Objet 30 Users Outline and SOP

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Training Checklist:

- Safety Issues
- Overview of the printer and software
    - Printheads, drawer with print material, support material and waste container
    - Objet Studio software, Remote Desktop connection
- Sequence of operation
    - Start of run: print placement, validate design, finish type, log in FBS, ensure job is running
    - After run: remove parts and any support materials, clean bed, run head cleaning wizard
- Post Processing: 3D print cleaning station, pressure washer, ensure water is turned completely off, bake in oven

Location:

The Objet 30 Pro printer is located in 3430 Elings Hall

Safety Issues:

- The printer should only be operated by persons trained by David or any Workshop Wizard.
- Gloves should be worn when working with the print resins and when cleaning the print heads
- All personnel operating or maintaining the printer should know the location of first aid and emergency equipment and how to use it.
- Never block access to this equipment!
- Keep fingers and other body parts clear of the printer cover when closing it.
- Never attempt to open the main cover of the printer while it is working!
- Never override the interlock safety switch!
- If the interlock safety switches ever fail, do not use the printer.
- Several parts of the printer remain extremely hot even after it has stopped operating. Avoid touching the UV lamp and the print block.

Overview of the printer and software

The printer comprises the following main components:

- Print heads that travel in a raster scanning pattern over a print platform that moves vertically.
- A drawer with a reservoir of print material, support material and a waste container
- A tower computer **running Objet Studio software**, and also running a **Remote Desktop connection to an embedded PC inside the printer running Objet software**. There are two computers and two separate software packages running together to operate the printer.
- A waterjet cleaning station.

The printer has two print heads – one prints the structural material for parts, and the other prints a

support material. Parts are built on a layer of the support material. Matt finish parts are surrounded in support, and overhanging features are supported with support material during printing. The support material is removed in the water jet station.
Training: New users should read the operators manual, and go through the Operator Training Course – both documents are linked on the lab website.

Sequence of operation:

Start of run

1. Save CAD file in .STL format, bring to printer on a thumb drive.
2. In **Objet Studio insert the file** – you should see the part on the image of the print platform.
3. Use **auto placement** to allow the printer software to attempt to optimize orientation and part location. Fine tuning by hand may be necessary for best results.
    1. Keeping the part within the horizontal lines outlined on the build platform can reduce the number of passes the print heads must make per layer
    2. Orientating the part to reduce Z height often greatly reduces print time
    3. Glossy surfaces can only be printed along the top surface of the part where there are **NO** overhangs
4. **Validate** the design
5. Select **matt or glossy finish** for each part
6. Run the **estimator** to determine the print materials required and the print time
7. Enter this information in the log book and FBS
8. Press **build**
9. Open the remote desktop connection to the printer
10. **In the printer window click on the red circle** – turning it green to start the job. At this point you should hear the cooling fans on the printer turn on. The print job should start after the heads warm up (~15 minutes if the printer hasn't been running for a while).

After run is complete

1. Remove parts using putty knife in drawer below printer.
2. Scrape any support material remaining on the bed off with the razor scraper in the drawer beneath the printer. Take care to collect the debris, don't dump it into the gap between the print bed and the printer.
3. Clean the print bed using a paper towel wetted with water.
4. **Run the head cleaning wizard – the print heads cost ~ $5k and will be ruined if not cleaned after the run!**

Post Processing

1. Take the part to the 3D print cleaning station by the pressure washer and remove the bulk of the support material with the cleaning implements. **Wear gloves as uncured resin may be on the surface of the part**
2. Place part within the pressure washer and open the DI valve on the sink. The power switch is located on the back of the washing enclosure.
3. Using the foot pedal clean the part using the high pressure nozzles located within the enclosure
4. After part has been cleaned ensure the water is **Switched Off** as leaks have occured within Elings hall before and **will damage equipment**

5. To achieve optimal mechanical properties or if part is to be used as a mold for casting part should be baked at 60 degrees C for a minimum of 4 hours

Maintenance

- Print heads and roller should be cleaned after EVERY print
- Build tray should be scraped free of debris and wiped with wet paper towel after EVERY print
- Printer should be restarted once every week or whenever printer is misbehaving.
- Head alignment and patterning should be done every month or so to ensure printer accuracy
- Waste resin container should be sealed, placed in hazardous chemical waste, and replaced as necessary

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