interview

Introducing the Additive Manufacturer Green Trade Association

Exclusive interview with Sherry Handel, Executive Director of the AMGTA

The AMGTA was launched in November 2019 and has embarked on two research-based initiatives to understand how sustainable AM is.¹

Last November at Formnext 2019, aerospace and defense AM company Sintavia announced the launch of a new trade group aimed at promoting the environmental benefits of additive manufacturing technologies. The group, called the Additive Manufacturer Green Trade Association (AMGTA), is now in its early stages of operation and is being led by Sherry Handel, an expert in non-profit management and entrepreneurship.

At its core, the AMGTA strives to educate the public and industry about the environmental benefits of additive manufacturing and to promote best practices of AM as an alternative to traditional manufacturing. Of course, in order to truly promote the sustainable benefits of AM, it is necessary to

fully understand them, and that's where AMGTA is arguably doing its most interesting work.

In the following interview, we speak to Executive Director Sherry Handel about the AMGTA's mission and membership and how it is focusing on research to not only understand the environmental advantages inherent in AM but also to help the industry evolve into a more ecological and sustainable sector.

3dpbm: *Can you tell me about how the AMGTA was formed?*

Sherry Handel: The AMGTA is the brainchild of Brian Neff, the CEO of Sintavia. Brian gave a TEDx Talk last year where he shared a case study example of a redesigned, optimized turbine bracket. In the talk, he extrapolated

the weight savings compared to a traditionally manufactured bracket, across an averaged sized jet fleet and analyzed the impact that the lightweighted bracket would have on the environment. Both the fuel savings and the reduction of CO2 emissions were significant. In the process of preparing for the TEDx Talk, he came to the conclusion that the environmental benefits of AM were not well understood and certainly not well promoted to end markets. The AMGTA is meant as a resource for the AM industry to help solve this problem.

Our mission is to educate the public and industry about the environmental benefits of AM, promote the adoption of AM as an alternative to traditional manufacturing methods, develop best practices for additive manufacturing, increase the adoption rate of AM, as well as help our member companies grow and attract new customers.

Sherry Handel,
Executive Director of the AMGTA. ²



3dpbm: *How important is sustainability in attracting new customers?*

SH: What we're hearing a lot from AMGTA members and those considering membership is that their customers have a vested interest in aligning with companies that have a sustainability framework and that are taking action to be more environmentally conscious and reduce their ecological footprints. Customers are encouraging, and in some cases mandating that companies in their supply chain are doing as much as they can to reduce the environmental impact in the production of parts. That is what inspired people to seek us out, and our goal is to help them get there.

Joining the AMGTA provides members with the opportunity to support the organization's mission of promoting the environmental benefits of AM within key industries and to the general public. The AMGTA provides a forum for members to share ideas and develop ways to improve the environmental benefits of the AM industry.

3dpbm: *How is the AMGTA organized in terms of membership?*

SH: There are three classes of membership: founding members, advisory members and participating members. Our founding members are the sustaining members that will carry the organization forward and serve on the AMGTA board of directors. Per our bylaws, founding members are limited to seven, and each will designate a representative of their company to serve on the AMGTA board. We have three founding members at this time: Sintavia, QC Laboratories and another which we have not yet announced.

“A key part of what the AMGTA is doing is allowing us to better understand the environmental impacts of AM: the good, the bad and the ugly”

We have a lot of interest already, and I expect that we will secure our founding member companies by this summer.

We decided to offer the advisory membership level to those companies who may have been interested in a founding membership. It's very high profile, but one of the key differences is that there is no perpetuity: membership is on an annual basis. Advisory members will be featured in every news release, are granted voting rights, they'll be invited to our annual meeting and will have opportunities to interface with our board of directors and get involved in special projects.

The participating member level is open to all companies in the industry. To be considered as a member, companies must have generated the majority of their business revenue through AM over the most recent fiscal year; they need to be committed to the AM industry. The other requirement for all membership levels is that the companies need to have adopted proactive internal policies relating to waste reduction and operational sustainability. Companies are not required to have a third-party certification when they apply, as long as they're working towards internal policies to operate more

sustainably they can join. In every case, I am reviewing applications and conducting interviews and meetings.

Finally, members need to be willing to actively participate in the advancement of non-commercial benefits of AM. This means they have to be willing to participate in forums and events, speak to the media, etc. We want our members to provide some transparency so that the industry can learn from them.

3dpbm: *So companies do not need a certification from the get-go to join?*

SH: Originally, the plan was that members should have Green Business Bureau (GBB) certification or a similar third-party certification, but we ultimately felt that was too stringent, especially at the forefront. We want to be guiding our members through the certification process and making suggestions. Even now during this COVID-19 pandemic, there are certification companies that are still operating. Some of their employees are able and willing to travel and others are offering this certification work remotely. We understand that our prospective member companies are going through a significant adjustment with COVID-19, so



trying to add something else to the to-do list is a tall order. It's important to respect that companies are evolving, and getting environmental certifications on their radar is the first step. They can think about moving forward with certification when the time is right for them.

3dpbm: *What type of work specifically will the AMGTA be doing?*

SH: In order to accomplish our goals, the AMGTA will engage in marketing and advertising campaigns, sponsor and conduct research and publish the results, and organize membership drives. The AMGTA is focused on commissioning academic research. We need to quantify and provide data and metrics on how AM is better for the environment than traditional methods. Of

course, in the process, we're going to learn more about where we as an industry need to do more work.

Initially, we're focusing on full life-cycle assessment (LCA). This means looking at what it takes to produce a particular part via both traditional and additive manufacturing processes: from the ore that's mined out of the ground, processed and refined to an AM powder through the gas-atomization process, transported, and then the energy used in the machine to produce a part, the emissions produced and all the steps, and there are many that I haven't mentioned, up and through the part's eventual end of life when it is no longer useful. We want to understand what the environmental impacts are all along the way, from cradle to grave.

It's important to focus on the full life-cycle assessment, because otherwise it would be like operating in a silo. By only looking at machine energy, emissions or waste in the manufacturing process we won't have the full environmental impact. Right now, those seem to be the three primary areas for AM that research has focused on from an environmental standpoint, but that's just part of the picture.

3dpbm: *Will the AMGTA be working to improve sustainable practices within the industry as well?*

SH: There are two ways we're doing that. The first is through research projects that we're commissioning through academic institutions. We have two research projects that we'll be kicking off soon and we plan to share the results of that research with the industry to help guide them by providing some vital data. The second way is that we plan to assist our members and guide them through third party certifications. For instance, we will encourage our members to get ISO 14001 certified, which is the environmental management system certification.

Some industry contacts that I've spoken to were not aware of the ISO 14001 certification. Our responsibility is to let them know that these third-party certification opportunities exist. Another option, which may be more feasible to start with for some companies, is the Green Business Bureau certification. It's not as robust as the ISO 14001 certification and audit process but it puts companies on the pathway towards more environmentally sustainable practices. We see the AMGTA as a guiding organization to help provide this information and let people know the options

that are available for improving sustainability within their company.

3dpbm: *Can you elaborate on the two research projects the AMGTA is undertaking?*

SH: The first is a case study white paper that we will publish and share with our members. In this study, academic researchers will produce two identical large metal parts – one using conventional CNC milling and the other via additive manufacturing.

From there, we will conduct a full LCA on those two production methods, from cradle to grave. Researchers will assess environmental impacts at every stage of the life cycle, including extraction and processing of raw materials, manufacturing, distribution, part use, recycling and final disposal. Interestingly, in the manufacturing LCA stage, this requires taking apart the AM machine, weighing every part within

AMEXCI's lab in Sweden where life-cycle assessments to understand the energy consumption of AM are conducted.⁴



the system and determining the life cycle impacts of the machinery components. Then, the researchers will go through the same process with the CNC machine.

The second research project is a "Literature-based paper on environmental sustainability of metal AM." For this research paper we've partnered with a leading researcher in the field of sustainable engineering who has a strong background in AM research. His team will examine and review existing academic literature that's already published. We're planning to have this study ready and published in time to share with stakeholders at Formnext 2020.

3dpbm: *How is AMGTA choosing its research projects now and in the future?*

SH: At this time, the AMGTA board of directors deliberates and decides on the third-party research that we sponsor. As we bring on new founding member companies over the next several months, the diversity of industry representation on the board will expand, resulting in a wider spectrum of research interest across the industry. Given that these founding member companies each have one board seat, we anticipate that there will be more diversity in the types of research that will be commissioned going forward.

While our first projects, the case study and the literature review, are both focused on metal AM, that doesn't mean that all subsequent studies will be. We'll also be looking at plastics, polymers and other areas that our membership is interested in. The long-term plan is to establish a

broad industry base in both our advisory member and participating member levels of membership. These membership classes each have voting rights. The board of directors intends to allow these members to vote on future research initiatives, giving them a voice in how we shape the research that's needed as the industry continues to grow.

3dpbm: *Any final remarks?*

SH: A key part of what the AMGTA is doing—and the life-cycle assessment—is allowing us to better understand the environmental impacts of AM: the good, the bad and the ugly. I don't think it's a bad thing when we find that a particular area is a real problem.

The more that we know, the better we can pay attention to those problematic areas with negative environmental impacts and make improvements over time. It's like with anything: if you don't know what you're up against, then how are you going to make any changes for the good? The research findings are not expected to always be positive. However, I'm confident that every AMGTA commissioned study will ultimately lead to actions that will have a positive impact on our environment and our industry.

At Formnext in November, I will be moderating a panel on Sustainability in AM. We will be discussing ways in which companies are improving their environmental impact and the areas that we need to focus on going forward. ♦



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