s F L E X

HOW TO MAKE AN ANGLE GRINDER **SAFER** TOOL?

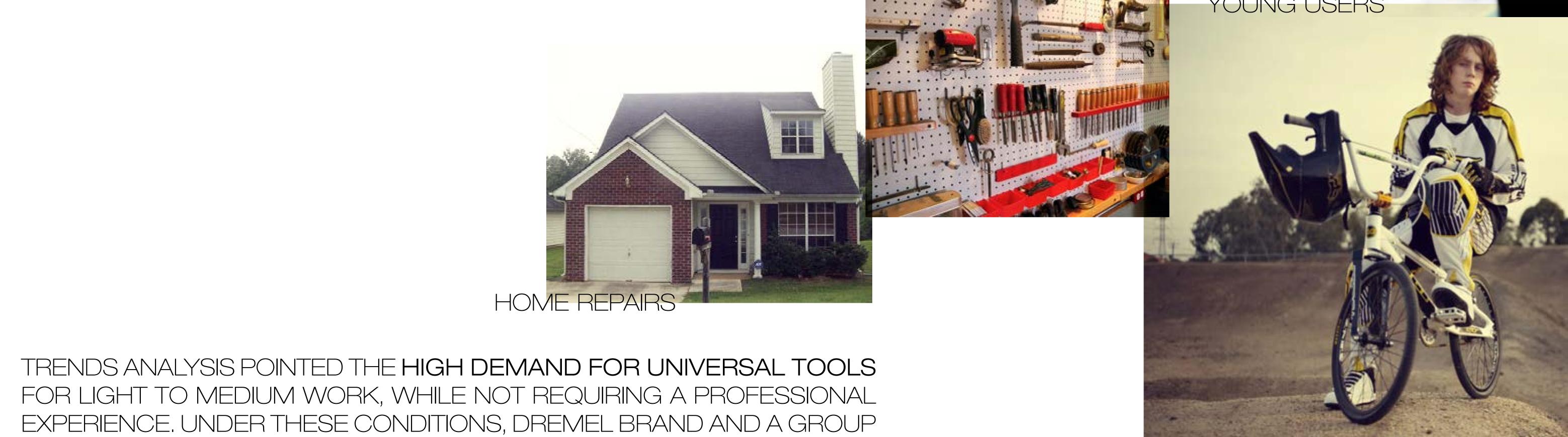


NEW AREAS OF INNNOVATION



OF TOOLS DESIGNED FOR THE LAYMAN BY BOSH (GREEN SERIES) ARE

DOING GREAT, BUT THEIR ABILITIES AND POWER ARE VERY LIMITED.



FOR THIS PARTICULAR CASE I MADE AN ATTEMPT TO DEFINE A MULTI-FACETED PERSONA MODEL - SUCH AS FAMILY OR RELATIONSHIP. SMART, FUN BUT NOT TOYSH, NEW, SUPPORTIVE

THE SON THE FATHER

16, IN HIGH SCHOOL 37, IT SPECIALIST USER BUYER

VERY OFTEN IT IS NOT CLEAR WHO EXACTLY A 'PERSONA' SHOULD BE. NOT ALWAYS THE FINAL USER DECIDES AND SELECTS THE PRODUCT.



SOLID BRANDS, SIMPLE, TRUST WORTHY PRODUCTS

PERSONA

WHY ANGLE GRINDER?

THE ANGLE GRINDER IS A VERY UNIVERSAL AND HELPFUL TOOL. IT CAN BE USED FOR CUTTING, GRINDING, AND POLISHING MANY MATERIALS. ON THE OTHER HAND IT IS ALSO VERY DANGEROUS AND AGGRESSIVE.

GOAL: TO MAKE IT SAFER, AND COMFORTABLE, BUT KEEP THE FUNCTIONALITY AND UNIVERSALITY.









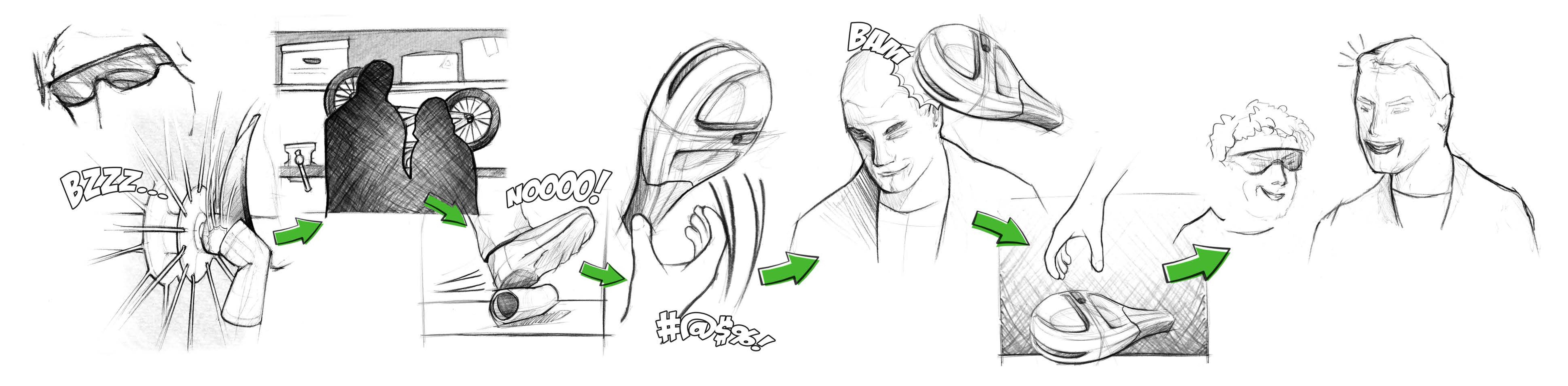


IMPORTANT PROBLEM



I'M A HOBBYIST. I USED THE ANGLE GRINDER MANY TIMES IN MY LIFE. I ALSO HAVE SEEN THE ACCIDENT WHEN THE GRINDER SLIPPED OUT FROM THE WORKER'S HAND AND CUT HALF OF HIS PALM. IT IS NOT SURPRISING, THAT MANY PEOPLE ARE AFRAID TO USE IT. IT IS VERY UNSAFE AND AGGRESSIVE TOOL. IN FACT, ANGLE GRINDER IS ONE OF THE MOST DANGEROUS TOOLS. ALL AROUND THE WORLD IT IS A CAUSE OF MANY ACCIDENTS, ALSO FATAL ONES. THIS ISN'T A GOOD SITUATION. OTHER MOTIVATION IS ALSO THE LIMITATION IT CAUSES - WITHOUT THE POSSIBILITY TO USE THE TOOL SAFELY, CREATIVE PEOPLE CAN ABANDON THEIR IDEAS.

CONCLUSIONS



TO MAKE AN ANGLE GRINDER **SAFER** TOOL.

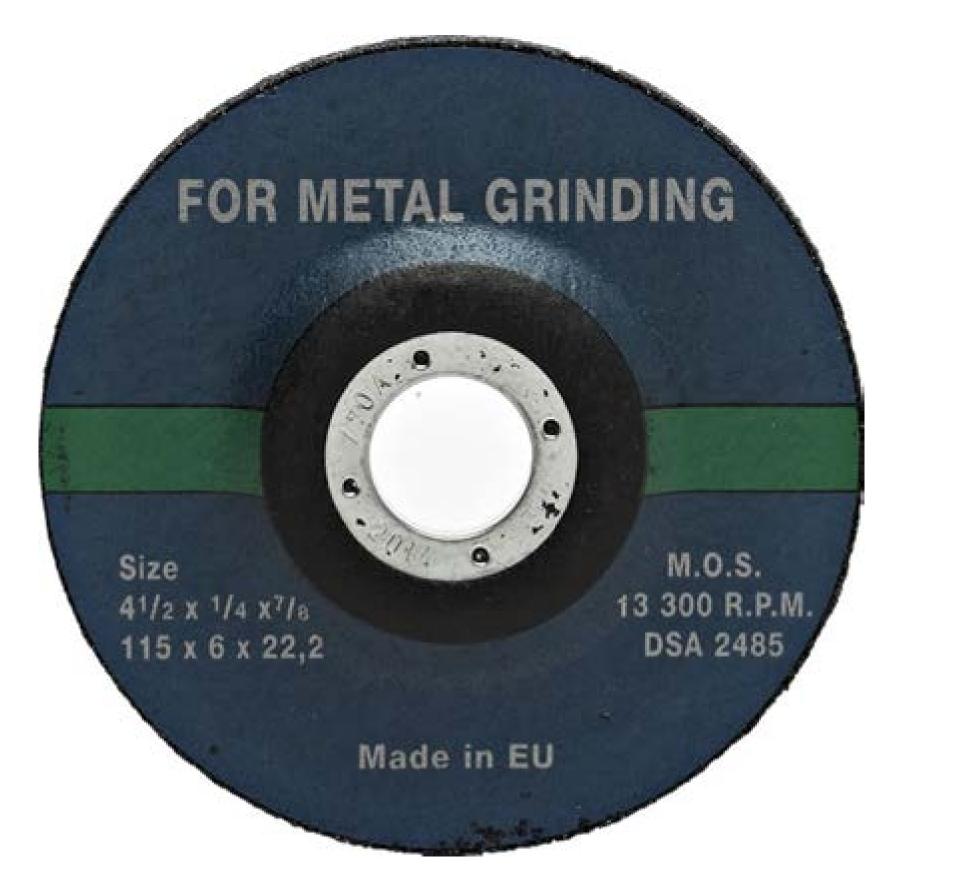
SAFETY + ANGLE GRINDER = s F L E X

TECHNOLOGICAL RESEARCH

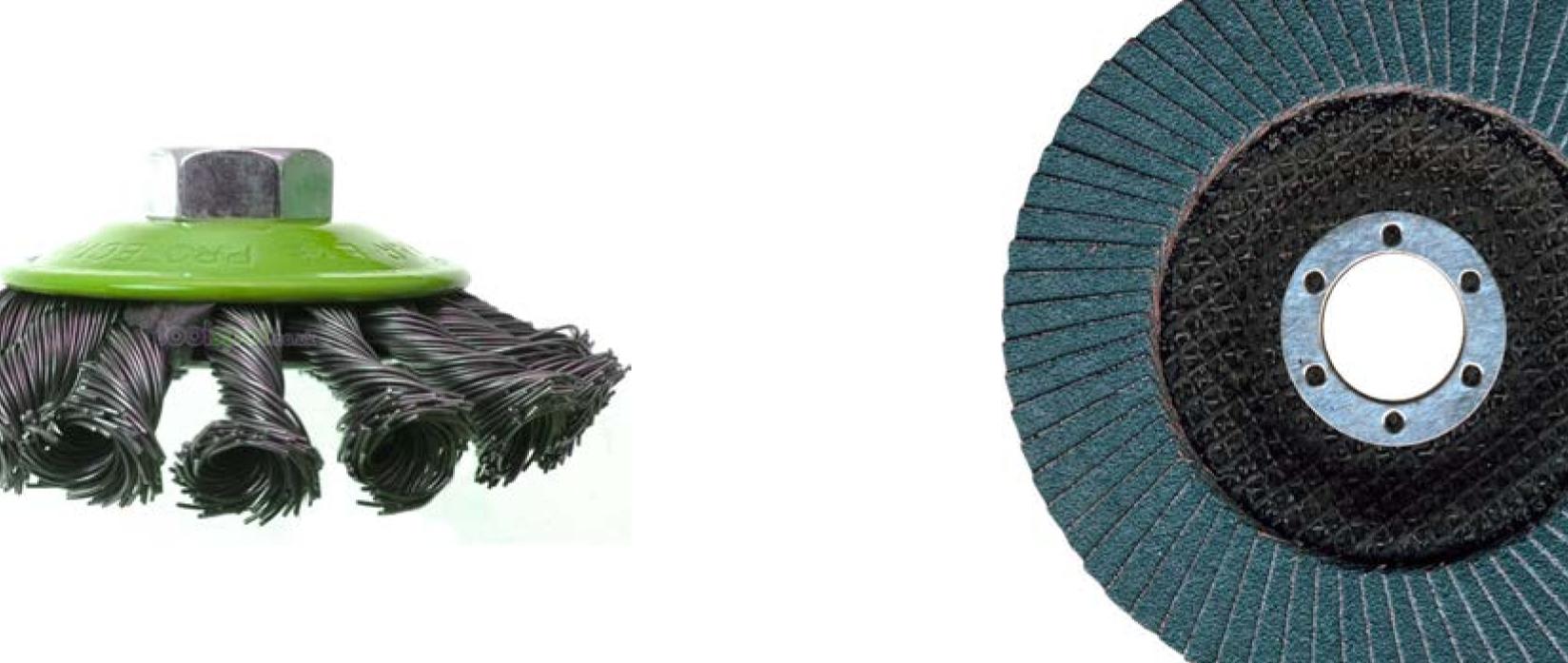
VERY IMPORTANT WAS TO KEEP AS MUCH FUNCTIONALITY OF A STANDARD ANGLE GRINDER, AS POSSIBLE BUT AT THE SAME TIME TO GIVE A USER CONTROL OVER ITS POWER AND LET HIM MAKE MISTAKES THAT FOR NORMAL ANGLE GRINDER COULD CAUSE A DANGEROUS ACCIDENTS.

DIFFERENT TOOLS WERE STUDIED DURING THE RESEARCH PROCESS. MODERN BATTERY POWERED ANGLE GRINDERS PROVIDE ENOUGH POWER AND FLEXIBILITY FOR NON-PROFESSIONAL USERS,

'sFLEX' WORKS WITH THE SAME ACCESSORIES AS OTHER CONVENTIONAL ANGLE GRINDERS THAT ARE AVAILABLE ON THE MARKET.



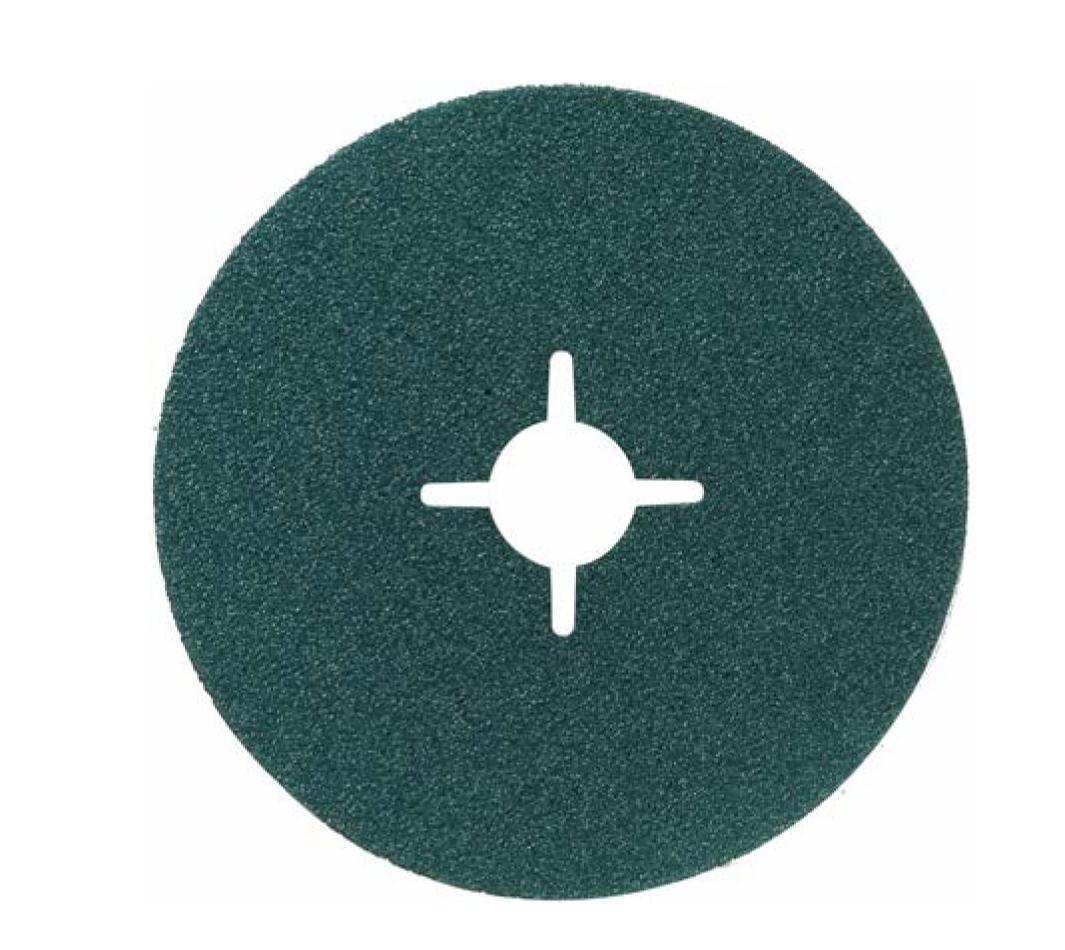




BRUSHING SANDING METAL



CUTTING CONCRETE



CUTTING WOOD

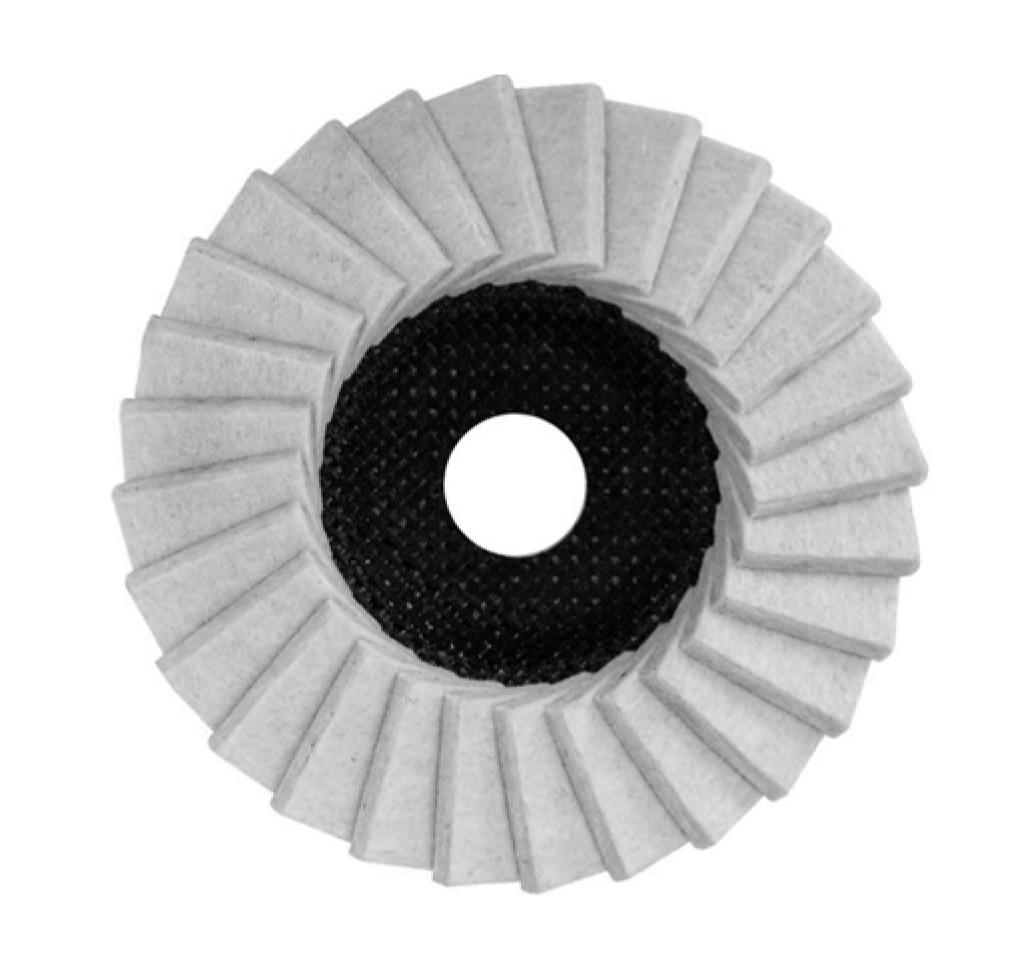
BLAUKRAFT

SANDING





SAWING BRANCHES

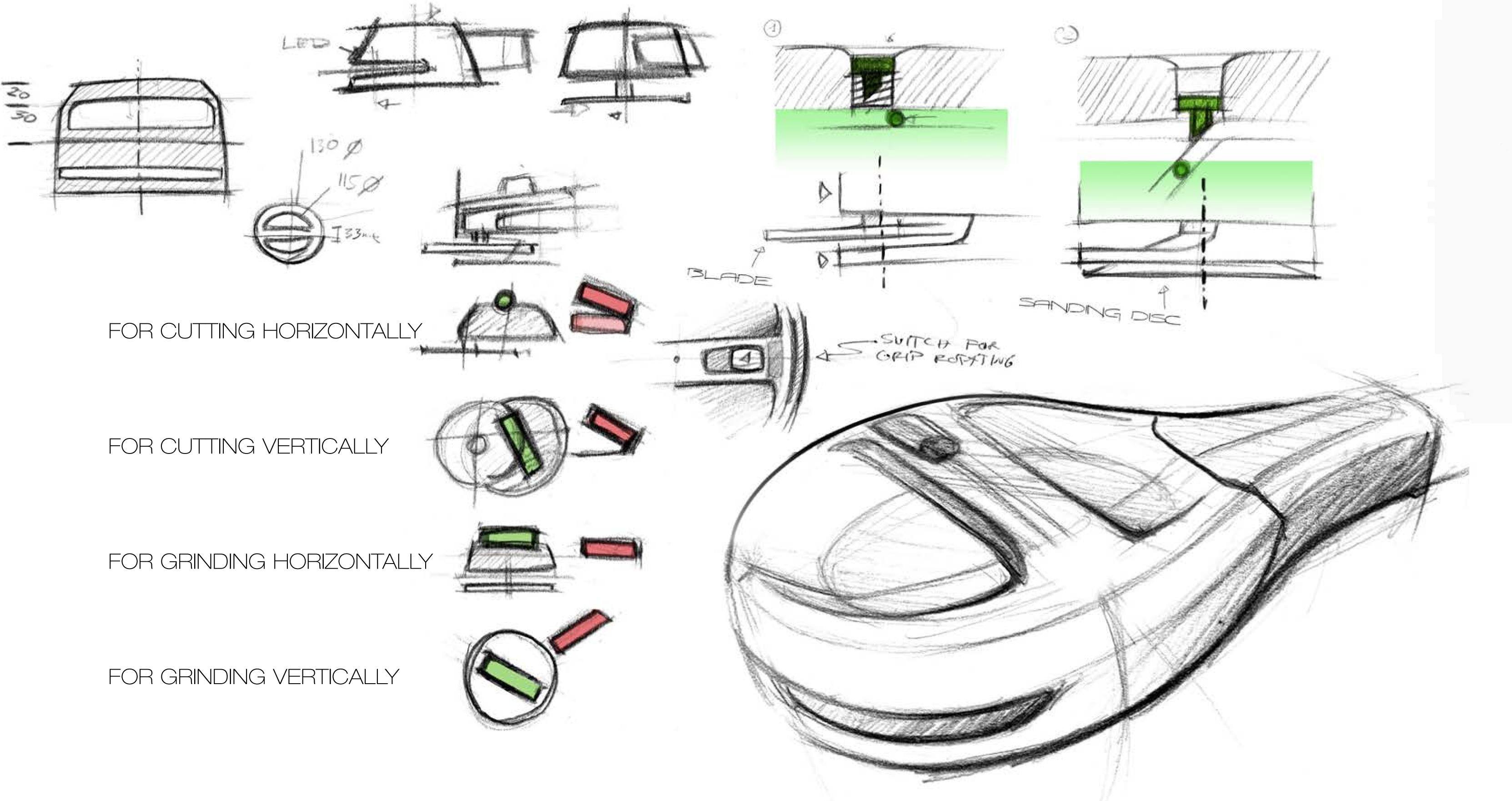


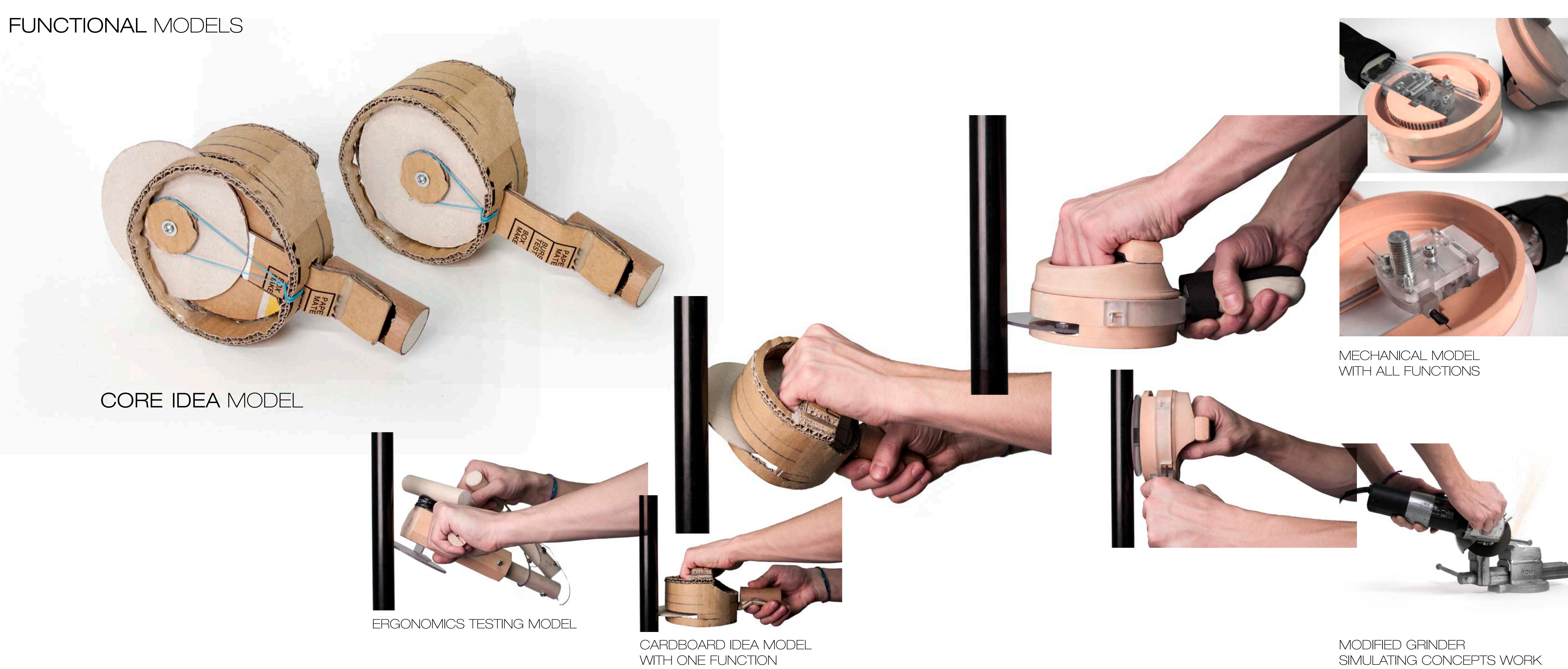
POLISHING

SOLUTION

'SFLEX' STOOD AS A RIGHT ANSWER TO THESE NEEDS. AFTER MANY ATTEMPTS IN SKETCHES AND SIMPLE CARDBOARD MODELS I CHOOSE THE BEST SOLUTION THAT MEETS THE PROJECT REQUIREMENTS.

THE BLADE IS HIDDEN IN A COVER. THE COVER IS MOVING ALONG THE LONGER HANDLE, BUT STRONG SPRING IS CLOSING COVER IF THE USER RELEASES ANY OF THE HANDLES. SFLEX IS DESIGNED FOR CRAFTSMEN, DIY AND HOBBY USERS. I DESIGNED IT TO GIVE THEM THE POWERFUL, YET MISTAKES FORGIVING TOOL.





FORM DEVELOPMENT MOODBOARD ARMOURED CALM POWER PRODUCT FORMAL LANGUAGE THOT AIRL

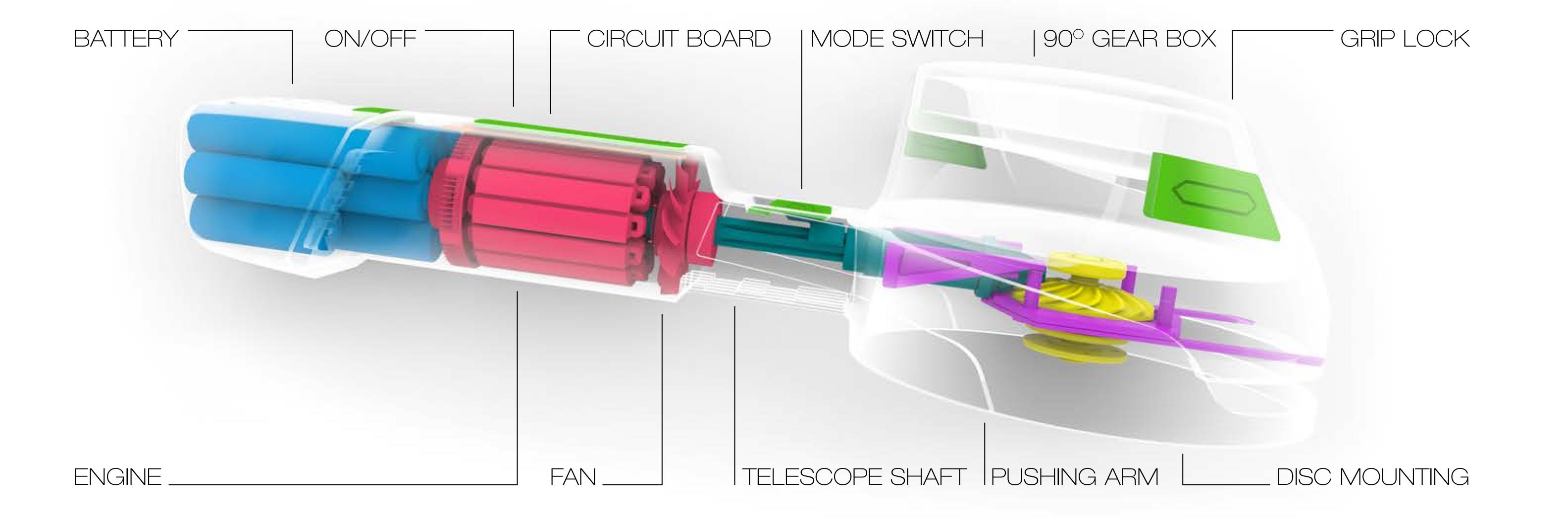
FUNCTIONALITY

'SFLEX' HAS TWO WORKING MODES. IT CAN BE USED AS A CUTTING TOOL OR AS A SANDING TOOL. TO START CUTTING, THE USER HAVE TO PULL THE TOP GRIP TOWARDS, THAN SAW BLADE COMES OUT.

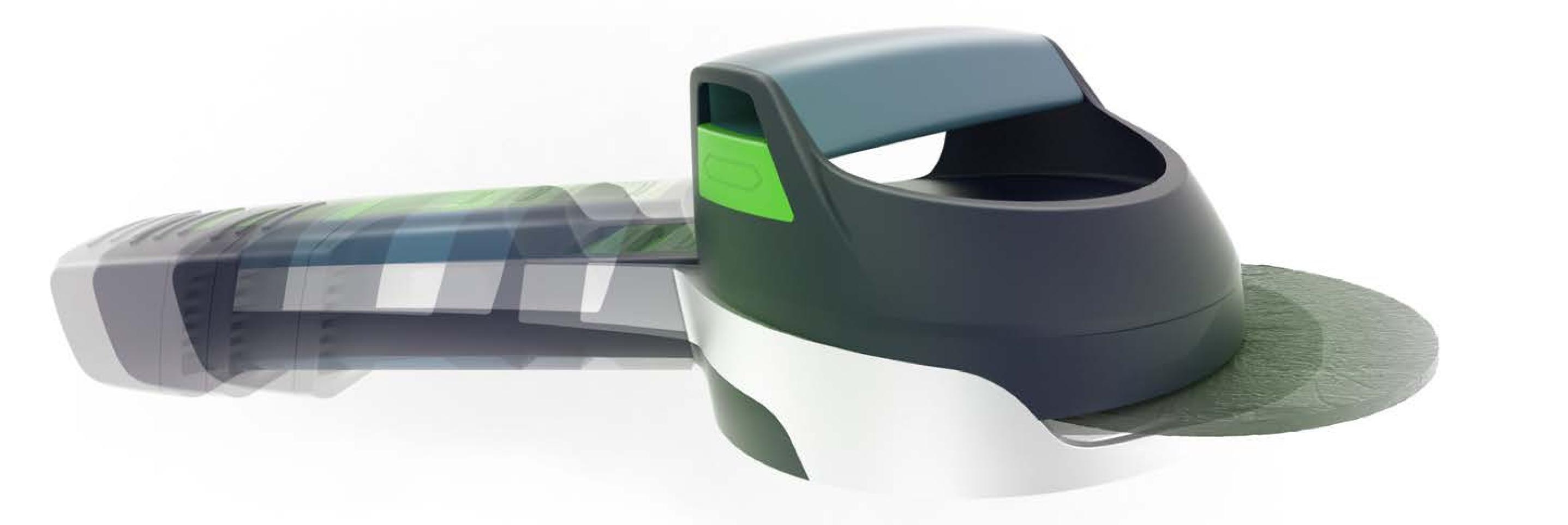
IF THE USER LOSES CONTROL, AND SFLEX FALLS OUT OF HIS HAND, THE SAW BLADE IS COVERED AUTOMATICALLY BY THE CASING. THE SANDING MODE WORKS IN SIMILAR WAY. IN THIS MODE THE GRINDING WHEEL SLIDES OUT OF THE HOUSING THROUGH THE BOTTOM.

IN THE MAIN BODY THERE IS AN ELECTRIC ENGINE AND THE BATTERY, IN THE FRONT PART IS AN ROTATABLE TOP GRIP FOR THE SECOND HAND, AND THE TRANSMISSION MECHANISM. TOP GRIP IS ROTATABLE, SO THE ANGLE CAN BE ADJUSTED TO THE NEEDS. IT MAKES THE 'SFLEX' ALSO FULLY FUNCTIONAL TOOL FOR BOTH LEFT- AND RIGHT-HANDED USERS.

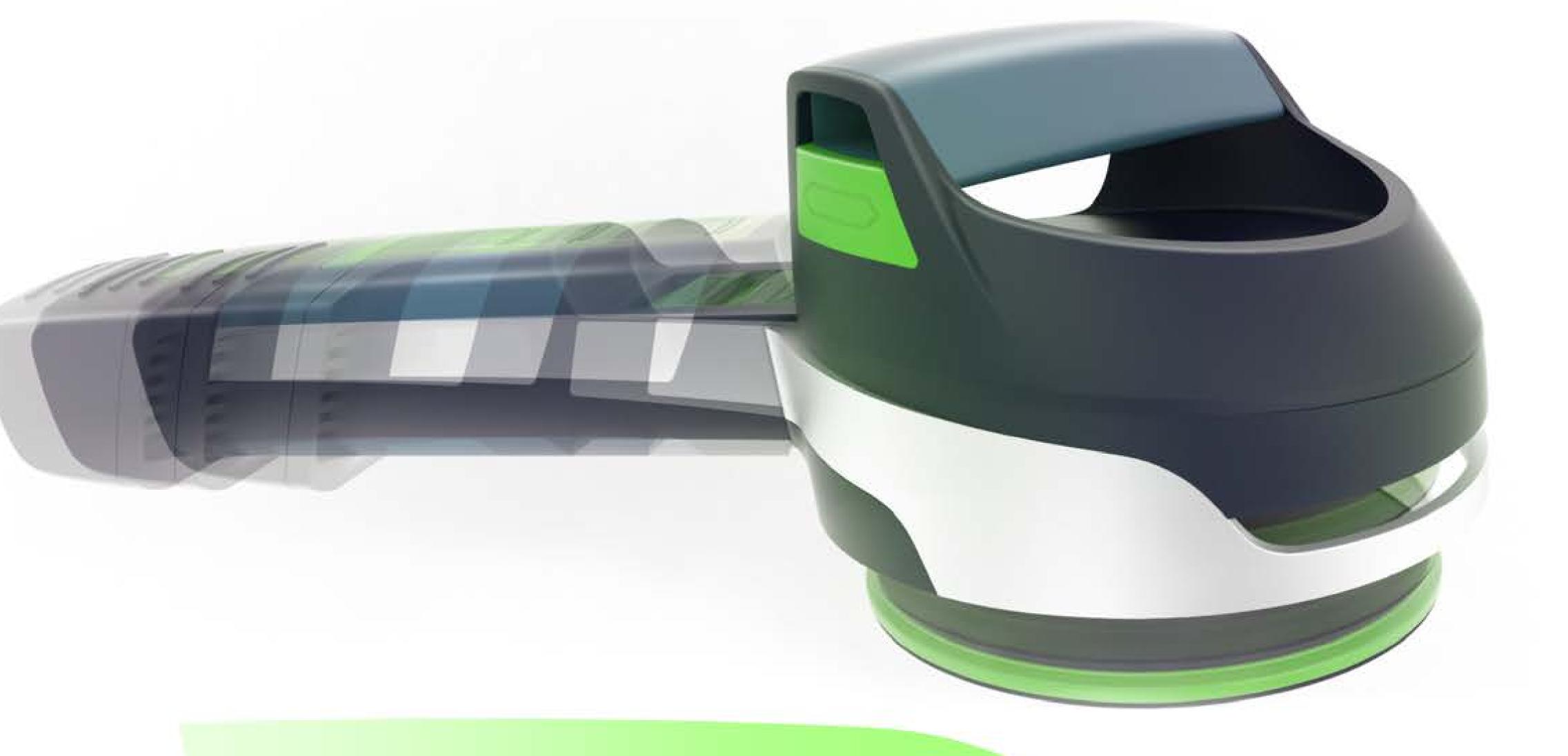
PACKAGE







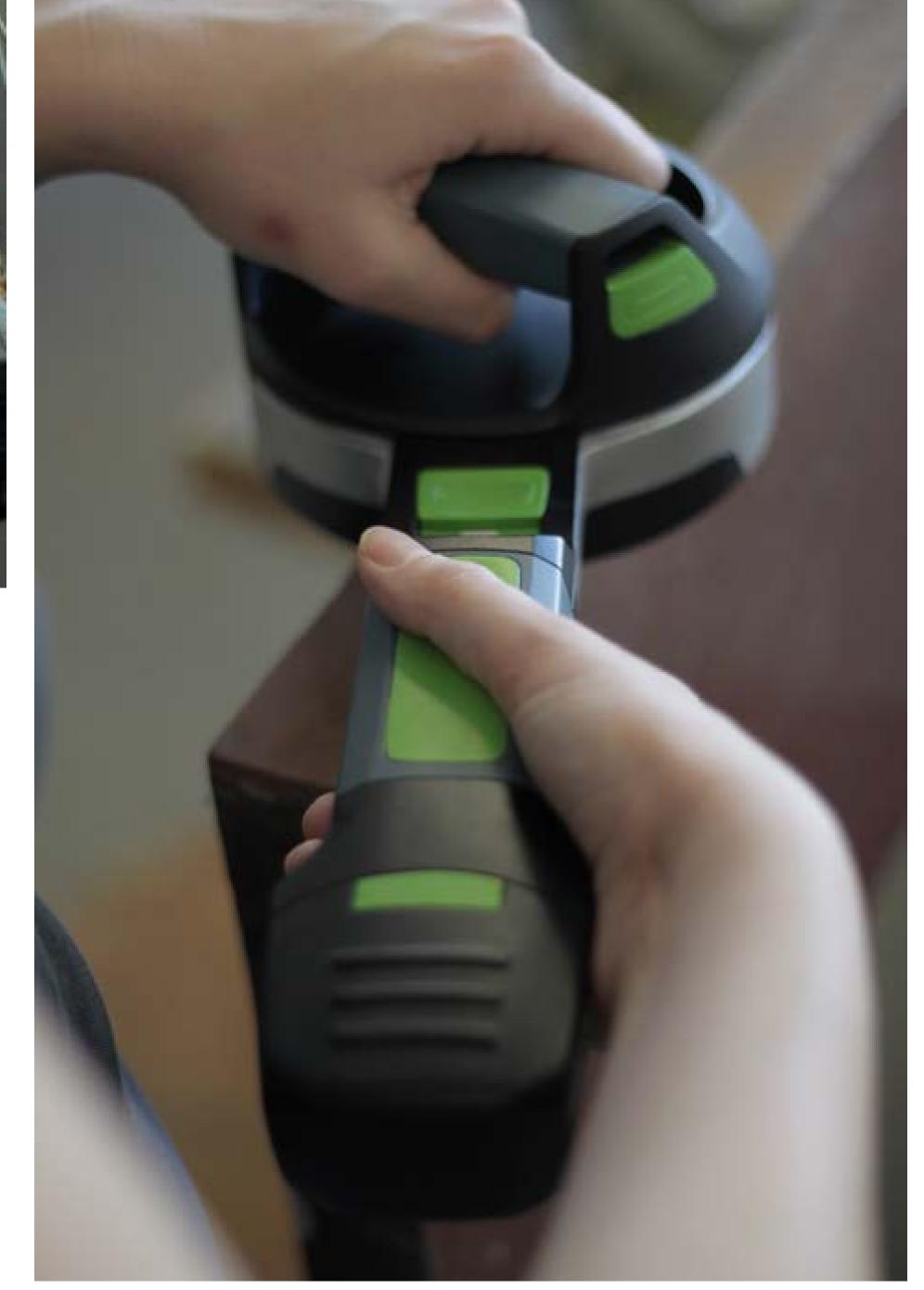
IN CUTTING MODE
...CUTTING DISC BLADE COMES THROUGH FRONT OPENING.



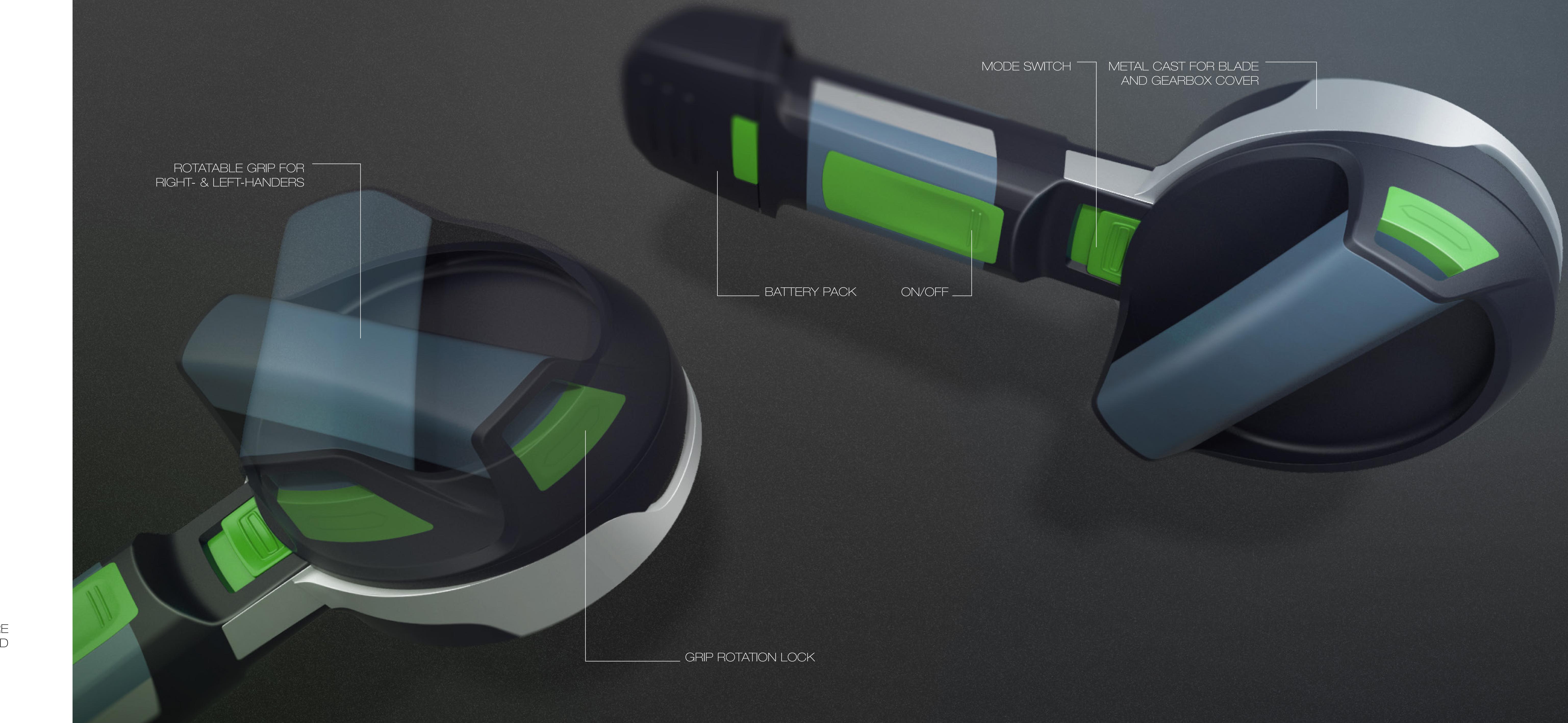
IN SANDING MODE
...SANDING PAD COMES THROUGH THE BOTTOM HOLE OPENING.

HUMAN FACTORS AND ERGONOMICS





MY MAIN FOCUS WAS ON SAFETY. THEN ON THE MENTAL AND PHYSICAL COMFORT. I WANTED TO CREATE A TOOL, WHERE THE EFFECT OF SAFETY FEATURES ON THE FUNCTIONALITY IS REDUCED TO MINIMUM. I WENT THROUGH MANY MODELS, AND PROTOTYPES TO DEVELOP THE FINAL PACKAGE AND SIMPLIFY THE CONSTRUCTION.



FINAL MODEL

AS A FINAL STAGE I BUILT A HARD MODEL FOR ERGONOMIC TESTS. HANDLES ON THE MODEL HAS THE SAME FUNCTIONALITY AS THE FINAL PRODUCT.





FINAL DESIGN





THE ASSUMPTIONS WERE CHALLENGING. ANGLE GRINDER HAS TWO MAIN MODES OF PROCESSING - WITH AN EDGE OF MOUNTED DISC/ACCESSORY (CUTTING), OR WITH THE BOTTOM SURFACE (GRINDING, POLISHING). FUNCTIONAL MODELS HELPED ME TO DEVELOP A PROTOTYPE OF THE MECHANISM THAT TRANSFERS ROTATION FROM THE MOTOR THROUGH THE TELESCOPIC AXIS. THIS MECHANISM PROVIDES THE ABILITY TO MOVE THE HEAD (WITH A MOUNTED DISC) IN TWO AXES. THE FINAL DESIGN - IN OPPOSITE TO TRENDS – WAS DEVELOPED TO MAKE SFLEX VISUALLY STABLE AND SECURE, SO THAT THE USER WILL NOT HAVE THE IMPRESSION THAT THE TOOL IS AGGRESSIVE AND UNPREDICTABLE.



s F L E X

TO MAKE AN ANGLE GRINDER **SAFER** TOOL.

