# HILTI CADathon

"We believe that with the right tools, you can build a better future. That is why our products, systems and services are all built with the construction professional in mind. Our goal is to make your job easier, safer and more productive – Whatever your project and wherever you are." With this philosophy in mind, we are always thinking a step ahead to make faster, safer and ergonomically superior products.

**Hilti manufacturing India** is into production and development of Diamond Coring and Sawing inserts. Our product range includes cutting blades, grinding wheels and core drills.

Circular sawing (cutting) of concrete and other base materials is a common practice in the construction sector (Figure 1). Hilti with its innovative cutting blade designs have been leading the market since a long time now. After having achieved all the desired performance parameters, we are now striving on making this process more ergonomic. The first step that we have figured to make this process ergonomic is to *reduce/eliminate the sound generated during the cutting process.*

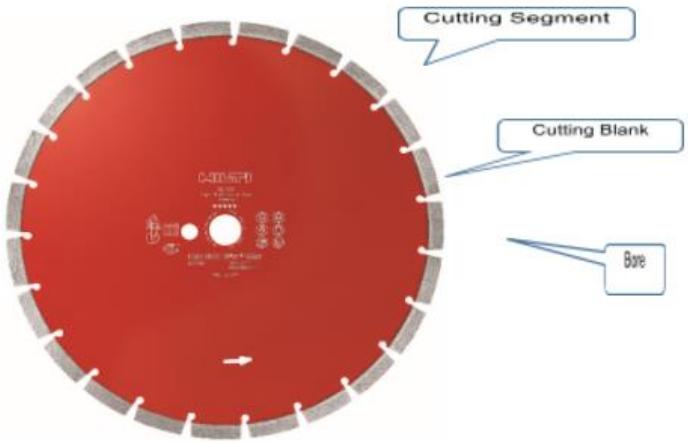
**(Fig 1) Concrete cutting application**

## Task:

The task is to come with a design of a cutting blade on a **CAD Software** that will eliminate or reduce the sound level during the process of Cutting considerably.

## Supporting data:

- Cutting Blade consists of a steel blank (Red) and cutting segments (Sintered PM parts with synthetic diamonds).




Diameter of Blank: 330 mm

Height of Segment: 10mm

Diameter of Blade: 350 mm

Bore Diameter: 25.4mm

Blank thickness: 2.2 mm

Cutting segments are a homogenous mixture of metal powders and synthetic diamonds. Synthetic diamonds are used for cutting and the metal matrix is used for mechanical holding of the diamonds. Cutting segments are joined with the blank using Laser Arc Welding.

**Metal powders (Matrix)** + **Synthetic diamonds (cutting edges)** = **Diamond segment**

- **For more clarity on the application, please follow this link.**
https://goo.gl/bAVQBd

- **Tool/Machine Parameters:**

| DEPTH OF CUT | LENGTH OF CUT | MACHINE POWER | RPM |
|---|---|---|---|
| 4 cm | 40 cm | 2600 W | 6500 |

- **Base Material:** M25 Concrete
- **Sound Level Targets:** Right now the sound level with our present design is 20 dB. So aim for sound levels less than 20 dB.
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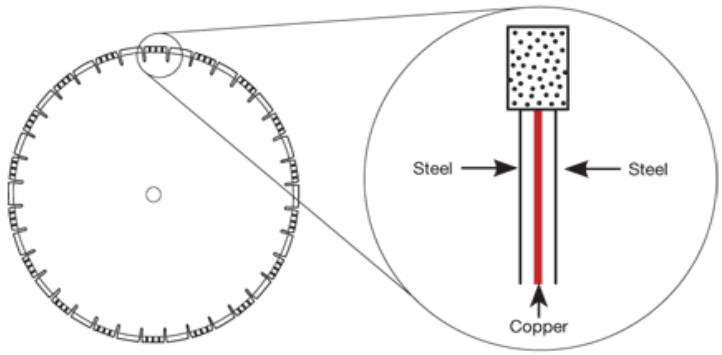
## To give your thoughts a direction:

One of such solutions already available in market and we are looking for solutions beyond that.

- Instead of using a steel blank, a thin sheet of copper is used in between the steel plates to make a sandwich type of structure. The copper damps the vibrations generated during the process and hence reduces the noise.




***We are open for all the crazy and innovative ideas. Feel free to suggest us new materials, new blank designs and new segment designs. Support your ideas using simulations, prototypes and models. Looking forward to it.***

## Design Constraint:

The diameter of the blank, thickness of the blank and the bore diameter cannot be changed.

## Rules:

**1. The idea, with all the thought process involved (Simulations, Models etc.) have to be submitted in pdf format latest by 1st November 2017.**
2. The top five designs would be shortlisted and will have to present their idea in the competition, with a prototype of their design.
**3. Judges and organizers decision shall be final and binding on all.**
4. The organizers reserve all rights to change any or all of the above rules as they deem fit. Change in rules, if any will be highlighted on the website and will be mailed to all the registered participants.

## Timeline:

1. Last date of Registration: 31st October 2017
2. Abstract Submission: 1st November 2017
3. Shortlisting and final result declaration: 20th November 2017
4. Final submission: 5th December 2017

## Structure:

1. All teams are supposed to submit the abstract by 1st Nov. All teams have to mail the abstract at **hilti@techfest.org.**
**2.** Abstract should contain the following:

- Design of the Cutting blade
- Materials used on CAD Software (if any)
- Simulation results on a software while cutting the above specified material (see supporting data)

**2. Top teams will be selected based on the abstract.** Selected teams will be informed through mail and they have to present the final presentation in Techfest for the final judging.

## Team Structure:

One can register with a maximum of 3 members in the team. Students from different colleges can form a team.

## Eligibility:

All students with a valid identity card of their respective educational institutes are eligible to participate in the event.

## Certificate Policy:

1. Top 3 teams will be awarded certificate of excellence. This will be judged combined on basis of ideation and quality of the CAD.
2. Teams who disqualify or fail to perform above a certain criteria, will not be eligible for any certificate.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