



Experiment Report Form

The double page inside this form is to be filled in by all users or groups of users who have had access to beam time for measurements at the ESRF.

Once completed, the report should be submitted electronically to the User Office via the User Portal:

<https://www.esrf.fr/misapps/SMISWebClient/protected/welcome.do>

Reports supporting requests for additional beam time

Reports can be submitted independently of new proposals – it is necessary simply to indicate the number of the report(s) supporting a new proposal on the proposal form.

The Review Committees reserve the right to reject new proposals from groups who have not reported on the use of beam time allocated previously.

Reports on experiments relating to long term projects

Proposers awarded beam time for a long term project are required to submit an interim report at the end of each year, irrespective of the number of shifts of beam time they have used.

Published papers

All users must give proper credit to ESRF staff members and proper mention to ESRF facilities which were essential for the results described in any ensuing publication. Further, they are obliged to send to the Joint ESRF/ ILL library the complete reference and the abstract of all papers appearing in print, and resulting from the use of the ESRF.

Should you wish to make more general comments on the experiment, please note them on the User Evaluation Form, and send both the Report and the Evaluation Form to the User Office.

Deadlines for submission of Experimental Reports

- 1st March for experiments carried out up until June of the previous year;
- 1st September for experiments carried out up until January of the same year.

Instructions for preparing your Report

- fill in a separate form for each project or series of measurements.
- type your report, in English.
- include the reference number of the proposal to which the report refers.
- make sure that the text, tables and figures fit into the space available.
- if your work is published or is in press, you may prefer to paste in the abstract, and add full reference details. If the abstract is in a language other than English, please include an English translation.



Experiment title: Dynamic compression of 3D printed metallic mesostructures	Experiment number: MA-4328	
Beamline: ID 19	Date of experiment: from: 05/09/18 to: 06/09/18	Date of report: 24.10.2018
Shifts: 1	Local contact(s): Alexander Rack, Margie Olbinado	<i>Received at ESRF:</i>

Names and affiliations of applicants (* indicates experimentalists):

***Martin Jaecklein, Fraunhofer EMI**

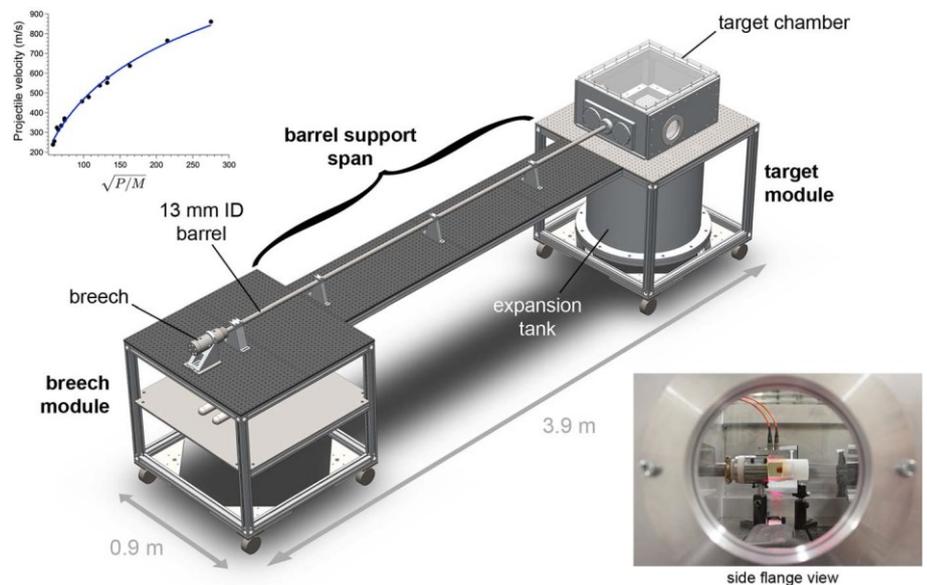
***Daniel Eakins, University of Oxford**

Margie Olbinado, ESRF

Report:

For this experimental session a variety of different metallic structures were additively manufactured by Selective Laser Melting in a titanium alloy. These structures were impacted by an aluminium flyer using a gas-gun. The impact event was recorded by applying dynamic X-ray imaging. The setup is shown in Figure 1 below.

Figure 1: Model of the portable mesoscale gas-gun designed for the dynamic X-ray imaging experiments, where gas lines and wiring have been removed for clarity. The breech and target tank modules detach from the barrel support span for transport. The gun is capable of launching a 13 mm diameter sabot at velocities nearing 900 m/s, as shown in the upper inset. [1]



During the experimental session a number of titanium structures could be tested, some of them at different impact velocities.

In the following Figure 2, some metallic lattice structures and corresponding images before and during dynamic compression are exemplarily shown.

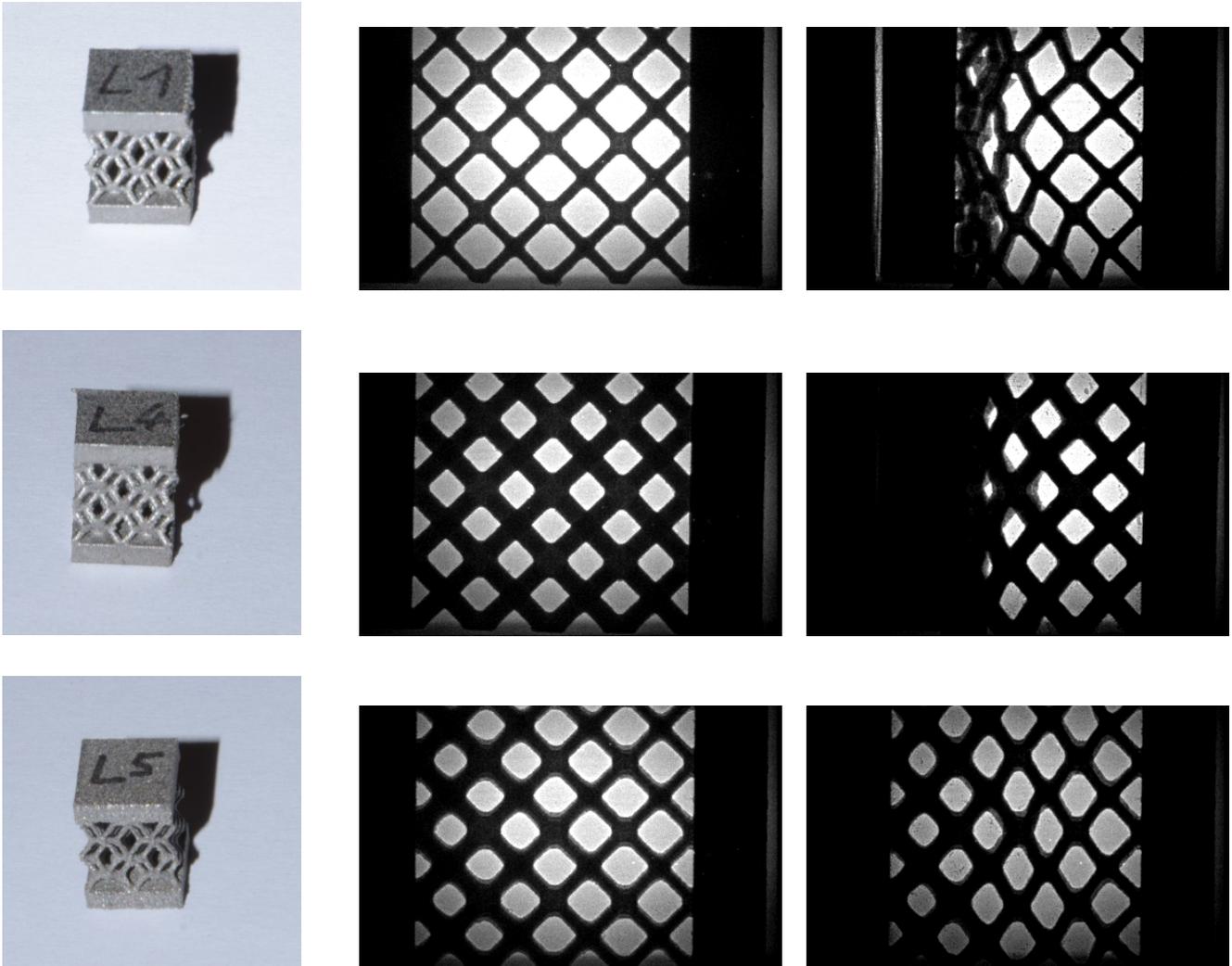


Figure 2: Titanium lattice structures before and during dynamic compression.

The image data obtained from the experiments need to be analyzed now. A correlation of the experimental data to simulation results is also planned.

Source:

[1] D.E. Eakins, D.J. Chapman; X-ray imaging of subsurface dynamics in high-Z materials at the Diamond Light Source. Review of Scientific Instruments 85, 2014.