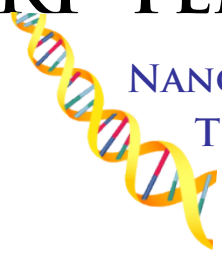


# RP TEMPERING™ TECHNOLOGY NEWS



NANO-COMPOSITE  
TECHNOLOGY

VOLUME 3

SOLID FREEFORM ADDITIVE TECHNOLOGY  
& PATENTED ENGINEERING TECHNIQUE

MAY 2006

## 3DSUG Conference.....

By: Earl Dunlap - Manufacturing

by Design

Manufacturing by Design, Inc. and Par3 Technology, LLC along with Total CS Team LLC would like to thank everyone in attendance at the 3DSUG Conference in Arizona. New technologies like our SFFF additive process and patented engineering technique is often met with both skepticism and intrigue. In our opinion the RP

Tempering™ technologies were met with genuine interest at the UG Conference. It was very educational on our part and the questions were constructive. Our goal was to open up the thought process and acceptance to our SFFF additive technology. The early feed has been back positive. Again, please call or email us with your questions and comments. We will do FREE samples for anyone interested in evaluation the technology further.

## TRAINING OPPORTUNITY.....

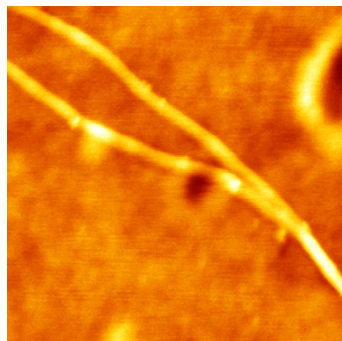
Manufacturing by Design, Inc will be holding two training sessions in St. Charles, Illinois on May 22nd at the Hilton Gardens Hotel. Which is across the street from Peasant Run Resort where the SME Rapid Prototyping Show is being held, from May 22nd through May 25th. We will have a table in the lobby at the Hilton Hotel all week for you to get information about our training, schedule a meeting or to pick up information on this SFFF technology. The first training session will be at 9:00 am and the second one will be at 1:00 pm. The class usually takes 6 hours, but we only have 3 ½ hours to cover

the session so please come ready to learn. We would appreciate you dropping us an email to let us know that you are attending and how many people. The email address is: RapidResponse@manufacturingbyDesign.com. If you would like to bring your own parts to temper at the class, you may do so. We will be supplying FREE of charge all the RP Tempering™ training materials and we will be applying the application in the classroom. If you plan on tempering your own parts please let us review the file first to see if we need to do any tunneling or "V" Grooves CAD work for you. This class is FREE and there is NO obligation and everyone is welcome to attend.

## In This Issue

3DSUG Conference	1
TRAINING OPPORTUNITY	1
Prototype Samples	2
SLS GF Results: FEA Comparison of RP Tempering™	3
Total CS Team Review of 3DSUG	3
3Matic Affordable Software Module Update	4
Compound Released for BETA Testing	4

## In Next Month's Issue: Nano-Carbon Research and Pictures



CNT-CFM Pictures - Proto-Plasma-Rx™ & RP Tempering™ Compound

## Prototype Samples.....

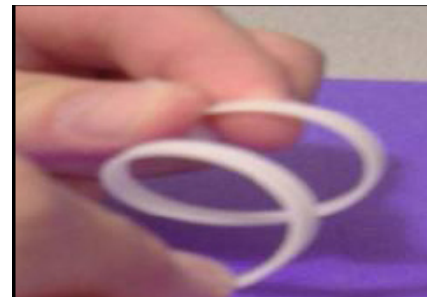
Thank You for the effort and supporting the RP Tempering™ Technologies. We took several sample prototypes to the 3DSUG to let people see and handle tempered parts. All the RP Tempering™ Technologies were represented

in the samples shown. Along with the tempered prototypes we took supporting technical information to include: Accelerated Life Aging Test Result Data, Heat Deflection & Heat Resistance Data, Wax Surface Finish Data, Mechanical Property Data (Physical & Typical

Properties), FEA Analysis Reports, Vibration Analysis Reports, Magazine Article Copies and more. Below is a list of company names that supplied the samples and a description of the tempered parts with pictures:

### American Precision Prototypes:

Jason supplied use with the bottles, tensile bars and flat wire tie parts. The bottles were completely functional even to the point where they can hold fluids/water. As seen at the 3DSUG vendor fair without breaking and as shown in this picture we can squeeze the WS11120 bottle. The flat wire ties were made out of SLS PA and Somos 9120. Tensile bars were grown from WS11120 and Somos9120.



**Protocall:** Doug gave us the tiny wire ties made in a digital printer (Eden) and WS11120. They are .030" in diameter with Hybrid-Temp-Rx applied. They are functional parts and it took only 5 minute to do 10 of them.



**Laser Reproductions:** Matt supplied us with the living hinge parts made from several SL resins and RTV casting materials. All the finished parts were fully functional and each living hinges was made fast.



## SLS GF Results: FEA Comparison of RP Tempering™

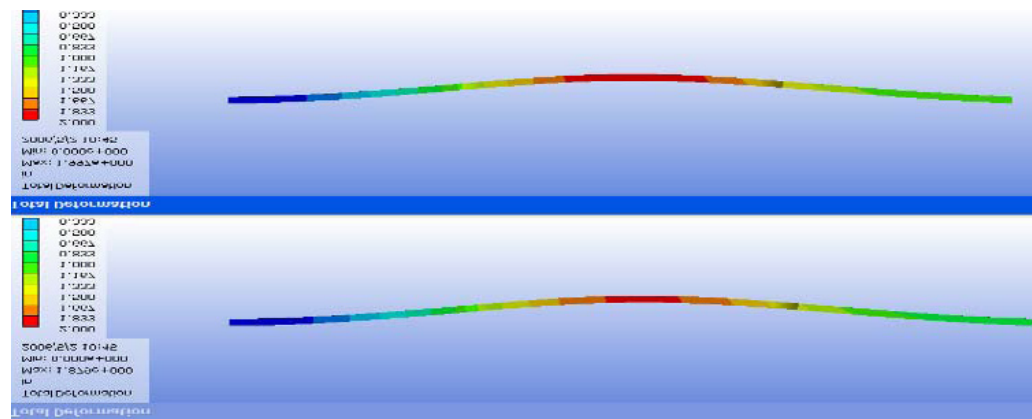
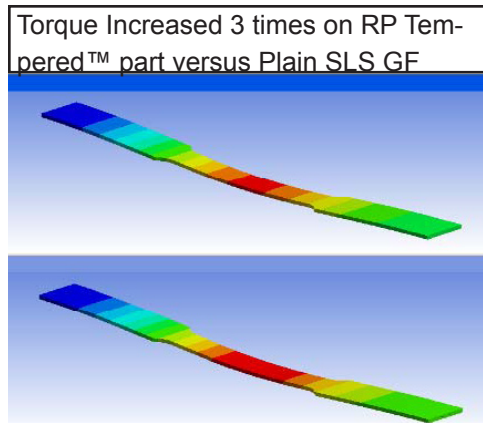
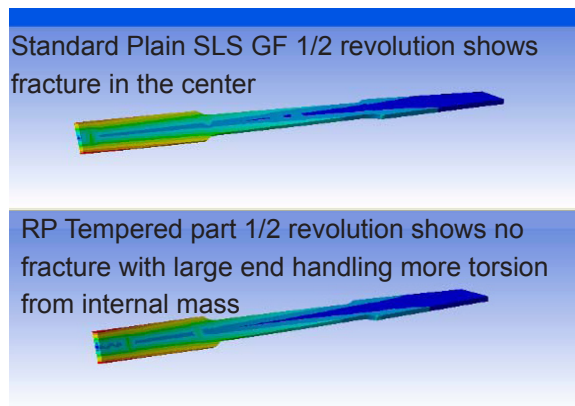
High Temperature Proto-Plasma-Rx™ SFF Additive used Analysis Driven Design™ to preform FEA Analysis. MBD, Inc. has done extensive analysis on non-linear SFF materials applying the RP Tempering™ technologies. The following pictures are screenshots of actual FEA (Finite Element Analysis) comparative study. Other analysis like CFD, Fluid Dynamics, Chemical, Electrical, Thermal, Vibration and Air have

also been completed. Analysis Driven Design is a key process in the development cycle. This saves time & money on physical experiments. Par3 Technology has PhD. Level engineers with practical experience in SFF. Comparative analysis work has been done on several SFF materials and systems which include : SL resin(7types), LS Powders(2 types), FDM(2 types) 3Dprinting(2 types) and Starch(1 type). The FEA results show:

- Impact strength increased 300% versus

standard RP parts.

- Flexural strength increased 100% versus standard RP parts.
- Tensile Strength was about the same versus standard RP parts.
- Elongation was about the same versus standard RP parts.
- Torsion increased 350% versus standard RP parts. Note: The analysis only told us it would improve about 50% but, the testing showed improvement of 350%.



## Total CS Team Review of 3DSUG

By Marty McGough, Total CS Team

Earlier this month, Earl and the TCST Team attended the 3DSUG Meeting in Tucson, Arizona. For many of the attendees, this was their first exposure to the RP Tempering™ technology. We experienced a

significant amount of interest from the people we talked to and the results of our presentation and workshop was very positive. We received some great comments and suggestions from the users and a lot of new applications to try in the coming months. We are looking forward to further discussions with the users and trying new creative

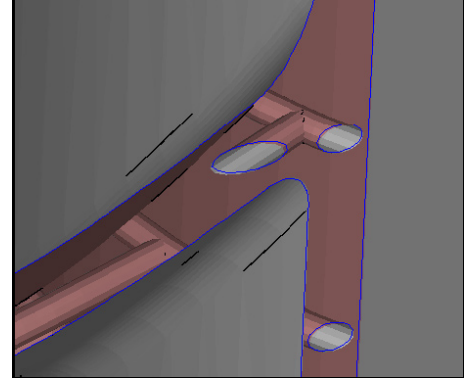
ways to apply this technology to add value to our Rapid Prototype and Solid Freeform Fabrication partners. If you have any questions about what was discussed in this meeting or would like more information on RP Tempering™, please feel free to contact Marty McGough at TCST (mmcgough@totalcsteam.com) or Earl Dunlap at MBD.

## 3Matic Affordable Software Module Update

By Andrew Graves, Total CS Team

In last months news letter we talk about tunneling STL files as the industry standard. The other major patented 3D CAD Engineering Technique is "V" Grooves™. The 3Matic software from Materialise is the ideal tool for creating the tunnels required for the RPTempering™ technology directly the STL file format. It is also easy to create the "V" Grooves™ necessary when geometries are too thin to run tunnels through. As shown in the picture, the grooves have a radius at the point and a width approximately equal to

their depth. They are created by first defining a curve along which the groove is required – this can be on any type of surface, curved or linear. The size of the "V" is then defined and the shape is swept along the curve creating a second solid object, which is then Boolean subtracted from the original file – creating the new STL file with a "V" Groove™. The process can be repeated as many times as necessary to generate the required number of grooves in the part. For more information contact Andrew Graves at Total C S Team, Inc. ([agraves@totalcsteam.com](mailto:agraves@totalcsteam.com)) or Dunlap P.E. Engineer MBD, Inc. [endunlap@manufacturingbydesign.com](mailto:endunlap@manufacturingbydesign.com).



## Compound Released for BETA Testing

MBD, Inc. has completed the initial testing for a new high heat resistance and higher heat deflection Proto-Plasma-Rx™ additive spray and compound. Since the initial testing was so impression we are going to release the NEW Hi-Temp

Protoplas for BETA applications. Over the next month we are testing over 600 samples of various RP materials. Heat resistance averaged 750\* degrees without damaging or distorting the additive technology coating. No imperfections were found. Heat deflection reached 400\* degrees on average per part. Complete details

will be published at the 3D System User Group Meeting in Tucson. Par3 Technology will be organizing a 2 and 3 round of qualification testing for this high temperature testing to include a broader rages of Materials (resin & powders).

### My RP Community - New Independent Website

David Yarnell has introduced a new website open to everyone within the RP community. This website promises to be helpful to everyone needing information about rapid prototyping and more. Take time to review this website at:  
[www.myrpcommunity.com](http://www.myrpcommunity.com)

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