

CONCRETE IS A MONOLITHIC CREATURE.

CONCRETE. TIMBER. FIRE.

HOW DO THEY MIX? HOW DO THEY REACT?

CAN YOU CHANGE THE FUNDAMENTAL PROPERTIES OF CONCRETE THROUGH FIRE?

WILL METAMORPHOSIS HAPPEN IF YOU TRY TO ALTER THE TEMPERATURE OF CONCRETE THROUGH THE MEANS OF LIGHTING TIMBER ON FIRE?

THESE ARE ALL QUESTIONS THAT HAVE TRIED TO BE ANSWERED THROUGH THE FOLLOWING EXPERIMENTS. AS STUDENTS, WE USE CONCRETE IN EVERY DAY DESIGN, BUT THIS WAS THE FIRST TIME WITH HANDS ON EXPERIENCE, NO BOOKS CAN TEACH YOU THE SAME LESSONS AS WORKING DIRECTLY WITH A MATERIAL SUCH AS CONCRETE.



MET • A • MOR •

WE STARTED TO COLLECT DIFFERENT SAMPLES OF TIMBER WE WERE ABLE TO FIND. WE WERE ABLE TO SOURCE MANY DIFFERENT TYPES OF TIMBER AS THERE WERE A VARIETY OF CUT OFFS AND DIFFERENT SHAPES AND SIZES OF SPARE TIMBER WE COULD USE.

WE STARTED TO THINK OF HOW WE COULD MIX CONCRETE WITH TIMBER AND FIRE. WE CAME TO THE CONCLUSION THAT WE WOULD TAKE FOUR SAMPLES OF TIMBER WE WANTED TO USE AND TEST HOW THEY WOULD INDIVIDUALLY WORK WHEN SET ON FIRE IN A CONCRETE HOLD.

IF WE WERE TO PLACE PIECES OF TIMBER OF THE SAME SIZE AND DEPTH, THEN CREATE A FORM WORK FOR WHERE WE WOULD POUR THE CONCRETE AROUND IT. ONCE THE CONCRETE HAD CURED, THE IDEA WOULD BE TO LIGHT EACH TIMBER AND RECORD ITS BURNING RATE AGAINST EACH OTHER AND SEE HOW IT WOULD EFFECT THE CONCRETE.

IT TOOK MANY DIFFERENT DAYS TO SET UP THE FRAME FOR WHICH WE WOULD BE POURING THE CONCRETE, CUTTING EACH PIECE OF TIMBER AND THEN SETTING DAYS WHERE THE CONCRETE WOULD BE MIXED AND LEAVING IT FOR THE FULL 28 DAY PERIOD TO FULLY CURE.

THE FOUR PIECE OF TIMBER WE USED WERE, ASH, POPLAR, RED DEEL, AND MARINE PLY WOOD. EACH TIMBER HAS A VARIETY OF STRENGTH AND FIBER MAKE UP, WE WANTED TO SEE, ONCE THEY SET ALIGHT HOW THEY WOULD REACT TO THE CONCRETE AND WHAT THEIR BURNING RATE WOULD BE WHILST ENCLOSED IN A CONCRETE CAST.

THE FORM WORK WAS MADE USING MD F. EACH SAMPLE OF WOOD MEASURED 200X200MM WITH A 50MM CIRCUMFERENCE OF SPACE LEFT BETWEEN EACH PIECE. THE TOTAL LENGTH OF THE FORM WORK ACCUMULATED TO 1200MM AND WAS 300MM WIDE WITH A 200MM DEPTH. THE STANDARD OF THE FORM WORK WAS HIGH SO THAT THE IT COULD BE REUSED FOR A SECOND/THIRD EXPERIMENT IF NECESSARY.

THE CONCRETE WAS MIXED AT HOME IN A SAFE ENVIRONMENT WE USED 1 PART CEMENT, 2 PARTS SAND, 3 PARTS GRAVEL ROUGHLY TO MIX OUR CONCRETE.

ONCE THE CONCRETE WAS CORRECTLY MIXED WE BEGAN POURING IT INTO THE FORM-WORK. IT WAS SPREAD USING THE SHOVEL TO MAKE SURE THAT ALL CORNERS WERE FILLED WITH CONCRETE. THE CONCRETE WAS ALSO VIBRATED USING A VIBRATING TABLE TO GET RID OF ANY TRAPPED AIR WITHIN THE CAST.

AS WE WERE POURING FROM WHAT WOULD BECOME THE BASE OF THE HOLD, THE WOODEN SAMPLES NEEDED TO BE COMPLETELY SUBMERGED WITHIN THE CONCRETE. THIS ALLOWED US TO BE ABLE TO REINFORCE THE CAST USING A MESH SHEET WHICH ACTS AS A RESISTOR TO CRACKING.

THE CAST WAS FINALLY COVERED WITH A POLYURETHANE PLASTIC SHEET TO PROTECT IT AND ALSO TO PREVENT RAINWATER FROM INTERFERING WITH THE CURING PROCESS. INSULATING FOAM WAS ALSO PLACED ON TO WHICH HELPS EVEN OUT THE COOLING TEMPERATURE OF THE CONCRETE WHILST DRYING.



AFTER THREE DAYS IN THE FORMWORK, THE FRAME IS STRUCK FROM THE SIDES AND THE CONCRETE IS LEFT TO HARDEN OVER A 28 DAY PERIOD



PHO • SIS

THE CONCRETE TOOK ITS TIME TO SET, ANOTHER SMALL EXPERIMENT WAS CARRIED OUT.

WE BEGAN FIRST BY SELECTING OUR TIMBERS BASED ON THEIR INDIVIDUAL TEXTURES AND SURFACES RATHER THAN THEIR BURNING RATE PROPERTIES AS THIS EXPERIMENT WAS FOCUSED MORE ON THE AESTHETIC FACADE THAT WOULD RESULT FROM USING SUCH TIMBERS AS FORMWORK.

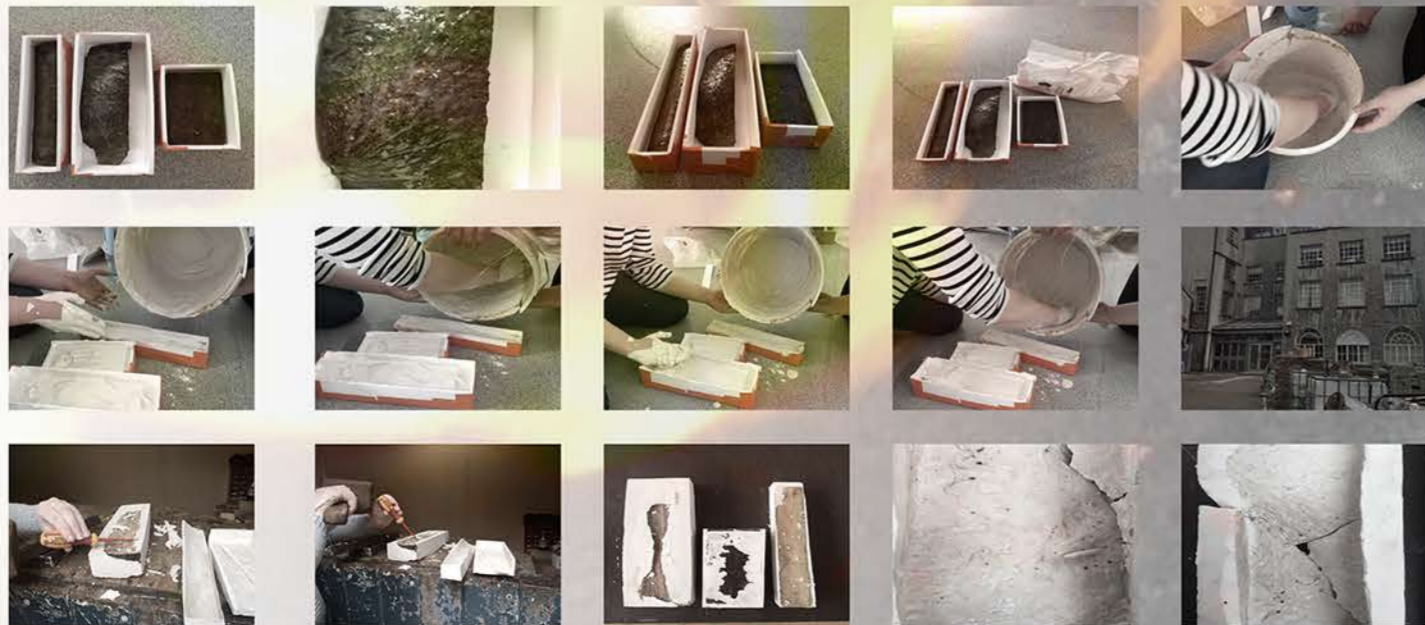
AS AN ADHESIVE, WE COVERED THE INDIVIDUAL PIECES IN VASELINE IN HOPE THAT IT WOULD AID TO THE REMOVAL OF THE PIECES FROM THE FINAL CAST PIECE. AS THE VASELINE WAS OF A THICK TEXTURE, WE MELTED IT USING A HAIRDRYER TO CREATE A THINNER SURFACE FILM SO THAT THE RESULTING BARK INDENTS WERE EMPHASIZED FURTHER.

WE ENVISAGED THIS EXPERIMENT AS BEING PHYSICALLY TRANSLATED INTO A FORM WORK. THEREFORE IT WAS NECESSARY TO TEST THE NATURAL TEXTURE THAT WOULD RESULT FROM USING BARK AS A MEANS OF SHUTTERING CONCRETE. IT WOULD ALSO GIVE US AN INSIGHT IN THE DIFFICULTIES ASSOCIATED WITH USING SUCH MATERIALS.

THE CAST WAS LEFT FOR 3 DAYS TO HARDEN AND CURE IN THE FOAM BOARD FORM-WORK BEFORE WE DECIDED TO STRIKE THE FINAL PIECE. ONCE READY WE REMOVED THE FORM-WORK AND ATTEMPTED TO REMOVE THE WOODEN PIECES IN A DELICATE MANNER.

WE VERY QUICKLY DISCOVERED THAT THE VASELINE AS AN ADHESIVE WAS NOT SUFFICIENT AND THE GRAIN IN THE TIMBER ACTUALLY CREATE A BOND WITH THE PLASTER WHICH PROVED VERY DIFFICULT TO DETACH WITHOUT DAMAGING THE CAST PIECE.

CONSIDERATION SHOULD BE GIVEN TO THE REMOVAL OF THE WOOD WHEN A TEXTURED FORMWORKS BEING PROPOSED TO PREVENT THE DIFFICULTIES THAT WE ENCOUNTERED.



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THE CONCRETE WAS LEFT TO CURE FOR 3 DAYS BEFORE WE FIRST STRUCK THE CAST. THE POLYURETHANE PLASTIC SHEET WAS REMOVED AND THE CONCRETE WAS MOVED INTO A DRIER ENVIRONMENT. THE CAST WAS THEN WRAPPED AGAIN WITH A POLYURETHANE PLASTIC SHEET AS IT WAS NECESSARY TO EVENLY SPREAD THE TEMPERATURE WHILST DRYING TO PREVENT CRACKING.

AFTER 4 WEEKS, 28 DAYS EXACTLY, THE CONCRETE WAS READY FOR THE BURNING EXPERIMENT. HOWEVER, AS WE BEGAN THE BURNING PROCESS WE FOUND THAT THE TIMBER PIECES HAD ACTUALLY ABSORBED A PORTION OF THE MOISTURE WITHIN THE CONCRETE HENCE WERE DAMP AND HARDER TO IGNITE THAN WE FIRST IMAGINED.

THE TIMBER PIECES WERE MARKED 50MM FROM THE TOP RIGHT HAND CORNER SO THAT EACH SAMPLE WAS IGNITED AT EXACTLY THE SAME POINT. THEY WERE BURNED FOR 120 SECONDS EACH THEN LEFT TO COOL DOWN. THE IMAGES SHOW THE PROCESS OF LEAVING TO SET THE TIMBER ON FIRE, THEN WAITING TO BE ABLE TO SCRATCH OUT THE ASH. EACH ATTEMPT ON BURNED AROUND 3MM DEEP INTO THE TIMBER. THIS PROCESS TOOK A LONG TIME AS ONLY SO MUCH TIMBER COULD BE BURNED AT ONE TIME.

PROPANE WAS USED TO ASSIST US IN THIS PROCESS WHICH EVENTUALLY BURNED THE ENTIRE SAMPLE. IN FUTURE, THE WOODEN SAMPLES SHOULD BE SEALED WITH MOISTURE RESISTOR TO PREVENT THIS FROM HAPPENING.

FROM THE PHOTOS TAKEN YOU MAY SEE THAT WHEN IGNITED, EACH SAMPLE BURNED INDEPENDENTLY FROM EACH OTHER. UNDER NO CIRCUMSTANCE DID A FLAME CROSS OVER AND SPREAD.

OUR INITIAL OBJECTIVE FOR THIS EXPERIMENT WAS TO TEST AND COMPARE HOW THESE FOUR SAMPLES OF TIMBER WOULD EFFECT THEIR CONCRETE ENCASED ONCE IGNITED. WE HAD HOPED FOR AN AESTHETICALLY PLEASING CHARD INDENTED PIECE OF CONCRETE, SIMILARLY TO ZUMPTHORS BRUDER KLAUS CHAPEL. HOWEVER, WHAT WE ACTUALLY WITNESSED WAS THAT CONCRETE DID EXACTLY AS IT WAS INTENDED TO DO, RESIST FIRE.

WE HAVE LEARNED FROM THIS EXPERIMENT MANY ASPECTS ASSOCIATED WITH CONCRETE SUCH AS THE VARIETY OF MIXES POSSIBLE DEPENDING ON ITS USE.

THE IMPORTANCE OF CURING THE CONCRETE IN A SUITABLE ENVIRONMENT AND ITS RESISTANCE AGAINST FIRE.

THE REALISATION THAT NO MATTER WHAT TYPE OF TIMBER, CONCRETE IS THE MORE DOMINANT MATERIAL.

IT IS INCREDIBLY DIFFICULT TO CHANGE THE STATE OF CONCRETE.

CONCRETE IS A MONOLITHIC CREATURE.

THROUGH A SERIES OF INVESTIGATIONS AND EXPERIMENTATIONS, WE HAVE NOT TAMED THE BEAST THAT IS CONCRETE.

IN OUR AIM TO SHIFT THE STATE OF CONCRETE THROUGH LIGHTING TIMBER, WE DID NOT SUCCEED IN ALTERING IT'S TRUE AND INHERENT PROPERTIES.

WITH THIS, WE HAVE COME TO THE CONCLUSION THAT CONCRETE CAN BECOME A PLACE IN WHICH METAMORPHOSIS CAN TAKE PLACE, THAT CONCRETE KEPT ITS INTEGRITY WHILE GIVING FREEDOM TO THE OTHER MATERIALS AROUND IT.

THE FIRE DID NOT JUMP, IT OBEYED THE ORDERS OF THE CONCRETE AND STAYED WITHIN ITS INDIVIDUAL METAMORPHOSIS.