

NDE/VT Research

Responses to Questions Raised by the ASC Board and NDE Task Force

Q1) How much "skin does Luna have in the game"? It appears ASC is being asked to contribute all the funds for the proposed NDE research

A1) Luna has invested \$135k in a new MTS load frame with the intent to conduct more NDE research in adhesives. This work would build on the success of a NASA contract and generate a lot of visibility for bond integrity in the professional world. Luna plans to attract federal R&D funding to continue to move this project that will expand the market for adhesives as well as sealants. In relation to the investment proposed to ASC, the amount is comparable.

Q2) Could the NDE device be used in the field, i.e. to analyze bond joints in situ?

A2) Yes, Luna envisions a portable unit which could be brought out to an application site.

Q3) How much will the NDE device cost?

A3) The estimated cost of a unit is expected to be around \$30k.

Q4) Could ASC partner with Virginia Tech directly instead of Luna (there is concern that Luna is a for-profit company and stands to gain from the sale of NDE instruments)?

A4) Yes, Virginia Tech has prepared a firm priced proposal which would position them to be ASC's primary research partner. Their proposal carries a slightly higher price tag to account for internal VT overhead as well as ongoing lease of one (1) NDE test unit in VT's labs.

Q5) What would the ASC and its membership get out of its investment? It sounds like this is type of research could go on for years and what we are talking about here is just initial seed money.

A5) While Luna does not envision that the initial research will solve all the adhesive industry's NDE issues, the bottom line deliverable is the attainment of an NDE methodology, or procedure, which sets the foundation for future research. It is envisioned that, although only a limited number of adhesive-substrate samples would be tested under the proposed research project, the results might be extrapolated to other types of adhesives and substrates. In addition, the longer term objective is to develop new NDE standards, either under ASTM, SAE, or other standards-development organizations.

Q6) My company does not get involved in structural adhesives applications, so I am not concerned with NDE research.

A6) High resolution NDE could be applied to film, coating, and other applications which have nothing to do with validating bond strength. By forging a relationship with VT/Luna, ASC members can take advantage of the collective expertise at discounted rates and test their own products post-research.

Footnote: In March 2006 Luna was granted a patent covering a bond strength tester and method for determining certain bond strength parameters of a bonded component, including a phaselocker, a transducer, a loading device that is capable of applying stress-loads to the bond, a controller for controlling the loading device, a data recording device to acquire data, and a computer device to analyze data calculating certain bond strength parameters. For more information, go to:

<http://www.google.com/patents?vid=USPAT7017422&id=UzJ3AAAAEBAJ&dq=Joseph+S.+Heyman>

Q7) How many FTE hours will Luna provide for its share of the work?

A7) 1 FTE for the entire year

Q8) Will ASC own the prototype instrument included in the research?

A8) No, it is not expected ASC will own the prototype instrument. The cost of the VT research proposal does include a “permanent loan” of one test unit to Virginia Tech, however, for ongoing research. In addition, the proposal spells out that ASC members may commission Luna to conduct testing on their specific adhesives or sealants at discounted rates for a period of two (2) years following the conclusion of this first phase research. Alternately, members may hire Virginia Tech in a similar capacity (an additional benefit out of this research is training VT personnel to operate the equipment, which provides an alternative non-commercial testing lab for industry). At this stage, ASC does not envision a “mobile NDE test unit” on loan to ASC members until we more fully understand the NDE test methodology.

Q9) Will ASC have input into which adhesive(s) are tested?

A9) Yes, an ASC member task force will be formed and provide input into what types of adhesives or sealants should be studied prior to beginning the research work. In addition, because the scope of this research is somewhat limited, the task force will be asked for their input on what type of substrate should be examined.

Q10) Should we consider involving an engineering design firm/consultant to assist in the research?

Q10) VT does not feel this is necessarily in this first phase of research. Keep in mind that NDE research is still in its infancy and this initial investigation will study the application of high-resolution ultrasonic technology on Arcan and single lap joint geometries, and not real-life fully assembled components. Contingent on the success of this initial research, VT envisions a future second phase which would incorporate testing of real-life assembled components. At this stage, VT and ASC feel it would be more appropriate to involve an engineering design firm for input. Also, it is expected that once Phase 1 gets underway and VT begins to collect test data, they will be able to better define the scope and cost of a second phase.

Q11) We do not want NDE test data on adhesives we submit to be publicly disclosed. This should be spelled out in the VT Agreement.

Q11) This is not a problem. VT agrees not to disclose the names/brands of the tested adhesives publicly, nor communicate specific results to the general public as representative of any member company's product. VT will publicize findings based on the type, or family classification, of adhesive or sealant tested. Included in the research proposal is the development of a database of NDE research findings potentially to be posted in a members-only section of the ASC website. Here again there would be no mention of a particular member's products. It is important to keep in mind that we are not trying to prove if an adhesive is working, but rather if the NDE testing methodology is a viable predictor of bond strength and performance.

Q12) Who owns the deliverables to the research findings? Will ASC members be able to have access to all research findings/test results at no charge?

A12) Research is being conducted by Virginia Tech for the benefit of ASC members. If a new NDE technique or methodology is developed as a result of the research, ASC members will have the right to participate in a royalty-free license and have free and open access to access all research and test findings developed under this Phase 1 research. Both VT and Luna desire to develop a long-term relationship with ASC and its members. To this end, both will parties will entertain separate contracts to assist members in characterizing new adhesives and sealants. Following the completion of this project, for those ASC members who would like to test their own adhesive and sealant samples, Luna has agreed to perform such tests at rates computed at the time of this agreement for a period of two (2) years. VT may be in a position to offer an alternative, cost-competitive option.

Q13) In the unlikely event ASC does not like the direction of the research, are there any provisions to terminate the contract and compensate VT for its time invested to date?

A13) Yes, performance under this Agreement may be terminated by ASC upon sixty (60) days prior written notice. Performance may be terminated by VT if circumstances beyond its reasonable control preclude continuation of the Research. Upon termination, VT will be reimbursed for all costs and non-cancelable commitments incurred in the performance of the Research (not to exceed \$200k).

Failure by either party to comply with any term or condition under this Agreement shall entitle the other party to give the party in default written notice requiring it to remedy such default. If the party in default has not cured such default within thirty (30) calendar days of receipt of such notice, the notifying party shall be entitled to terminate this Agreement. The termination shall be given in writing and shall take effect as of the date of the termination notice.