

# ASSEMBLE OF STEREO LITHOGRAPHY APPARATUS AND PRODUCT DEVELOPMENT BY USING IT

PWDS MILTON<sup>1</sup>, Dr SCV RAMANAMURTHY NAIDU<sup>2</sup>, S DASS<sup>3</sup>, G HAREESH<sup>4</sup>, K BALAKOTAIAH<sup>5</sup>, L RAJESH<sup>6</sup>

<sup>1</sup>Associate Professor, Kallam Haranadhareddy Inst.of Tech., Guntur, AP-522 019

<sup>2</sup>Professor, Head of the Dept, Kallam Haranadhareddy Inst.of Tech., Guntur, AP-522 019

<sup>3</sup>Assistant Professor, Kallam Haranadhareddy Inst.of Tech., Guntur, AP-522 019

<sup>4</sup>Assistant Professor, Kallam Haranadhareddy Inst.of Tech., Guntur, AP-522 019

<sup>5</sup>Student, Kallam Haranadhareddy Inst.of Tech., Guntur, AP-522 019

<sup>6</sup>Student, Kallam Haranadhareddy Inst.of Tech., Guntur, AP-522 019

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**Abstract :-** A prototype is generally used to evaluate a new design to enhance precision by system analysts and users. Prototyping serves to provide specifications for a real, working system rather than a theoretical one. In some design workflow models, creating a prototype (a process sometimes called materialization) is the step between the formalization and the evaluation of an idea. This design of prototype is based on the state of material considered. As of now considered liquid rapid prototyping system is most widely used in the field of jewellery, dental and investment casting models. The process of this prototype is slightly complicated and the dimensions considered to be more precise. The considered apparatus has some technical specification that includes printing, dimensioning

**Key Words:** Prototype<sup>1</sup>, Materialization<sup>2</sup>, Jewellery<sup>3</sup>, Dental<sup>4</sup>, Casting Models<sup>5</sup>

## 1. INTRODUCTION:

A prototype is an early sample, model, or release of a product built to test a concept or process. It is a term used in a variety of contexts, including semantics, design, electronics, and software programming. A prototype is generally used to evaluate a new design to enhance precision by system analysts and users. Prototyping serves to provide specifications for a real, working system rather than a theoretical one. In some design workflow models, creating a prototype (a process sometimes called materialization) is the step between the formalization and the evaluation of an idea.

A **prototype** can also mean a typical example of something such as in the use of the derivation 'prototypical'. This is a useful term in identifying objects, behaviors and concepts which are considered the accepted norm and is analogous with terms such as stereotypes and archetypes.

The word **prototype** derives from the Greek prototypon, "primitive form", neutral of prototypos, "original, primitive", from protos, "first" and typos, "impression".








### 1.1 BENEFITS OF PROTOTYPES:

- Fail early and inexpensively
- Gather more accurate requirements
- Technically understand the problem
- Conflict resolution
- Funding
- Easily file patent

### 1.2 TYPES OF RAPID PROTOTYPING:

- Additive manufacturing
  - Stereolithography (SLA)
  - Selective laser sintering (SLS)
  - Direct metal laser sintering (DMLS)
  - Fused Deposition Modelling (FDM)
  - Binder jetting
  - Poly jetting

## 2. PACKAGING LIS

			
Photon S 3D Printer		Print platform 1 PCS	Resin vat 1 PCS
			
Mask 1 PCS	Gloves 3 Pairs	Memory stick 1 PCS	250g Resin (Random color) 1 PCS
			
Extra EEP film 1 PCS	After sale service card 1 PCS	Funnel 10 PCS	User Manual 1 PCS
			
Power adaptor/Power cord 1 unit	Tool kit 1 unit	Scraper 1 PCS	
			
		Extra M3*5 screw 5 PCS	

### 3. INTRODUCTIONS TO OPERATION:



### 4. ASSEMBLY AND LEVELLING INSTRUCTIONS:

1. Unpack the machine and then remove the protective film outside.
2. Open the top cover, take out the wrapping materials and resin vat. Check and ensure the 2K LCD screen and platform are clean and free of dust, as shown in Fig.(1). **(Do not install the platform and resin vat until Step 6).**
3. Plug in the power and turn on the power switch.

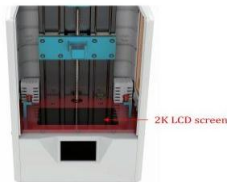


Figure.(1)

**\*Please strictly follow the next steps for leveling.**  
 4. As shown in Fig.(2), click the "TOOLS" → "MOVE Z" → "HOME" on the color screen. Wait for the Z axis to descent and then it will stop automatically.

Click emergency stop if need to stop the Z axis immediately.

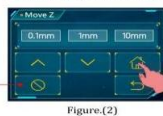


Figure.(2)

### 5. FIRST PRINT INSTRUCTIONS:

Before printing, to minimize the first time frustration, please ensure (1) Z axis is working fine; (2) the platform is well leveled and fit with 2K LCD screen; (3) the UV light is functional properly.

#### 1. Print

Insert the memory stick (or the memory card with card reader) into the USB port. **Then wear masks and gloves**, slowly pour the resin into the vat until it reaches 1/3 volume of the vat. After that, close the door. Take off the gloves, select the "PHOTON.photons" test files or your own files (as shown in Fig.(13) ①②③), and start printing. **During printing, avoid direct sun light and keep the printer sitting flat without shaking.**



Figure.(13)

If you think the resin is insufficient to finish an ongoing print (or you wish to change the resin color), you can click "Pause", the platform will rise, and you can slowly pure (or change) the resin into the vat. After that, press "Start" to resume, as shown in Fig.(15).

### 6. MACHINE MAINTAINCE:



(1) If Z axis make noisy sound, please apply lubricant to Z lead screw.



(2) Do not use sharp objects to scrape off the residues on the FEP film.



(3) Be careful when remove the platform, do not let it fall onto the 2K LCD screen.



(4) Do not left the resin in the vat for over two days if not using it. Please filter and store the resin properly.



(5)The FEP film may lose the tension over time and usage. Please adjust the tension by tightening the screws at the bottom of the resin vat.

(6) After printing, please clean up the platform (wipe clean with paper towels or wash with alcohol), and ensure no residue left before next print (filter the residue with funnel).

(7) If the outside of printer is stained with resin, use alcohol to wipe clean.

(8) To switch the resin colors, please clean the original resin vat first.

### 7. APPLICATIONS:

- Fit/form, proof of concept prototypes and engineering verifications
- Investment Casting Patterns
- Rapid Tooling, Jigs & Fixtures
- Designer models, snap-fit assemblies
- Scale & exhibition models

### 8. ADVANTAGES:

- Fast implementation of prototypes in early stages of product development
- Single-stage production process produces smooth surfaces even without finishing
- Low material consumption: non-hardened synthetic resin can be reused
- Production of both flexible and rigid 3D objects
- Cost-effective production
- Customized colouring
- Multi-part assemblies are possible

### 9. LIMITATIONS:

- Depending on the material, components may be brittle
- Support structures can limit design freedom
- Components are only UV-resistant to a limited extent

## 10. CONCLUSIONS:

- Computer aided design/computer aided manufacturing (CAD/CAM) facilitates the in-office design and fabrication of dental prosthetics and appliances.
- In addition to chairside CAM milling equipment, the next generation of technology for designing and manufacturing onsite is available in the form of three-dimensional (3D) printers.
- With increasing accuracy and an ever-expanding list of materials to use for 3D printing, the potential for wider application in clinical dentistry is significant.

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