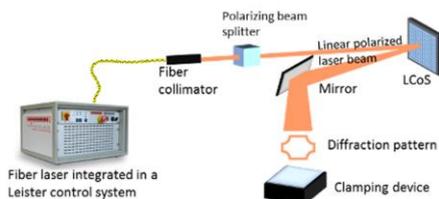


Highlight

Kaegiswil,
September 06, 2012

Laser polymer welding using a highly contour-flexible dynamic mask

Figure 1: Sketch of dynamic mask welding set-up using an LCoS element in reflection



During regular laser polymer welding in mask configuration, the radiation is transmitted by a contour-adapted (metallic) mask. Weld contour modifications are equivalent to changing the complete mask. Reflecting diffracted fiber laser radiation using a liquid crystal on silicon device (LCoS), Leister demonstrated highly contour-flexible simultaneous welding within PolyBright's work package 4.

The LCoS head with its display is connected to an embedded controller board featuring a DVI input. A monitor signal with a resolution of 800x600 can be directly sent to the control board displaying the signal on the LCoS.

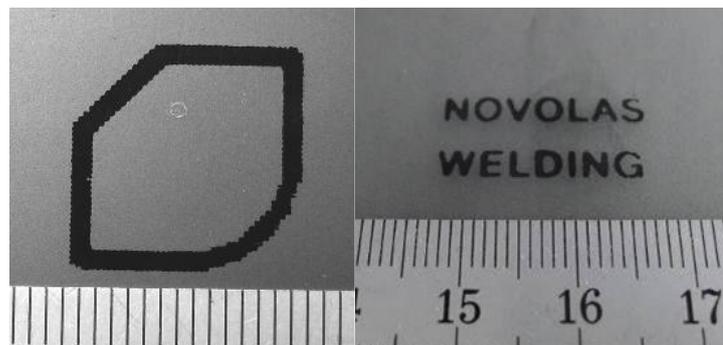


Figure 2: Two different simultaneously welded contours

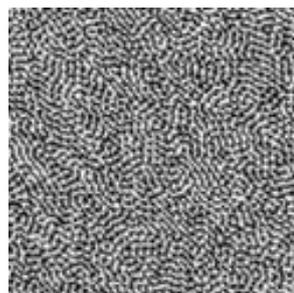


Figure 3: Computer generated holograms 122x122 pixels to generated the square-like contour

Diffraction structures for the LCoS display are calculated by special optical software, i.e. by Virtual Lab. The calculating algorithm is based on a Fourier transformation algorithm.



The computer generated hologram, i.e. the diffraction structure, can be saved as a bitmap file and loaded in a Labview program. The program sends this bitmap file to the LCoS. Beside this, the Labview program provides the possibility to adjust the grey-value (phase level) in order to optimize the diffraction pattern and the efficiency of the setup.

Since computer generated holograms can be displayed and changed within seconds on the display, this technique enriches simultaneous polymer laser welding with its high flexibility

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