

Rapid Prototyping Adding Real Value in Industry



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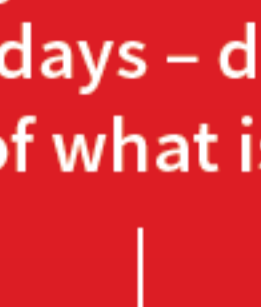
What is rapid prototyping?



Rapid prototyping as a technology emerged in the late 1980's and has been used ever since



Rapid prototyping uses 3D computer aided design models (CAD) in the production process



Parts and prototypes, etc. are built up gradually layer by layer over a period of minutes/hours/days – depending on the complexity of what is being made



Layers are typically created by:



Lasers cure a layer



Lasers cut a layer



Lasers sinter a layer



Materials are ejected from a specially made nozzle

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Benefits of rapid prototyping



Ability to deliver complex and precise prototypes – Highly complex and precise designs can be produced using RP techniques

Cost reduction – This is achieved in many ways:



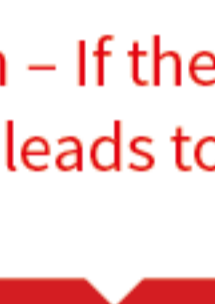
Wastage reduction



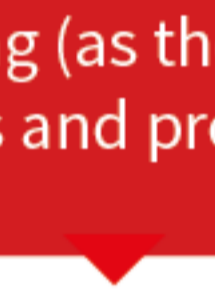
Tooling cost reduction



Production cost reduction



Design integrity evaluation – If there is a fault in design, rapid prototyping usually leads to an earlier diagnosis



One-offs – Rapid prototyping (as the name suggests) is ideal for one-offs and prototypes



Small batches – Rapid prototyping's lower cost supports small batch production



Time savings – As implied by the word "Rapid" time is saved (including time of products to market):



Rapid production of prototypes, tools, models – whatever is needed



Bottleneck elimination – remove production bottlenecks with rapid prototyping initiatives



Reduced testing time

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Rapid prototyping processes

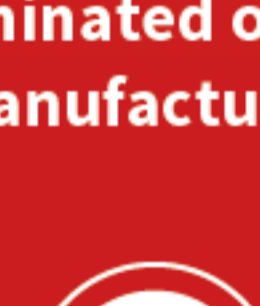
The main rapid prototyping processes are detailed below:



3D Printing / Additive Manufacturing



Fused deposition modelling (FDM)



Laminated object manufacturing



Laser sintering



Solid ground curing



Stereolithography

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Materials which can be used in rapid prototyping

Many materials can be used in rapid prototyping; here are just a few examples:



Food



Metal powder



Paper



Plastics



Polymers



Wax

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Rapid prototyping in the news



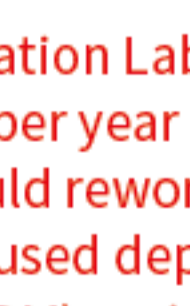
Automotive

Ford Motor Company (and many others) use rapid (and many techniques) to save \$millions per year compared to traditional manufacturing techniques



Food

Saariainen, Finland saved money off manufacturing sauce bottles and also were able to make faster alterations to bottle durability



Medicine

Instrumentation Laboratories saved \$600K per year and \$50K in one-off mould rework costs by using a Fused deposition modelling (FDM) rapid prototype technique rather than traditional manufacturing methods



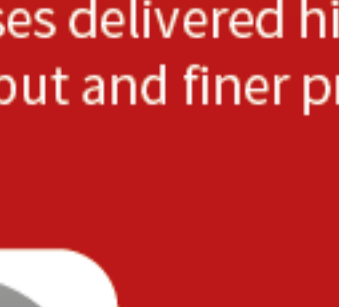
Sporting Goods

The XO Heart Shield for Basketball players prototype was developed in just a week

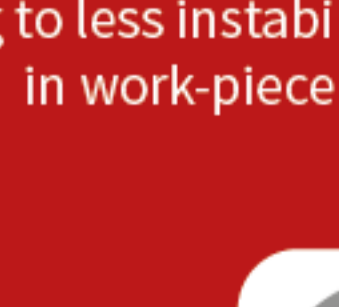
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SPI Lasers and rapid prototyping

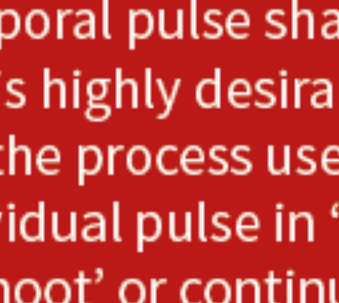
For organisations creating metal-based prototypes, SPI Lasers can offer many process performance advantages:



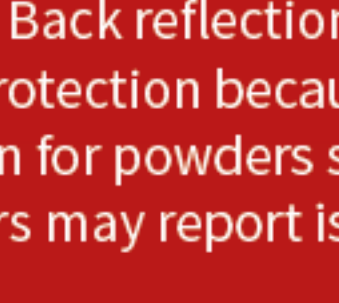
Faster pulse rise times - shorter pulses delivered higher throughput and finer processing



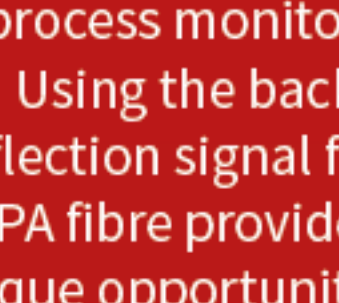
Power stability at switch on leading to less instability seen in work-piece



Temporal pulse shaping. This is highly desirable as the process uses individual pulses in 'point & shoot' or continuous vector mode



Back reflection protection because even for powders some users may report issues



In process monitoring. Using the back reflection signal from PIPA fibre provides a unique opportunity for real time non-invasive process monitoring

To find out how SPI Lasers can improve your Rapid Prototyping processes please contact us on 01489 779 696 or visit www.spilasers.com