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Development of the symmetrical laser shock test for weak bond inspection.[1] MAXIME SAGNARD, LAURENT BERTHE, ENSAM, CNRS, CNAM, ROMAIN ECAULT, Airbus, FABIENNE TOUCHARD, MICHEL BOUSTIE, PPRIM institute, CNRS-ENSMA-Universit de Poitiers — This paper presents the LAser Shock Adhesion Test (LASAT) using symmetrical laser shocks. The study is part of ComBoNDT European project that develops new Non-Destructive Tests (NDT) to assess adherence properties of bonded composite structures. This NDT technique relies on the creation of a plasma on both side of the sample using two lasers. The plasma expands and generates shockwaves inside the material. When combined, the shockwaves create a local tensile strength. Properly set, this stress can be used to test interfaces adherence. Numerous experiments have shown that this adaptive technique can discriminate a good bond from a weak one, without damaging the composite structure. Weak bonds are usually created by contaminated surfaces (residues of release agent, finger prints, ...) and were artificially recreated for ComBoNDT test samples. Numerical simulations are being developed as well, to improve the comprehension of the physical phenomenon. And ultimately, using these numerical results, one should be able to find the correct laser parameters (intensity, laser spot diameter) to generate the right tensile strength at the desired location.

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Maxime Sagnard
ENSAM, CNRS, CNAM

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