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MINIMISING THE EFFECTS OF ACIDIC AIRBORNE POLLUTION
ON WATERBORNE ROOFCOATINGS A SOUTHERN AFRICAN PERSPECTIVE
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SYNOPSIS: THIS PAPER BRIEFLY OUTLINES WHAT ACIDIC AIRBORNE POLLUTION IS (IN A SOUTHERN AFRICAN CONTEXT), THE MECHANISM BY WHICH IT IS THOUGHT TO ATTACK WATERBORNE ROOFCOATINGS AND HOW THESE EFFECTS CAN BE COST EFFECTIVELY MINIMISED WITHOUT ADVERSELY EFFECTING OTHER COATING PROPERTIES.

1) INTRODUCTION

THERE IS NO DOUBT WHAT SO EVER THAT WATERBORNE OR AS THEY ARE MORE POPULARLY KNOWN HERE IN SOUTHERN AFRICA AS ACRYLIC ROOFPAINTS, ARE ONE OF THE HIGHEST VOLUME "SPECIALIST" DECORATIVE COATINGS MADE IN THE REGION. FROM A COMBINATION OF OFFICIAL AND UNOFFICIAL SOURCES I ESTIMATE THAT IN EXCESS OF 5 MILLION LITRES PER ANNUM OF THIS TYPE OF PRODUCT ARE MADE AND SOLD IN THE SOUTHERN AFRICAN MARKET. PRE 1990 ONLY A LIMITED COLOUR RANGE (BLACK, IRON, CHROME OXIDE COLOURS (RED, YELLOW, GREEN)) WAS OFFERED. THEN ARCHITECTS AND ASSET OWNERS STARTED TO USE MORE FASHION COLOURS (GREENS, BLUES, PLUM, MAUVES ETC) AND THE LOCAL COATINGS COMPANIES TOOK UP THE CHALLENGE. AND STARTED PROVIDING THESE COLOURS, WHICH IN TURN LED TO INCREASED DEMAND AND SALES.

WHEN PURCHASING, USING AN ACRYLIC ROOFPAINTE THE AVERAGE ENDUSER EXPECTS THE COATING TO HAVE BOTH EXCELLENT COVERING POWER AND DURABILITY. THE CUSTOMER PERCEIVES EXCELLENT DURABILITY AS MEANING THAT THE COATING DOES NOT BEGIN TO CHALK OR SIGNIFICANTLY CHANGE COLOUR WITHIN AT LEAST 5 YEARS OF APPLICATION.

THEN IN MID 1994 REPORTS BEGAN TO BE RECEIVED BY QUITE A FEW DIFFERENT PAINT MANUFACTURERS THAT THEIR DARK COLOURED ACRYLIC ROOFPAINTS WERE BEGINNING TO CHALK, CHANGE COLOUR AFTER ONLY 3-9 MONTHS. THIS PAPER IS A SUMMARY OF THE AUTHORS INDEPENDENT INVESTIGATION, CARRIED OUT TO IDENTIFY THE ROUTE CAUSE OF PROBLEM, THE MECHANISM BY WHICH THE COLOUR CHANGE MOST LIKELY OCCURS AND IDENTIFY A COST EFFECTIVE WAY TO MINIMISE THE EFFECTS OF THE PROBLEM, WITHOUT ADVERSELY EFFECTING OTHER FILM PROPERTIES.

2) IDENTIFICATION OF THE PROBLEM

FROM MID 1994 TO MID 1995 THE AUTHOR WAS INVOLVED WITH 12 CASES OF "PREMATURE" COLOUR CHANGE/CHALKING WITH THE 2 PREMIUM ACRYLIC ROOFPAINTE RANGES OFFERED BY ONE OF THE LARGER SOUTHERN AFRICAN COATINGS COMPANIES, WITH WHOM HE WORKED AT THE TIME. AT FIRST THERE SEEMED TO BE NO PATTERN TO THE PROBLEM ROOFS, AS THEY INVOLVED DIFFERENT AREAS OF THE COUNTRY, DIFFERENT BATCHES, COLOURS (ALL DARK COLOURS) AND THE TWO PRODUCTS INVOLVED, WERE AT DIFFERENT PVCS AND ON DIFFERENT LATEX TYPES. ALSO ACCELERATED WEATHERING (QUV/XENON ARC) OF THE PRODUCTS, BATCHES INVOLVED COULD NOT DUPLICATE THE SAME EFFECT.

ONE OF THE AUTHOR'S MAJORS AT UNIVERSITY WAS ENVIROMENTAL CHEMISTRY AND THE EFFECTS ON BIOLOGICAL MATERIALS, CAUSED BY POLLUTION. HE WAS THEREFORE VERY INTERESTED IN TRYING TO ESTABLISH A PATTERN TO THE INCIDENTS. BY PLOTING THE INCIDENTS ON A MAP OF SOUTH AFRICA HE BEGAN TO SEE THAT THE MAJORITY OF THE REPORTED CASES WERE SITUATED IN THE GAUTENG, MPUMLANGA REGIONS DIRECTLY TO THE EAST OF JOBURG. WITH A SMALLER NUMBER OCCURRING IN A SPECIFIC AREA OF THE WESTERN CAPE, TO

THE WEST OF MOSSEL BAY AND INNORTHERN NATAL IN THE RICHARDS BAY AREA FROM ENQUIRIES MADE WITH THE LOCAL AUTHORITIES IT WAS UNCOVERED THAT ALL OF THE AREAS, WHERE PREMATURE COLOUR CHANGE

HAD TAKEN PLACE WERE DOWNWIND OF SOURCES OF AIRBORNE POLLUTION (EG POWERSTATIONS, COALMINES, OIL, GAS REFINERIES AND ACID PLANTS ETC). ON IDENTIFYING THIS PATTERN WE BEGAN TO INVESTIGATE THE PREMATURE COLOUR CHANGE SITES MORE CLOSELY. THE AUTHOR OR HIS TEAM VISITED 9 OUT THE 12 SITES (3 HAD ALREADY BEEN REPAINTED DUE TO PRESSURE FROM THE ASSET OWNERS, THEY LATER WERE FOUND TO SHOW THE SAME SYMPTOMS) AND FOUND THE FOLLOWING PATTERN:

- A) ALL THE ROOFS HAD GONE "LIGHTER, WHITER" IN COLOUR- AS YOU WOULD NORMALLY EXPECT WHEN CHALKING TAKES PLACE-HOWEVER NO "CHALK" COULD WIPED OR WASHED OFF WITH WATER (EVEN WITH HIGH PRESSURE WASHING).
- B) IF THE EFFECTED AREA WAS WASHED WITH A DILUTE ACID (ACETIC (VINEGAR) OR HYDROCHLORIC) THE ROOFPAIN'T'S COLOUR WAS RETURNED TO THE ORIGINAL ONE.HOWEVER THE "LIGHTER" COLOUR WAS FOUND TO RETURN AFTER APPROX 6-8 WEEKS).
- C) WE EXAMINED THE COLOUR CHANGE UNDER A MICROSCOPE AND FOUND IT TO CONSIST OF A WHITE CRYSTALLINE POWDER, THAT WAS NOT TAP WATER SOLUBLE, BUT READILY SOLUBLE IN DILUTE ACIDS.

FROM ALL THIS EVIDENCE AND HIS TRAINING THE AUTHOR BEGAN TO BELIEVE THAT THE OBSERVED COLOUR CHANGE WAS BEING CAUSED BY SOME SORT OF AIRBORNE ACIDIC COMPOUND ATTACKING, INTERACTING WITH ONE OF THE MAJOR COMPONENTS IN THE PAINT FILM.THIS AIRBORNE ACID WAS MORE THAN LIKELY AN AIR OR RAIN BORNE POLLUTANT.THE INVESTIGATION THEN SPLIT INTO TWO DISTINCT PORTIONS- A) WHAT THE AIR/WATER BORNE POLLUTANTS AND HOW DID THEY COME IN CONTACT WITH THE PAINT FILM AND B) WHAT EXACTLY WAS THIS POLLUTANT ATTACKING, INTERACTING WITH IN THE PAINT FILM.

3) ACIDIC AIRBORNE POLLUTION-AN OVERVIEW

STARTING IN THE LATE 1950'S, EARLY 1960'S EUROPEAN AND AMERICAN SCIENTISTS BEGAN TO GATHER EVIDENCE THAT INDUSTRIAL AIRBORNE POLLUTION WAS HAVING A DETRIMENTAL EFFECT ON THE ENVIROMENT AROUND INDUSTRIAL AREAS.FLORA AND FAUNA WERE DEFINITELY BEING ADVERSLY EFFECTED AND IN EUROPEA SOME MEDIEVAL LIMESTONE BUILDING, WHICH WERE CLOSE TO INDUSTRIAL AREAS, SHOWED DISTINCT ACID ATTACK. BY THE EARLY 1980'S IT WAS BEGINNING TO BE EVIDENT THAT SUCH EFFECTS WERE NOT LIMITED TO EUROPE OR NORTH AMERICA, BUT THEY WERE BEGINNING TO BE SEEN HERE IN SOUTH AFRICA IN THE MORE INDUSTRIALISED REGIONS (GAUTENG). ESCOM-THE SOUTH AFRICAN GOVERNMENT CONTROLLED ELECTRICITY PROVIDER BEGAN TO CARRY OUT AN INDEPTH STUDY INTO THIS SUBJECT WHICH LASTED OVER 7 YEARS.THE TEAM INVOLVED ISSUED MANY PAPERS ON THIS SUBJECT, WHICH ARE FASCINATING READING FOR ANYBODY INTERESTED IN SUBJECT. HOWEVER THE AMOUNT OF INFORMATION GIVEN IN THESE PAPERS IS FAR TOO MUCH TO PRESENT IN A PAPER LIKE THIS, SO OUTLINED BELOW IS A CONDENSED SUMMARY OF THEIR FINDINGS:

- A) ACIDIC AIRBORNE POLLUTION CAN INTERACT, COME IN CONTACT WITH SUBSTRATES BY 3 DISTINCT MECHANISMS- ACID RAIN, DRY DEPOSITION AND ACID MIST.
- B) ACID RAIN OR WET DEPOSITION-THE BIGGEST SOURCES OF ACID RAIN IN RSA ARE THE BURNING OF THE BIOMASS, WHICH CAUSES THE PRESENCE OF ORGANIC

ACIDS IN THE RAIN (IN THE NORTHERN PROVINCE, WHERE INDUSTRIAL POLLUTION IS LIGHT THE RAIN WATER STILL HAS A LOW PH OF 4.5) AND THE BURNING OF FOSSIL FUELS IN INDUSTRIAL MANUFACTURING SITES AND ELECTRICITY GENERATION. THE LATTER EMIT LARGE AMOUNTS OF SULPHUR DIOXIDE, SUSPENDED PARTICULATE AND NITRIC OXIDE. THESE MATERIALS ARE THEN TRANSPORTED BY THE WINDS-SOMETIMES VERY LONG DISTANCES. THEY ALSO FORM SECONDARY POLLUTANTS SUCH AS NITROGEN DIOXIDE, NITRIC ACID VAPOUR AND DROPLETS OF VAPOUR CONTAINING SOLUTIONS OF SULPHURIC ACID AND SULPHATE, NITRATE. THESE VAPOUR DROPS THE FORM RAIN CLOUDS WHICH CAUSE ACIDIC RAIN (PH AS LOW AS 4.2 HAVE BEEN MEASURED IN GAUTENG, MPUMALANGA) TO FALL ON THE LOCAL ENVIROMENT, ALLOWING THE ACIDIC COMPONENTS TO INTERACT WITH THE PLANTS, SOIL AND IN THE CASE OF COATED ROOFS THE PAINT.

- C) DRY DEPOSITION- COMES FROM EXACTLY THE SAME SOURCES AS ACID RAIN BUT COMES IN CONTACT WITH THE ENVIROMENT IN A DRY FORM, WHICH THEN INTERACTS AND LEAVES A DEPOSIT. IN EUROPE, NORTH AMERICA THIS PROCESS DOMINATES VERY CLOSE TO SOURCES OF ACIDIC EMISSION, WHEREAS WET DEPOSITION DOMINATES AS THE DISTANCE FROM THE POLLUTION SOURCE INCREASES. HERE IN SOUTH AFRICA, ESPECIALLY IN THE VERY DRY INTERIOR (GAUTENG, MPUMALANGA) AND WINTER MONTHS, DRY DEPOSITION IS THOUGHT TO PROBABLY BE THE MAIN SOURCE OF THIS TYPE OF POLLUTION. HOWEVER DRY DEPOSITION MEASUREMENTS ARE VERY EXPENSIVE AND TO DATE NO ACCURATE DATA IS AVAILABLE. BUT SOME RESEARCHERS FEEL THAT DRY DEPOSITION COULD ACCOUNT FOR AT LEAST 60 % OF THE OBSERVED PROBLEMS.
- D) MIST DEPOSITION-ALSO KNOWN AS OROGRAPHIC CLOUD, FOG OR OCCULT PRECIPITATION IS KNOWN TO CONTAIN MUCH HIGHER LEVELS OF DISSOLVED CHEMICALS (UPTO TWICE AS MUCH SULPHATE AND UPTO 4 TIMES AS MUCH NITRATE AS "NORMAL" ACID RAIN) AND BE FAR MORE ACIDIC THAN NORMAL ACID RAIN. ESCOM'S RESULTS, ALTHOUGH NOT CONCLUSIVE INDICATE THAT MIST DEPOSITION COULD DOMINATE THE ACIDIC ATTACK PROCESS IN SOME AREAS LIKE THE MPUMALANGA ESCARPMENT OR THE CAPE SOUTH COAST WHERE FOGS AND MISTS ARE REGULAR OCCURRANCES DURING CERTAIN PERIODS OF THE YEAR.
- E) ALTHOUGH ESCOM THINK THAT FAR MORE MEASUREMENT WORK HAS TO BE CARRIED OUT BEFORE ANY TOTALLY VALID CONCLUSIONS CAN BE DRAWN. THEY FEEL THAT ACIDIC AIR BORNE POLLUTION IS POTENTIALLY A MAJOR PROBLEM IN CERTAIN AREAS OF SOUTH AFRICA-ESPECIALLY IN EASTERN GAUTENG, RICHARDS AND MPUMALANGA.

4) IDENTIFICATION OF WHICH OF THE PAINT COMPONENTS IS BEING ATTACKED BY THE AIRBORNE ACIDIC POLLUTION

AS A GOOD GENERALISATION IT CAN BE SAID THAT MOST ACRYLIC ROOF PAINTS ARE FOUND IN THE PVC BAND 30-50%, WITH A VOLUME SOLIDS OF BETWEEN 30-40 %. IN THE LOWER PVC (30-40%) RANGE PURE ACRYLIC AND VA-VEOVA POLYMER DOMINATE, WHEREAS TOWARDS UPPER THE PVC LIMIT (50%) PURE OR STYRENE ACRYLIC POLYMERS DOMINATE. THE PIGMENTATIONS ARE NORMALLY VERY SIMILAR WITH IRON OXIDES DOMINATING ALL BUT THE FASHION COLOURS. THE MAIN EXTENDERS USED ARE CALCIUM CARBONATES, TALCS, MICAS AND CLAYS- WITH 5/10 AVERAGE PARTICLE SIZE CALCIUM CARBONATES DOMINATING (WITH LEVELS AS HIGH AS 400-500 G/L BEING USED. ALTHOUGH DIFFERENT DISPESING, WETTING, BIOCIDES, DEFOAMERS AND THICKENERS TYPES ARE USED THESE COMPONENTS ONLY ACCOUNT FOR LESS THAN 1% OF THE TOTAL DRY PAINT FILM AND WERE THEREFORE THOUGHT UNLIKELY TO BE THE MAIN MATERIALS INTERACTING WITH THE AIRBORNE ACIDIC POLLUTION AND CAUSING THE OBSERVED CRYSTALS/ COLOUR CHANGE. ALTHOUGH IT HAS BEEN PROVEN OVERSEAS THAT EXCESSIVELY HIGH LEVELS OF CERTAIN DISPERSANTS CAN CONTRIBUTE TO THE

PROBLEM IT HAS NEVER BEEN PROVEN THAT IT IS A DOMINATING FACTOR HERE IN SOUTHERN AFRICA.

THE AUTHOR AND HIS TEAM THEN DEVELOPED A QUICK LAB TEST USING PAINTED TILES WITH WAX SEALED PLASTIC RINGS ATTACHED TO THEM AND 5% SULPHURIC ACID. WHICH GAVE SIMILAR RESULTS TO WHAT WAS SEEN IN THE FIELD BUT IN ABOUT 3-5 DAYS NOT 3-6 MONTHS. USING THIS TEST WE COULD NOT REALLY PICK UP ANY DIFFERENCE IN THE OBSERVED SURFACE COLOUR CHANGE, WHITE CRYSTAL FORMATION WHEN PAINTS AT THE SAME PVC (40%) ON A WHOLE RANGE OF DIFFERENT LATEX TYPES WERE EXPOSED IN OUR TEST. WE DID PICK UP A SLIGHT DIFFERENCE WHEN WE CHOSE ONE LATEX TYPE (PURE ACRYLIC) AND VARIED THE PVC LEVEL (KEEPING VOLUME SOLIDS CONSTANT). BY INCREASING THE 5 MICRON CALCIUM CARBONATE LEVEL (FROM 30 TO 50 % IN 5% INCREMENTS). THE HIGHER PVC, CALCIUM CARBONATE LEVELS SHOWED SLIGHTLY MORE CRYSTALS, IN A SHORTER TIME. AT THIS POINT WE WERE NOT 100% CERTAIN WHETHER OR NOT THE

PROBLEM WAS PVC OR EXTENDER RELATED. WE THEN DECIDED TO SEE IF WE COULD MAKE UP A PAINT SERIES (VARING THE PVC BETWEEN 30-50%) ON DIFFERENT, MORE INERT EXTENDER. WE CHOSE MICROBARYTES, AS BARYTES HAS BEEN USED FOR MANY YEARS TO INCREASE THE SOLIDS OF ALKYD BASE ROOF PAINTS, STOP GLOSS LOSS.

WE ALSO HAD AN EXAMPLE WHERE SUCH AN ALKYD ROOF PAINT HAD SHOWN NO COLOUR CHANGE, CRYSTAL FORMATION, WHEREAS A ROOF PAINTED IN THE CALCIUM CARBONATE CONTAINING ACRYLIC ROOF, WHICH WAS WITHIN 10 METRES OF THE ALKYD ROOF PAINT (IN SIMILAR COLOURS) DID SHOW A COLOUR CHANGE, CRYSTALS. WHEN TESTED USING OUR TEST NONE OF THE MICROBARYTES CONTAINING PRODUCTS SHOWED THE PROBLEM. WE THEREFORE REASONABLY CONCLUDED THAT THE CALCIUM CARBONATE IS THE COMPONENT WHICH IS ATTACKED BY THE ACID SPECIES. WE THINK THAT THE MECHANISM IS PROBABLY AS FOLLOWS:

A) IT HAS BEEN PROVEN IN EXTENSIVE LOCAL AND OVERSEAS EXPOSURE SERIES THAT A WELL BOUND LATEX BASED PAINT (AT A PVC BELOW CPVC (CPVC IS NORMALLY BETWEEN 55-60% FOR MOST LATICES)) HAS A VERY THIN (MUCH LESS THAN 1 MICRON IN THICKNESS) LATEX LAYER AT THE AIR COATING LAYER INTERFACE. WITHIN THE FIRST 2-3 MONTHS OF EXPOSURE TO THE ELEMENTS THIS VERY THIN LATEX LAYER HAS "WORN" AWAY, EXPOSING THE WELL BOUND EXTENDERS, PIGMENTS LAYER TO THE ELEMENTS.

B) THE THREE TYPES OF ACID DEPOSITION THEN COME IN CONTACT WITH THE THE WELLBOUND EXTENDER, PIGMENT LAYER AND THE ACIDIC GROUPS (BOTH IN ORGANIC AND ORGANIC ACIDS) START TO CHEMICALLY INTERACT WITH THE CARBONATE GROUPS PRESENT IN THE FILM CAUSING THE FORMATION OF "SALTS" IN, ON THE FILM THESE "SALTS" ARE NOT ONLY WHITE IN COLOUR, BUT ALSO ARE NOT NORMALLY SOLUBLE IN NEUTRAL, OR SLIGHTLY AKALINE WATER.

C) AT FIRST THE PRESENCE OF THESE SALTS IS NOT REALLY AT A HIGH LEVEL AND THEREFORE NOT REALLY NOTICABLE, BUT AS THE ACIDIC POLLUTANT DEPOSITION, INTERACTION PROCESS CONTINUES TO OCCUR THE "SALT" CRYSTALS BECOME MORE NUMEROUS, OBVIOUS AND THE WHOLE FILM LOOKS TO HAVE FADED, "CHALKED" GONE LIGHTER IN COLOUR.

D) AS THESE SALTS ARE NOT REALLY WATER SOLUBLE WASHING THE FILM, EVEN WITH HIGH PRESSURE WATER HOSES DOES NOT REMOVE THEM, HOWEVER DECREASING THE WATER PH WITH DILUTE ACID, SOLUBLISES THE CRYSTALS AND ALLOWS THEM TO BE WASHED FROM THE FILM. GIVING RISE TO THE "ORIGINAL" COLOUR BEING OBSERVED.

E) THEN IF ACIDIC POLLUTANT DEPOSITION CONTINUES THE CRYSTALS REAPPEAR.

SO NOW WE KNEW HOW THE COLOUR CHANGE OCCURED AND WHAT THE COMPONENT WAS THAT WAS BEING INTERACTED WITH, BY THE AIRBORNE ACIDIC POLLUTANTS. THE PROBLEM THEN BECAME ONE OF HOW DID WE MINIMISE THE PROBLEM IN THE MOST COST EFFECTIVE MANNER.

5) COST, PROPERTY EFFECTIVE SOLUTIONS

FROM THE ABOVE SECTIONS IT IS VERY OBVIOUS THAT TO MINIMISE THE CHANCE OF AIRBORNE ACIDIC POLLUTANT ATTACK ON A WATERBORNE ACRYLIC ROOFPAIN, IN AN AREA WHERE AIRBORNE ACIDIC POLLUTION IS KNOWN, OR THOUGHT TO OCCUR, WE NEEDED TO MINIMISE THE CALCIUM CARBONATE OR MAGNESIUM CARBONATE LEVEL IN THE FILM AND REPLACE IT BY A MORE ACIDICALLY INERT EXTENDER.THE PROBLEM WAS TO IDENTIFY THE MOST COST, PROPERTY EFFECTIVE EXTENDER TO USE.

USING OUR ACCELERATED ACID ATTACK TEST METHOD AND QUV (ACCELERATED WEATHERING, HUMIDITY TEST) WE STARTED TO EVALUATE VARIOUS ACIDICLY INERT EXTENDERS IN OUR ACRYLIC ROOF FORMULATION OUR FINDINGS WERE AS FOLLOWS:

NB IN ALL CASES THE CARBONATES WERE REPLACED TOTALLY ON A VOLUME SOLIDS BASIS BY THE EXTENDER UNDER TEST AND THEN THE PAINT PIGMENT LOADINGS WERE ADJUSTED SO THAT EQUAL COLOUR, OPACITIES TO THE ORIGINAL CARBONATE BASED COLOURS.

A) KOALIN, CHINA CLAY

GAVE NO COLOUR CHANGE, CRYSTALS WITH THE ACCELERATED ACID TEST BUT FILM CHECKING, CRACKING UNDER THE ACCERATED WEATHERING TEST.ALSO THE PAINT VISCOSITY WAS TOO HIGH TO APPLY EVEN WHEN MOST OF THE THICKENER WAS REMOVED.

B) MICA 325

AGAIN NO COLOUR CHANGE, CRYSTAL FORMATION WAS OBSERVED IN THE ACID TEST BUT SLIGHT CRACKING WAS OBSERVED IN THE ACCELERATED WEATHERING TEST.ALSO COLOUR MATCHING WAS FOUND TO MORE DIFFICULT AND COST WAS AN ISSUE.

C) FINE WHITE TALC

THE RESULTS WERE VERY SIMILAR TO MICA ACCEPT COLUR MATCHING WAS EASIER BUT THE COSTS HIGHER.

D) MICROBAYRTES

NO PROBLEMS WITH EITHER OF THE TESTS WAS OBSERVED.HOWEVER THE FINAL PAINT COST INCREASED TO ABOVE THAT, THAT WAS THOUGHT TO BE ACCEPTABLE BY THE MARKET PLACE.

E) MILLED FELDSPAR

AGAIN THIS EXTENDER GAVE NO PROBLEMS IN EITHER OF THE TESTS.ITS COSTS WERE ALSO FOUND TO BE ACCEPTABLE.THESE RESULTS WERE THEN PRESENTED TO HIGHER MANAGEMENT, WHO ACCEPTED BUT WERE VERY DUBIOUS THAT THIS FELDSPAR CONTAINING PRODUCT WOULD PERFORM ACCEPTABLY IN A PRACTICAL

TEST IN A SIDE BY SIDE TEST IN AN AREA WHERE THE PROBLEM WAS NOT ONLY KNOWN TO OCCUR BUT ALSO ACTUAL COMPLAINTS HAD BEEN RECEIVED.TWO SITES WERE CHOSEN ONE IN THE SOUTHERN CAPE, ONE IN THE EASTERN TRANSVAAL. THE TWO SITES WERE MONITORED CLOSELY-AFTER 3-4 MONTHS THE CARBONATE CONTAINING CONTROLS WERE SHOWING COLOUR CHANGE, CRYSTAL FORMATION. WHEREAS THE FELDSPAR CONTAINING VARIANTS WERE STILL UNCHANGED AFTER OVER 12 MONTHS.IN VIEW OF THESE RESULTS A FINAL DECISION WAS MADE TO CHANGE THE ACRYLIC ROOF PRODUCT PERMENANTLY ON TO FELDSPAR-THAT WAS OVER TWO YEARS AGO AND AS FAR AS THE AUTHOR KNOWS NO FURTHER INSTANCES OF COLOUR CHANGE CRYSTAL FORMATION HAVE BEEN REPORTED.SEVERAL MPUMALANGA, GAUTENG BASED COATINGS COMPANIES HAVE ALSO SUCCESSFULLY LAUNCHED FELDSPAR CONTAINING ROOFPAINTS WHICH HAVE ALSO GIVEN GOOD PRACTICAL RESULTS.

6) CONCLUSIONS

- 1) AIR BORNE ACID POLLUTANTS DEFINITELY ARE AT WORK IN CERTAIN AREAS OF SOUTHERN AFRICA, GIVING RISE TO COATINGS COLOUR CHANGE AND CRYSTAL FORMATION.
- 2) BY STUDYING THE PROBLEM IN GREAT DETAIL NOT ONLY WAS THE CAUSE IDENTIFIED BUT SO WAS THE MECHANISM OF ATTACK AND THE MOST COST. PROPERTY EFFECTIVE WAY TO MINIMISE THE PROBLEM.
- 3) FELDSPAR CONTAINING PAINTS HAVE BEEN PRACTICALLY SHOWN TO OVERCOME THE PROBLEM.

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