

Case Study



“Water Damage SERR ROLF SR Metallbau
Rülzheim”

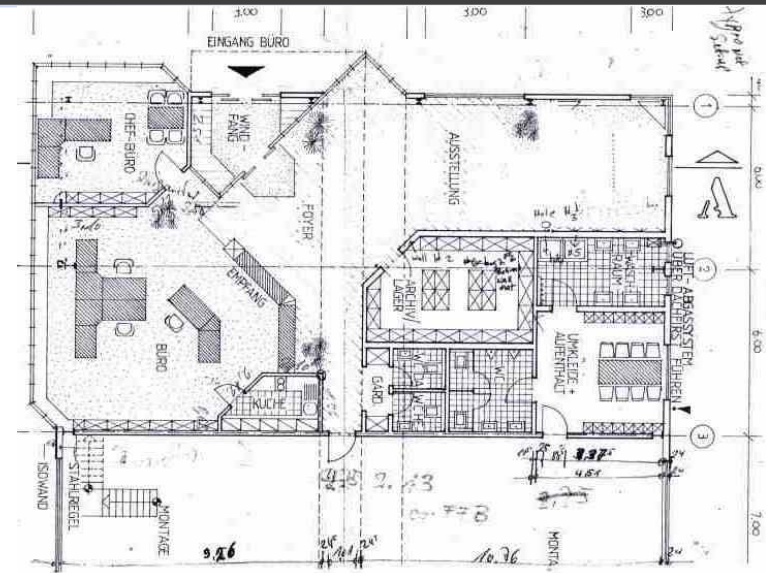
The Project

- Water Damage to SR Metallbau in Rülzheim
- DBK Germany is also located directly across the street in Rülzheim
- 210 M² total area of drying
- Commercial enterprise that needed to continue business operations
- No insurance coverage for this water loss
- Bid was awarded to DBK Germany on June 5th 2013 due to the new Drymatic heat drying system
- One other German Water Damage contractors also bid on the job using the traditional drying technology used in the German market and needing 28+ days to complete each area
- The other contractor was going to ruin the floor in the office and showroom, flooring and wall tiles in the back areas by drilling holes to complete the drying process



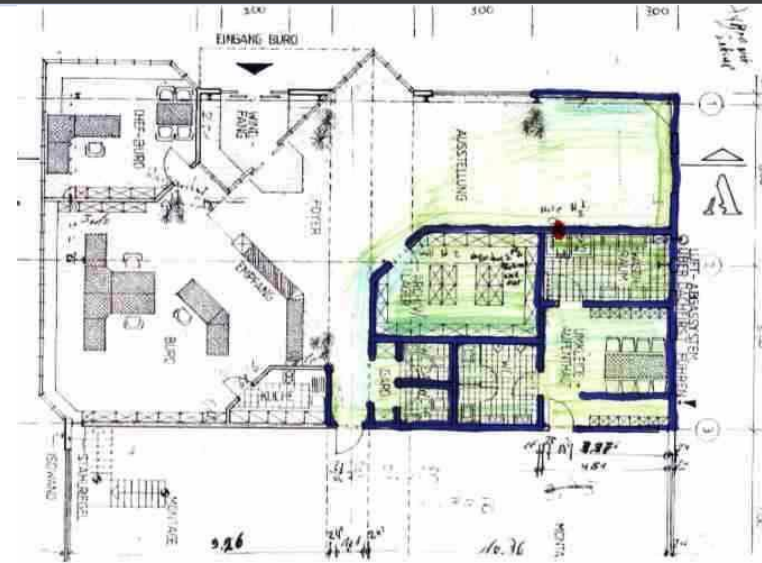
The Background

- 1980's German Commercial Building
 - Block walls
 - Layered floor over concrete
 - Plaster, wallpaper and paint on walls
 - Tile on walls and some floors
- Pipe leak in wall
 - Leak started at shower fauset and was not noticed for 6-8 weeks
 - Caused large amounts of water to leak into the walls and floor areas
 - All plumbing was redone in the building
 - Water was able to spread through the block wall construction and affect the other areas continued to enter the structure causing more damage to the other areas



The Background

- Areas affected
 - Showroom
 - Foyer and hall to warehouse
 - Archive room
 - Two office bathrooms
 - Electrical room
 - Breakroom
 - Two large bathrooms
 - Washroom (where loss occurred)
- Owner was told by other contractor that the entire floor (top to bottom) was wet and need suction/absorption drying
- Owner will have his workers help move furniture, files, equipment and do any removal/demolitions we need
- Office will stay open during all of our work
- Requested that the back areas be done first and then the front areas



Questions that were addressed

- Access required >> We needed full access during our operations which started on June 6th and ended on June 28th 2013
- Equipment needs >> 2 Drymatic's, 6 Air movers, 5 Drymatic Boost boxes, 4 Wall mats, 2 Floor mats, 1 power boxes and extension cables, containment materials
- Other Equipment needs >> thermal camera, moisture meters, distance measure, digital camera, thermo hygrometer, ladder and HygroNet base with 5 sensors
- Electrical needs >> 1 electrical extension cable with 1 power junction boxes
- H&S risk assessment >> Electrical, lifting, working in hot conditions
- Other issues >> Can we dry the floors with this type of construction? Can we dry the walls with tile surfaces? Can we dry the floors with tile surfaces?
- Labour required >> 2 for equipment loading, set up and take down, 1 for ongoing monitoring and equipment moving and resetting

Questions that were addressed

- Questions we need answers on:
 - Who is our point of contact for submitting the bid?
 - If we receive the job, who will be our point of contact for onsite coordination?
 - What is the time frame? When do you expect a start date for drying?
 - Is there a goal as to when you expect the drying to be finished?
 - What will be the access times? 8-5 M-F? Weekend work? Will we have access afterhours and on the weekends?
 - Will we have a Key to the building? Or will someone need to let us in and out?
 - Security? How will we have a guarantee that our equipment will remain safe and secure while we are not there?
 - What are the phases of the project?
 - What will happen with the contents of each area? Will it stay? Will we need to move them around? Who will be responsible for that?
 - Will other trades be working in the areas during our drying process?
 - What is the drying goal? How will it be measured? Moisture mapping with moisture meters and Infrared Camera of walls, ceilings and floors before the job and verified at the end? Data logging on a daily basis e.g. Rh, Temp and GPK to verify the equipment and methods have dried each area? Or is it based on the moisture content of the each type of building materials? Or a combination of all of the above?

The Initial Survey - Construction

- Flooring throughout was concrete/screed based standard German construction of 5 cm screed, 8 cm of Styrofoam on a bituthene membrane laid over concrete
- Finished flooring materials consisted of sealed concrete screed in the front areas and tile in the bathroom and back areas
- Walls were block construction with plaster covering and wallpaper in the front areas and tile in the bathrooms and wash room areas
- Ceilings were a concrete deck with a dropped acoustic ceiling tiles

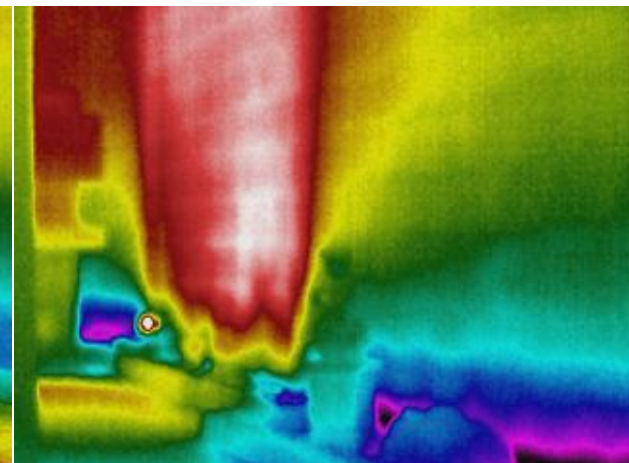
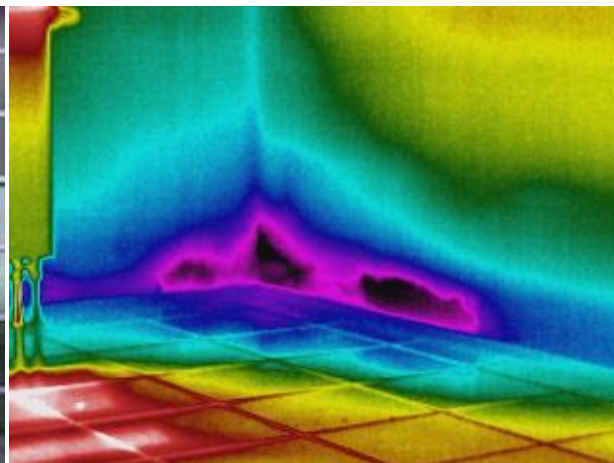
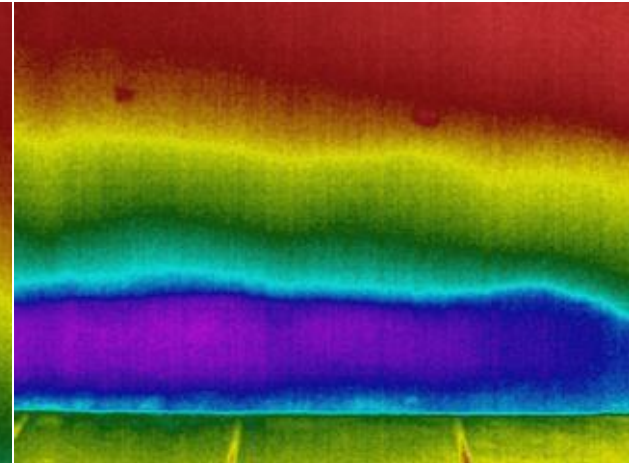
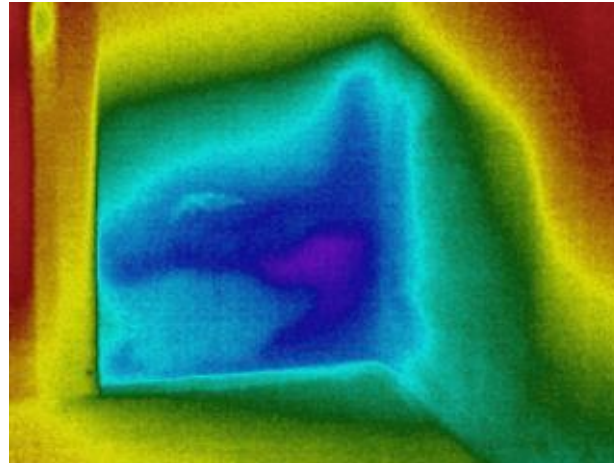


The Initial Survey

- The initial survey of the damage was the on June 6th 2013
- Two people were needed to complete all moisture mapping surveys and each lasted about 2.5 hours to complete
- Equipment used to measure moisture
 - FLIR B20HSV Infrared Camera
 - Fluke TiR32 Infrared Camera
 - Tramex Moisture Encounter Plus moisture meter
 - Tramex Concrete Encounter CME4 moisture meter
 - Tramex MRH 3 moisture and humidity measurement meter
 - Tramex RWS Roof and Wall Scanner deep penetrating measurement meter
- This equipment was used during the complete drying process and for drying verification



The Initial Survey



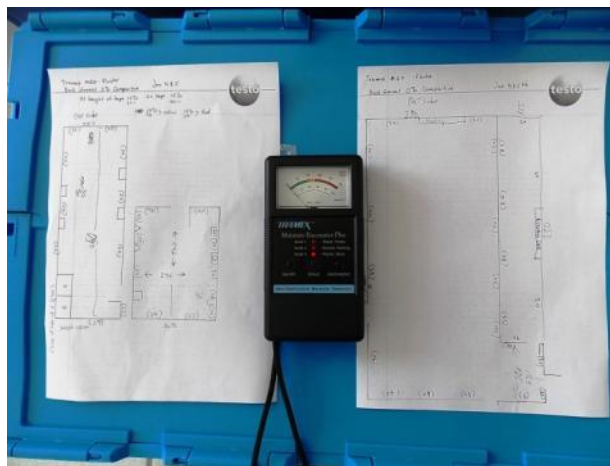
The Initial Survey – Front Areas



The Initial Survey – Back Areas



The Initial Survey - Measurements



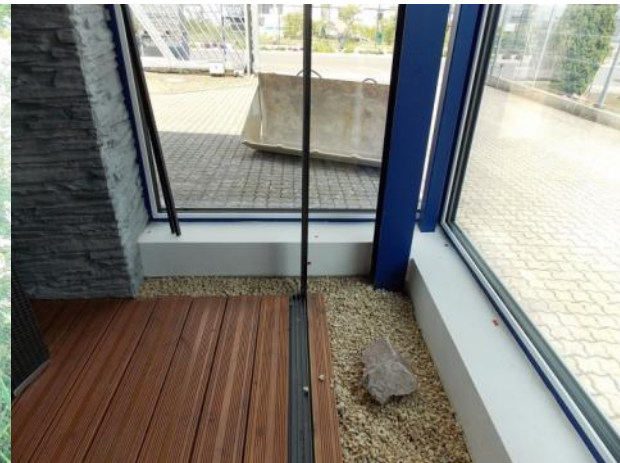
The Initial Survey – Moisture Mapping



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The Initial Survey – Moisture Mapping

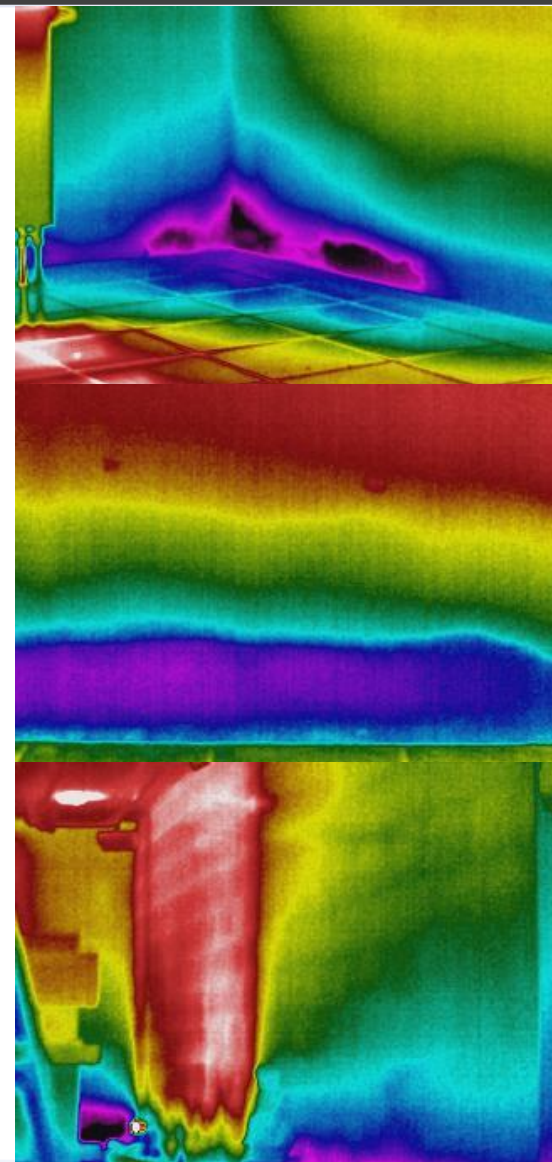


The Initial Survey – Moisture Mapping



Measurements Results

- Front Areas
 - Showroom – 40 cm height moisture average
 - Foyer and hall to warehouse – 25 cm height moisture average
 - Archive room – 35 cm height moisture average
 - Two office bathrooms – 30 cm height moisture average
- Back Areas
 - Electrical room – 30 cm height moisture average
 - Breakroom – 35 cm height moisture average
 - Two large bathrooms – 55 cm height moisture average
 - Washroom (where loss occurred) – 65 cm height moisture average and 140 cm high at loss point



The Project

- Front Areas
 - Showroom
 - Foyer and hall to warehouse
 - Archive room
 - Two office bathrooms
- Back Areas
 - Electrical room
 - Breakroom
 - Two large bathrooms
 - Washroom (where loss occurred)
- Contents and structure items were removed and reset by the companies employees



The Project – Other equipment needs



The Project – Showroom

- Consisted of a very large area with sections for display's, entry, office, bathrooms and hallway with screed flooring and plaster walls
- The plastic film wall paper was removed ½ halfway for drying and all contents were removed by the company
- 1 Drymatic's, 2 boost boxes, 2 air movers and 2 wall mats were used for the total drying process of these areas
- This was conducted on the second phase and we could only run the equipment at night and on the weekends
- We used a sandwich drying approach drying from both sides of the walls



The Project – Archive/File room

- Consisted of a large area with walls connecting to showroom, hall, bathrooms and washroom with screed floor and plaster walls
- 1 Drymatic's, 2 boost boxes, 2 air movers and 2 wall mats were used for the total drying process of this area
- This was conducted during both phases and we could only take the temperature up to 30 due to the company server located in this room
- We had to work around the contents in this room and move them from side to side
- We used a sandwich drying approach drying from both sides of the walls



The Project – Break room

- Consisted of a large area with walls connecting to electrical, bathrooms and washroom with tile floor laid over screed and plaster walls
- 1 Drymatic's, 2 boost boxes, 2 air movers, 1 wall mat and 1 floor mat were used for the total drying process of this area
- This was conducted during the first phase and the contents were removed by the company
- We used a sandwich drying approach drying from both sides of the walls



The Project – Electrical room

- Consisted of a small room with walls connecting to the break room and warehouse and consisted of a concrete screed floor and plaster walls
- 1 boost box, 1 air mover, and 1 floor mat were used for the total drying process of this area – 1 Drymatic was setup in the break room
- This was conducted during the first phase
- We used a sandwich drying approach drying from both sides of the walls



The Project – Washroom

- Consisted of a large area with walls connecting to the showroom, archive/file, and break room with tile floor laid over concrete screed floor and tiled walls
- 2 boost boxes, 2 air movers, 1 wall mat and 2 floor mat were used for the total drying process of this area – 1 Drymatic was setup in the break room
- This was conducted during the first phase and the contents, sinks, and shower pans were removed by the company
- We used a sandwich drying approach drying from both sides of the walls



The Project – Bathrooms

- Consisted of a large area with walls connecting to the warehouse, hallway bathrooms, archive/file, and break room with tile floor laid over concrete screed floor and tiled walls
- 2 boost boxes, 2 air movers, 1 wall mat and 1 floor mat were used for the total drying process of this area – 1 Drymatic was setup in the break room
- This was conducted during the first phase and was being used daily by the companies employees
- We used a sandwich drying approach drying from both sides of the walls



The Monitoring – Rh, Temp & GPK

Date and Time of Readings: 04/06/13 @11:30 - Taken by Mike

<u>Area/Location</u>	<u>Rh</u>	<u>Temp</u>	<u>Td</u>	<u>GPK</u>
Outside	50	23	8.1	6
Showroom	47.8	21	8.9	7
File room	49	22	10.9	7
Warehouse	48	20	8.9	6
Breakroom	67.6	21	10	7
Toilet room	45	21	10	7
Washroom	45	21	7.6	7

Date and Time of Readings: 06/06/13 @ 10:30 - Taken by Mike

<u>Area</u>	<u>Rh</u>	<u>Temp</u>	<u>Td</u>	<u>GPK</u>
Outside	48	24	11	7
Showroom				
File room				
Warehouse	34.5	28	11	7
Breakroom	86.9	35	32.3	30
Toilet room	88.8	35	32.8	31
Washroom	87.8	36	33	33

The Monitoring – Rh, Temp & GPK

Date and Time of Readings: 13/06/13 @ 8:30 - Taken by Mike

<u>Area</u>	<u>Rh</u>	<u>Temp</u>	<u>Td</u>	<u>GPK</u>
Outside	51.5	26	15.2	10
Showroom	43.6	30	16.1	11
File room	37.1	36.1	18.1	12
Warehouse	51.5	27	16.3	11
Breakroom	80.4	43	38.9	42
Toilet room	84.4	40	36	38
Washroom	73.1	47	40.9	47

Date and Time of Readings: 17/06/13 @ 8:30 - Taken by Yanick

<u>Area</u>	<u>Rh</u>	<u>Temp</u>	<u>Td</u>	<u>GPK</u>
Outside	59.9	23	14.6	10
Showroom	87.8	39	36.5	39
File room	84.9	39	35.9	38
Warehouse	49	26	14.3	9
Breakroom	80.9	40	36	38
Toilet room	73.6	45	38.9	42
Washroom	73.6	44	37.9	40

The Monitoring – Rh, Temp & GPK

Date and Time of Readings: 20/06/13 @ 9:15 - Taken by Mike

<u>Area</u>	<u>Rh</u>	<u>Temp</u>	<u>Td</u>	<u>GPK</u>
Outside	70.4	26	20.1	14
Showroom	51.8	28	17.1	11
File room	35.1	34	16.3	11
Warehouse	60	30	21.3	15
Breakroom	35.8	38	20.1	14
Toilet room	91	41	39.1	43
Washroom	30.9	41	20.3	14
Office area	49.4	26	14.5	9

Date and Time of Readings: 21/06/13 @ 9:00 - Taken by Mike

<u>Area</u>	<u>Rh</u>	<u>Temp</u>	<u>Td</u>	<u>GPK</u>
Outside	50.7	25	14	9
Showroom	38.3	34	17.7	12
File room	86	38	35.1	36
Warehouse	46.2	28	15.3	10
Breakroom	87.3	36	33.5	33
Toilet room	75.9	44	38.7	42
Washroom	74.7	45	39.3	43

The Monitoring – Rh, Temp & GPK

Date and Time of Readings: 24/06/13@ 9:30 - Taken by Andreas & Ian

<u>Area</u>	<u>Rh</u>	<u>Temp</u>	<u>Td</u>	<u>GPK</u>
Outside	38	25	10.3	7
Showroom	33	29	11.9	8
File room	42	28	14.6	10
Warehouse	44	23	10.6	7
Breakroom	20	41	14.3	9
Toilet room	19	43	14.9	10
Washroom	20	43	16	11

Date and Time of Readings: 25/06/13 @ 4:30 - Taken by Mike

<u>Area</u>	<u>Rh</u>	<u>Temp</u>	<u>Td</u>	<u>GPK</u>
Outside	80.3	18	14.5	9
Showroom	41.5	28	13.6	9
File room	84.8	36	32.8	31
Warehouse	59.8	22	13.7	9
Breakroom	56.9	22	13	9
Toilet room	50.3	25	13.8	9
Washroom	84.4	39	34.5	35

The Monitoring – Rh, Temp & GPK

Date and Time of Readings: 27/06/13 @ 9:00 - Taken by Mike

<u>Area</u>	<u>Rh</u>	<u>Temp</u>	<u>Td</u>	<u>GPK</u>
Outside	67.7	16	9.7	7
Showroom	34.5	28	10.8	7
Office	37.1	27	11	7
File room	89.2	32	29.9	26
Warehouse	40.3	26	11.4	8
Breakroom	47.2	23	11.1	7
Toilet room	53.5	23	12.9	8
Washroom	72.7	40	34.1	34

Date and Time of Readings: 28/06.13 @ 9:30 - Taken by Andreas

<u>Area</u>	<u>Rh</u>	<u>Temp</u>	<u>Td</u>	<u>GPK</u>
Outside	51	20	10.2	7
Showroom	33	30	12.3	8
Office	46	24	11.9	8
File room	28	34	13.2	9
Warehouse	40	24	10.3	7
Toilet room	37	27	11.2	9
Washroom	19	41	13.8	9

The Monitoring – Final Readings

Date and Time of Readings: 02/07/13 @ 9:30 - Taken by Andreas

<u>Area</u>	<u>Rh</u>	<u>Temp</u>	<u>Td</u>	<u>GPK</u>
Outside	37	28	12.5	8
Showroom	24	39	14.7	10
File room	26	37	14.8	10
Toilet room	20	43	16.1	11

Date and Time of Readings: 04/07/13 @ 9:30 - Taken by Mike

<u>Area</u>	<u>Rh</u>	<u>Temp</u>	<u>Td</u>	<u>GPK</u>
Outside	72	20	15.4	10
Showroom	52	27	16.5	11
Office	41	32	16.8	11
File room	37	34	17.2	11
Warehouse	52	26	15.5	10
Breakroom	44	29	16.1	11
Toilet room	42	31	16.7	11
Washroom	51	27	16.2	11

The Monitoring – Rh, Temp & GPK

- Used both closed and open drying system during the job when weather allowed
- Some GPK numbers were low in the show room due to only being allowed to run the equipment after business hours and our containment being taken down by the occupants
- Had continually high GPK reading in the Break room and large bathrooms – this was due to them being in operation and people using the bathroom with an open source of liquid water
- GPK numbers also went higher when wall mat, floor mats, boost box and air movers were moved for target drying – this show the power of monitoring and moving the equipment

The Final Survey

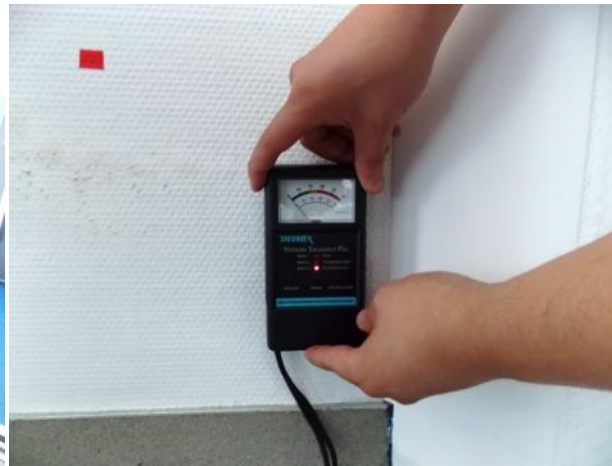
- The initial survey of the damage was the morning following the tornado on June 21st 2013
- Two other surveys and contractor meeting were conducted on June 21st and July 15th 2013
- Two people were needed to complete all surveys and each lasted about 2.5 hours to complete
- Equipment used to measure moisture
 - FLIR B20HSV Infrared Camera
 - Fluke TiR32 Infrared Camera
 - Tramex Moisture Encounter Plus moisture meter
 - Tramex Concrete Encounter CME4 moisture meter
 - Tramex MRH 3 moisture and humidity measurement meter
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- This equipment was used during the complete drying process and for drying verification



The Final Survey - Floor



The Final Survey - Showroom



The Final Survey – File & Archive room



The Final Survey - Washroom



The Final Survey – Break room



The Final Survey - Bathrooms



The Final Survey - Floors



The Equipment Power Consumption

- 2 Drymatic's used 900 kWh – 450 kWh average
- 5 Boost box's used 1850 kWh – 370 kWh average with 2721 hours used – 544 hours runtime average
- 6 air movers used **1954** kWh with 2800 hrs used - 466 hours runtime average
- 22 days total to dry the complete structure!
- 12 days for the back areas and 10 days for the front areas



Personal Requirements

- Project Manager hours
 - For initial investigation planning and putting the bid together = 4 hrs or 1/2 work days
 - For job set-up, monitoring and takedown = 60 hrs or 7.5 work days
- Technician hours
 - For job set-up, monitoring and takedown = 40 hrs or 5 work days
- Other Assistant hours
 - For job set-up, and takedown = 8 hrs or 1 work day



The Conclusions

- DBK started the drying June 6th and ended on June 28th 2013, but was done in two phase's
- DBK's drying was slowed in all areas by 3 days due to having to work around the companies ongoing business operation
- The company suffered little or no business interruption due to DBK drying operations
- The drying was completed in 12 days for the back areas and 10 days for the front areas
- DBK was able to prove that all of the walls and their finish materials (tile, plaster, wallpaper, were completely dried in all areas
- DBK was able to prove that there was no need to ruin and/or remove any of the flooring material and that all areas were completely dried
- Drying of these areas was verified using the moisture detection equipment, as well as conducting complete and detailed moisture mapping of these areas from prior to the start of the job, during the progress of the drying phase and at completion prior to removal of the drying equipment.

The Conclusions

- Visual and Infrared images were taken throughout the process as well as environmental conditions readings of Temperature, Relative Humidity and GPK (grains per kilogram) to also help in the determination of bring these affected areas to a dry state and drying standard.
- Drying using the DBK's Drymatic Heat drying system proved to be more effective and **65%** faster than the traditional drying equipment being used in Germany and Europe
- Proper project and equipment management proved to be very useful in our success
- Moisture investigation with the right tools and knowledge of water damage restoration done before, during and after this project helped proved the drying success and set the client at ease

- Owner was very pleased with the work and their working relationship with DBK's project manager
- Owner did not have to shutdown his business
- Owner was able to use his own employees to move contents, paint and repair wallpaper
- DBK completed the job without and demolition needed for drying
- Job was well within budget and finished under the estimated time