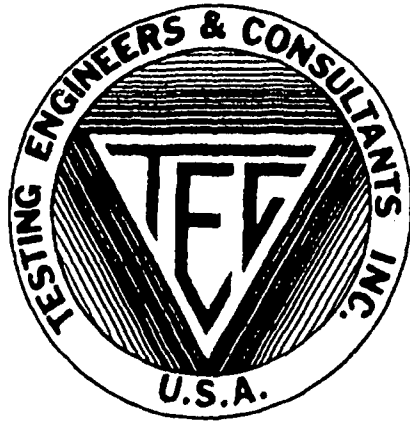
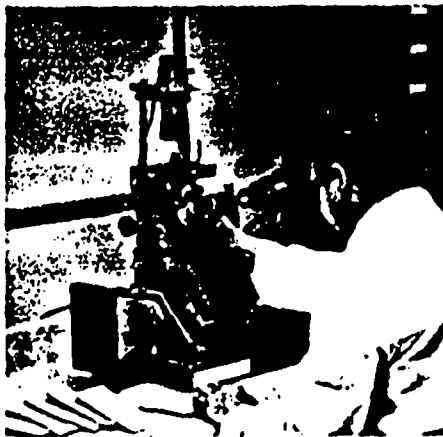
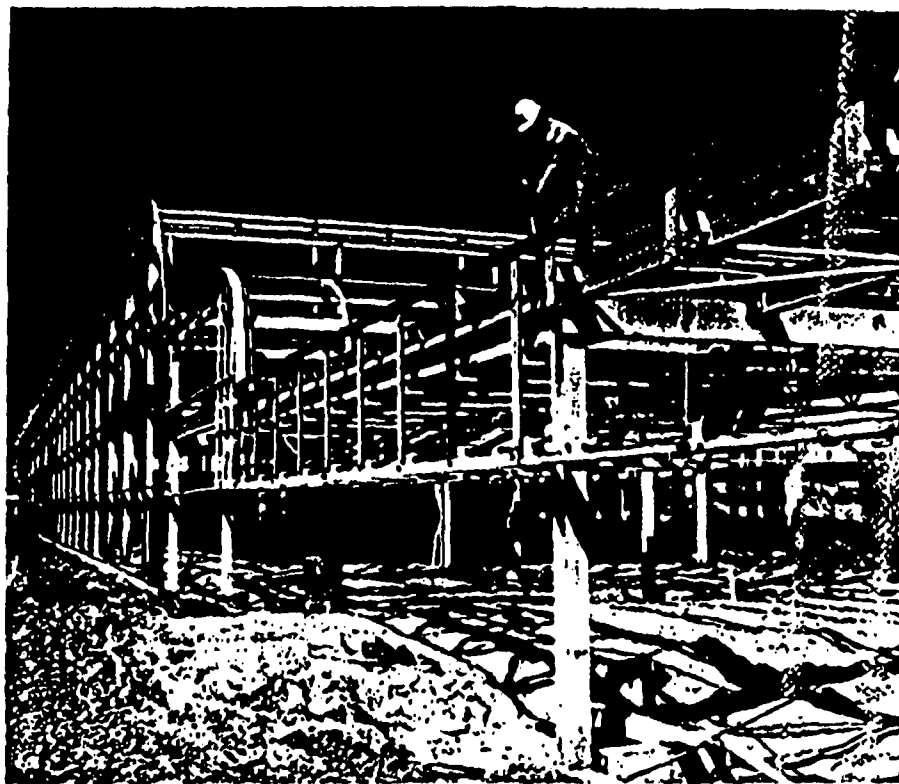
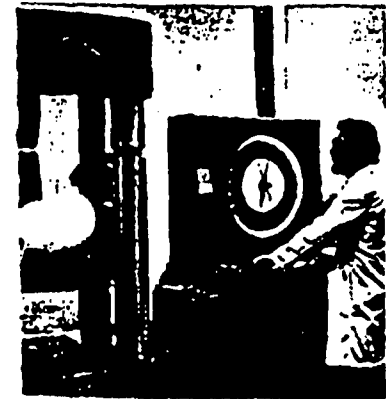
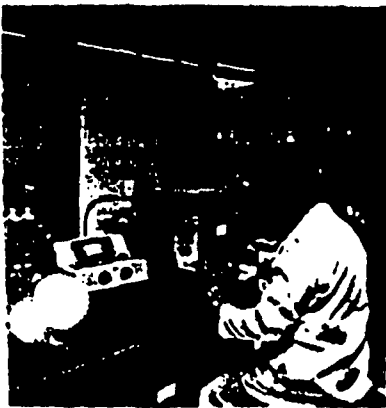




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John Banicki, P.E.
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REQUIREMENT FOR FORMALDEHYDE VAPOR LEVEL ANALYSIS IN RESIDENTIAL AND COMMERCIAL BUILDINGS

The emission of formaldehyde vapors from urea-formaldehyde foam insulation (UFFI) has become a volatile subject since medical research has shown the vapor is linked to certain types of cancer and health problems. As you may be aware the Seller Must Disclose the type of insulation used in the building. Contractual modifications are now needed for the sales of houses and buildings where UFFI has been applied.

Our experience has shown that buildings containing UFFI may have formaldehyde level ranges from ambient levels (0.02 ppm) to high levels (5.0 ppm). However, even though urea formaldehyde foam insulation may have been used, our analysis may show low levels of vapors which may not require remedial action.

TESTING ENGINEERS AND CONSULTANTS, INC. provides environmental testing services to residential, commercial, and industrial concerns for formaldehyde vapor levels as well as other chemical parameters. Our test methods for formaldehyde vapors are recognized by the CONSUMER PRODUCT SAFETY COMMISSION as their method of choice.

Additional support services are provided for the inspection of wall cavities for presence of UFFI using a boroscopic method, as well as insulation material identification by chemical and infrared spectroscopic analysis.

If you or your clients have a need for atmospheric formaldehyde analysis, inspection of residences for the presence of UFFI, or insulation material identification, please feel free to call on us at your earliest convenience. We can provide this analysis economically and without delay.

Contact Person: David W. Byrd
Organic Chemist



CONSULTING ENGINEERS & FULL-SERVICE PROFESSIONAL TESTING AND INSPECTION



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FACT SHEET ON FORMALDEHYDE

What is formaldehyde?

Formaldehyde (HCHO) is a colorless gas which has a pungent, irritating odor. Formaldehyde has traditionally been used as a constituent in products such as embalming fluids, fungicides, and bactericides. It is also used to produce other chemicals and resins.

What products can emit formaldehyde?

Formaldehyde may be released from urea-formaldehyde foam insulation (UFFI), some particle board, chip board, plywood, and wood paneling. Formaldehyde may also be released from carpeting, curtains, and permanent press fabrics. Some other common household products that may contain formaldehyde are cosmetics, deodorants, detergents, paints, and paper products. Cigarette smoke also contains formaldehyde.

Why is there a concern about formaldehyde?

Human exposure to formaldehyde in the air represents a potential for health problems such as eye, nose, and throat irritation; coughing; shortness of breath; skin rash or irritation; nausea; vomiting; headaches; dizziness; nosebleeds; and asthma and flu-like symptoms. The severity of the human reaction to formaldehyde depends on the exposure concentration, the duration of the exposure, and the sensitivity of the individual. A single exposure may not cause a reaction; however, repeated or long-term exposure may increase an individual's sensitivity to the gas. Some people develop acute (short-term) health effects from exposure to formaldehyde. Some people can develop an allergic response to formaldehyde and can become sensitized to it because of long-term exposure at low concentrations. Adverse health effects may be more pronounced in persons already suffering from other allergies, asthma, and respiratory disorders.

The chronic (long-term) effects of human exposure to formaldehyde are still uncertain. Additional federal studies are being conducted to further evaluate the human carcinogenicity of formaldehyde.

What do studies show about exposure to formaldehyde?

An industry sponsored study has found that breathing formaldehyde causes nasal cancer in laboratory animals.¹ While formaldehyde levels in the home are lower than the levels which caused cancer in the study, there is concern about consumer exposure to these low levels. The U.S. Consumer

¹ J.A. Swenberg, W.D. Kerns, R.I. Mitchell, E.J. Gralla and K.L. Pavkov. Induction of Squamous Cell Carcinomas of the Rat Nasal Cavity by Inhalation Exposure to Formaldehyde Vapor. Cancer Research 40:3398-3401, 1980.

Product Safety Commission, in collaboration with the National Toxicology Program, formed a panel of health science experts from various federal agencies to review and analyze currently available data and studies on formaldehyde. This federal panel has concluded that formaldehyde should be presumed to pose a risk of cancer to humans.²

The National Academy of Sciences estimated that less than 20 percent of the healthy adult population will experience adverse effects when exposed to 0.25 parts per million (ppm) or less of formaldehyde, and that age and health variations may increase the frequency and severity of these effects.³

Formaldehyde concentrations of 0.5 ppm and over will usually cause eye irritation.^{4, 5, 6, 7, 8} Some individuals can smell formaldehyde at levels less than 0.5 ppm, but do not necessarily have irritation of the nose or eyes. Individuals who are sensitized to formaldehyde can suffer adverse health effects at levels below those detectable by smell or eye irritation.

Are there any Michigan regulatory home standards for formaldehyde?

Michigan currently has no regulations which set permissible levels of formaldehyde in conventional homes or mobile homes. The U.S. Consumer

²Carry, V.P., L. Oatman, R. Pleuss, and D. Gray (1980) Formaldehyde in the home, environmental disease perspectives, Minnesota Med. 63:107-111.

³Prauss, P.W., Ulsamer, A.G., and Gupta, K.C. (1980) Health Sciences Input for the Regulatory Options for U.F.F.I., U.S. Consumer Product Safety Commission. July 30, 1980.

⁴Miller, R.H., and H.P. Blejer. Report of an Occupational Health Study of Formaldehyde Concentrations at Maximes, 400 E. Colorado Street, Pasadena, California. Study No. S-1838. Los Angeles: State of California Health and Welfare Agency, Department of Public Health, Bureau of Occupational Health, 1966. 5 pp.

⁵Schuck, Z.A., E.R. Stephens, and J.T. Middleton. Eye irritation response at low concentrations of irritants. Arch. Environ. Health 13:570-575, 1966.

⁶Sim, V.M., and R.E. Pattle. Effect of possible smog irritants on human subjects. J. Am. Med. Assoc. 165:1908-1913, 1957.

⁷Walker, J.F. Formaldehyde, pp. 77-99. In A. Standen, Ed. Kirk-Othmer Encyclopedia of Chemical Technology. 2nd rev. ed. Vol. 10. New York: Wiley-Interscience Publishers, 1966.

⁸Zaeva, G.N., I.P. Ulanova, and L.A. Dueva. Materials for revision of the maximal permissible concentrations of formaldehyde in the inside atmosphere of industrial premises. Gig. Tr. Prof. Zabol. 12:16-20, 1968. (in Russian)

Product Safety Commission voted on February 22, 1982, to ban new installations of urea-formaldehyde foam insulation. This ban became effective August 10, 1982.

What do the test results mean?

The presence of formaldehyde is dependent upon several variable environmental conditions such as temperature and humidity and as environmental conditions vary, the amount of formaldehyde present in the home may also vary. The test results only tell you if formaldehyde was present in the home at the time of sampling and at what concentration.

The test results do not tell you the source of the formaldehyde. If the test is positive, the formaldehyde may be from one of several sources previously mentioned. A negative test result indicates that during the sampling period there was no formaldehyde detected at the detection limit.

If formaldehyde is detected in a home, is there a way of reducing or eliminating it?

Individuals experiencing problems or who are concerned about formaldehyde in their home should contact the manufacturer or installer and have them correct the problem. The Michigan Department of Public Health is not aware of any foolproof means of reducing or eliminating formaldehyde in the home. Several different ways of reducing formaldehyde have been reported which include:

1. Remove the urea-formaldehyde foam insulation and/or other sources of formaldehyde.
2. Apply a sealer to the interior wall, paneling, particle board, or plywood surfaces.
3. Increase the ventilation within the home.
4. Introduce tempered air into the home thereby creating a positive air pressure within the dwelling.

Listing of these attempted solutions does not imply endorsement by the Michigan Department of Public Health.

Should a physician be consulted?

When any of the previously noted symptoms are experienced, a physician should be consulted to determine the cause or to advise the patient if the symptoms may be related to formaldehyde exposure. The physician should be made aware of the patient's history of possible exposure to formaldehyde, both at work and at home. If the physician feels the symptoms are consistent with formaldehyde exposure and there is reason to suspect that formaldehyde exposure exists in the home, the physician may determine that testing of the home environment is warranted. The test results should be shared with your physician.



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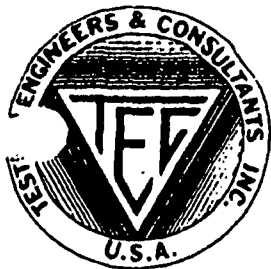
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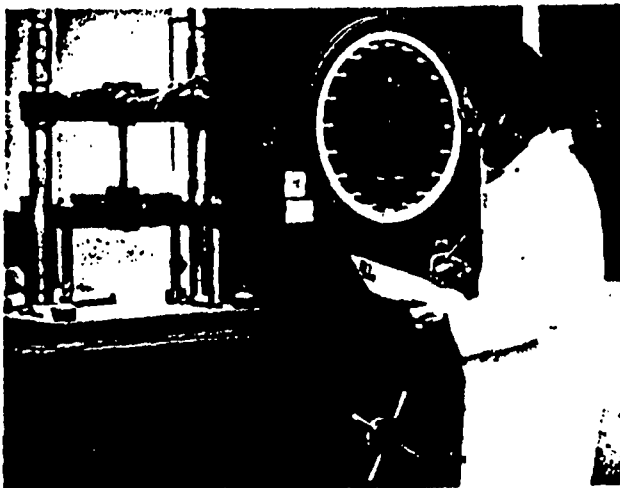
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Steel and Metal Testing Services

Structural analysis of steels and metals can help ward off costly potential problems. Testing Engineers & Consultants maintains complete facilities for any of the following: fabrication and mill inspection and testing, including welder qualifications, weld testing and inspection; field erection inspection of structural steel, including high-tensile bolt testing and weld inspection; non-destructive testing (NDT), including: ultrasonic, X-ray, magnetic particle and dye penetrants; chemical and physical tests on all specification grades of mill products, castings and forgings; testing and inspection of reinforcing steel, including field placement control and laboratory physical tests.



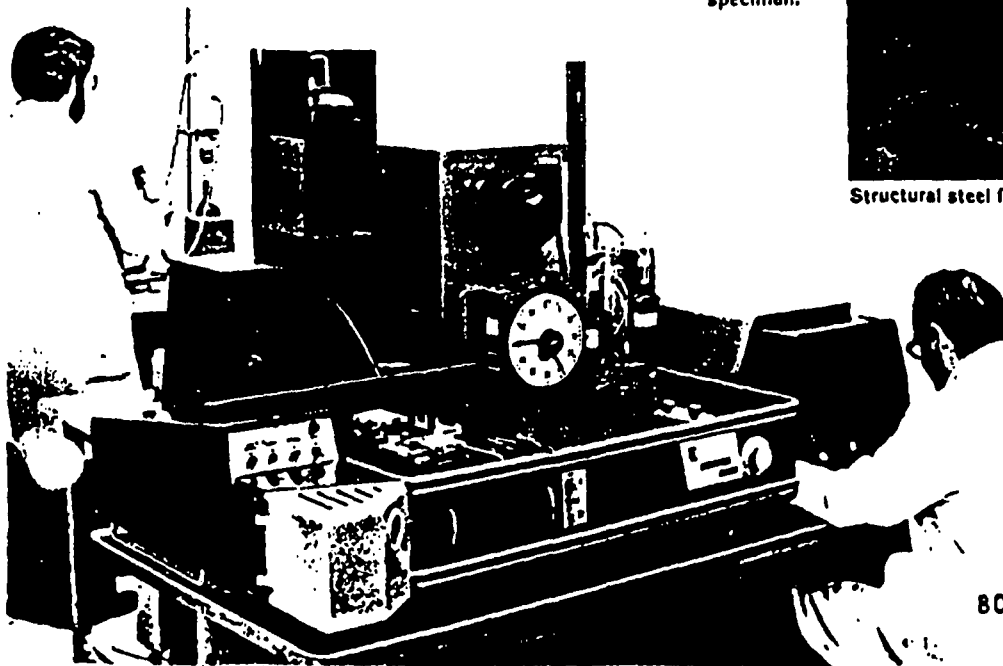
Tensile test of prepared steel specimen.



Ultrasonic analysis of metal castings.



Structural steel fabrication inspection.



Emission spectrographic determines metallic elements by emission spectra.

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Complete Concrete and Asphalt Testing Services



Quality-control testing of concrete and asphalt is a primary function on any construction site. Testing Engineers & Consultants offers a complete range of concrete and asphalt testing services, including: design of mixes; physical and chemical tests of Portland cement; field control tests and field inspection during construction; compression and flexural strength testing; batch plant inspection; diamond core drilling and non-destructive testing and analysis; testing of pre-cast and pre-stressed members; on-site load test; extraction and density testing.

Compression testing of concrete cylinders.



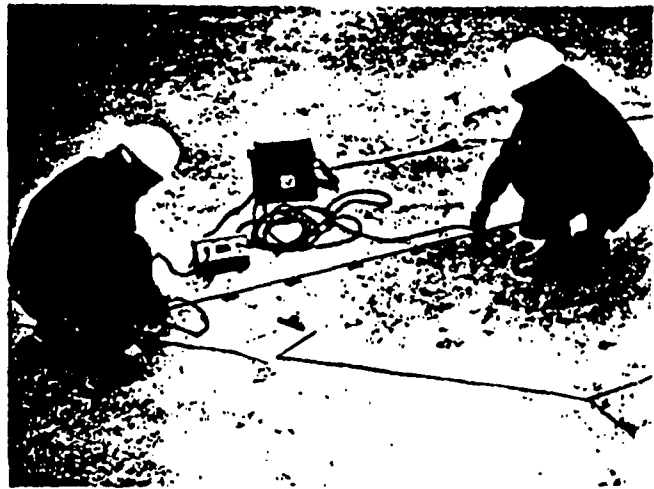
Lab curing of concrete cylinders.



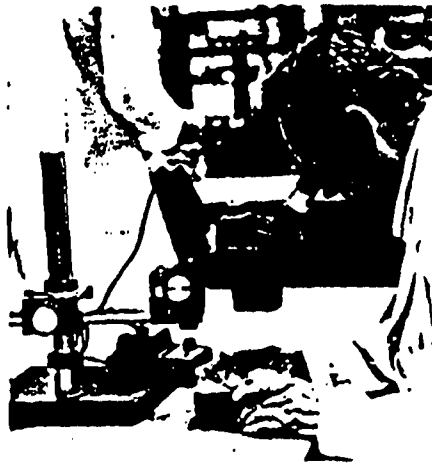
Testing of plastic concrete in the field.



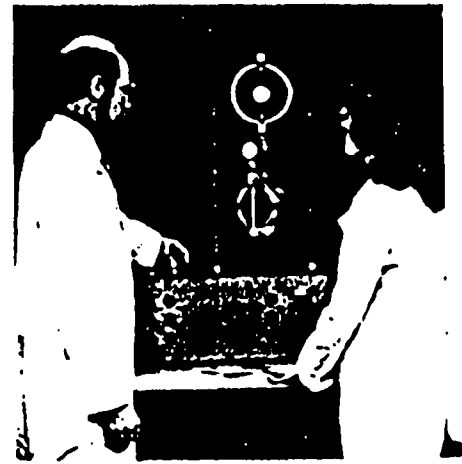
Sonic tests of pavement concrete.



Calibrated Vernier scale determines concrete core length.



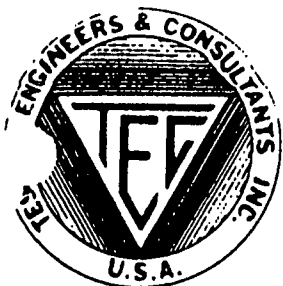
Stereo microscope examination of concrete sample.



Marshall Mix Design tests of bituminous paving mixtures.

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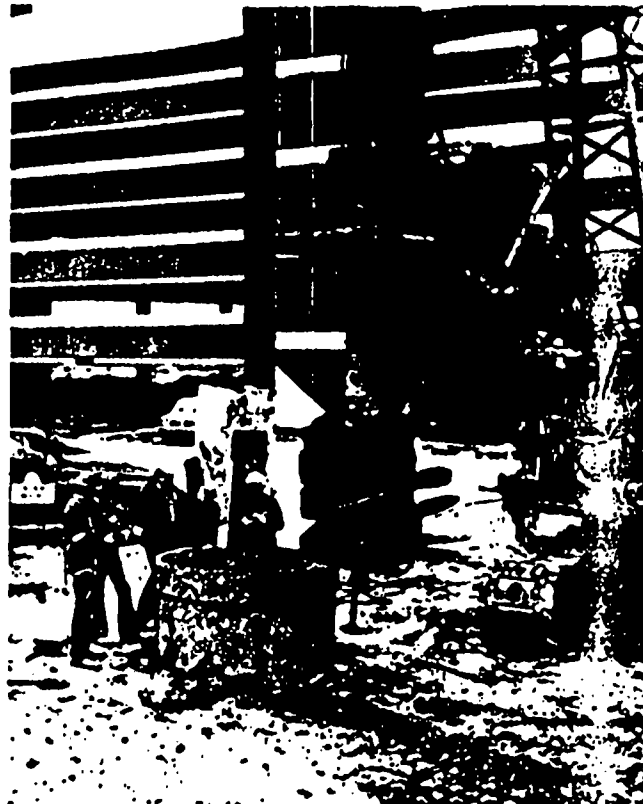
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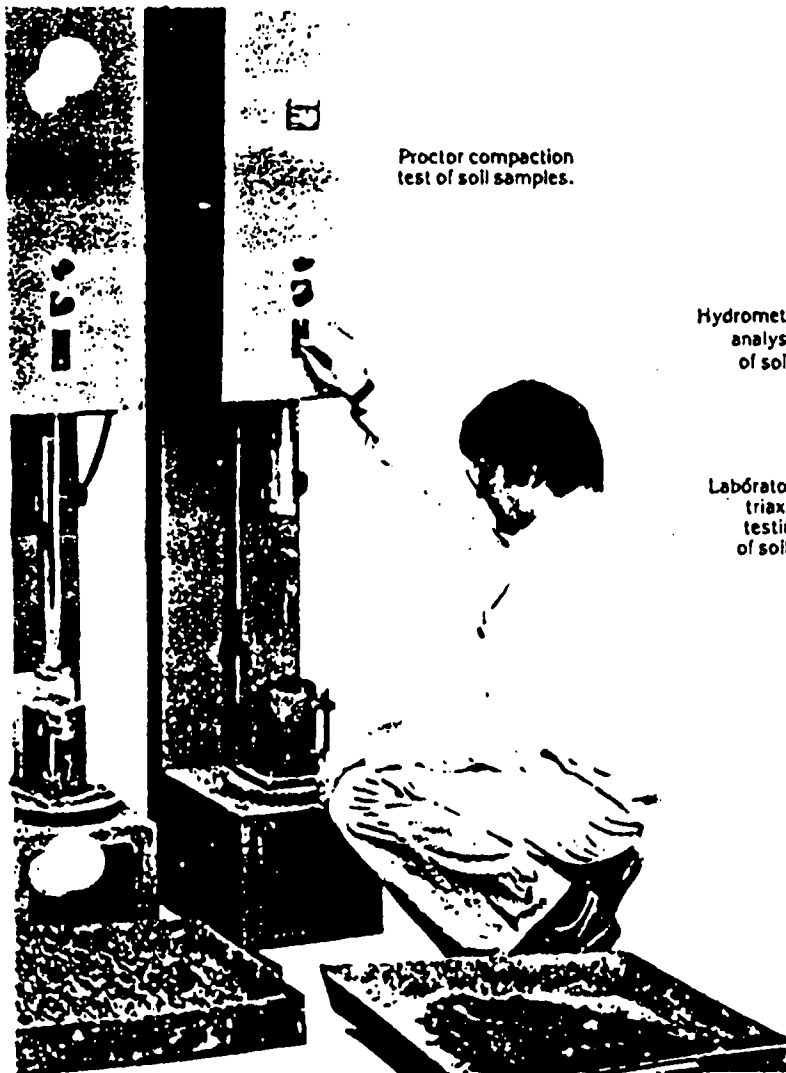
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Soil and foundation testing is a major part in construction development. Testing Engineers & Consultants offers a total soil and foundation testing package, featuring: soil and geotechnical exploratory borings; percolation tests; complete laboratory testing and analysis of soils, including unconfined compressive strength, consolidation, transverse shear, triaxial shear, permeability, compaction and CBR tests; field testing inspection and control of engineered fill, footings, piles, caissons and load tests; field CBR and plate load tests.

Caisson
foundation
inspection.



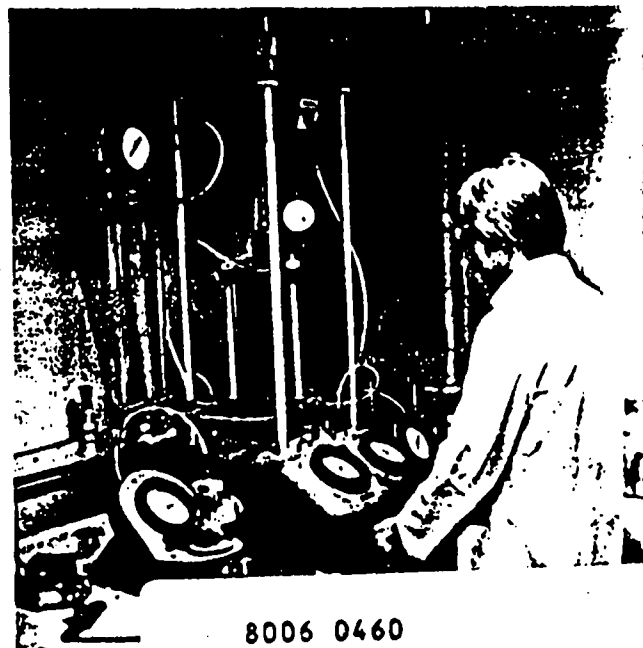
Proctor compaction
test of soil samples.



Hydrometer
analysis
of soils.



Laboratory
triaxial
testing
of soils.



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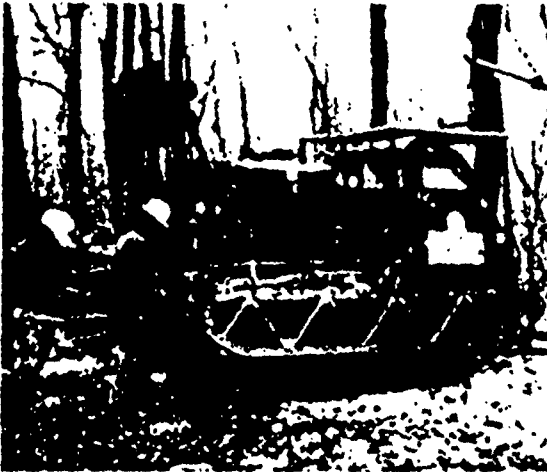
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Exploration at
Michigan State
Capitol building.



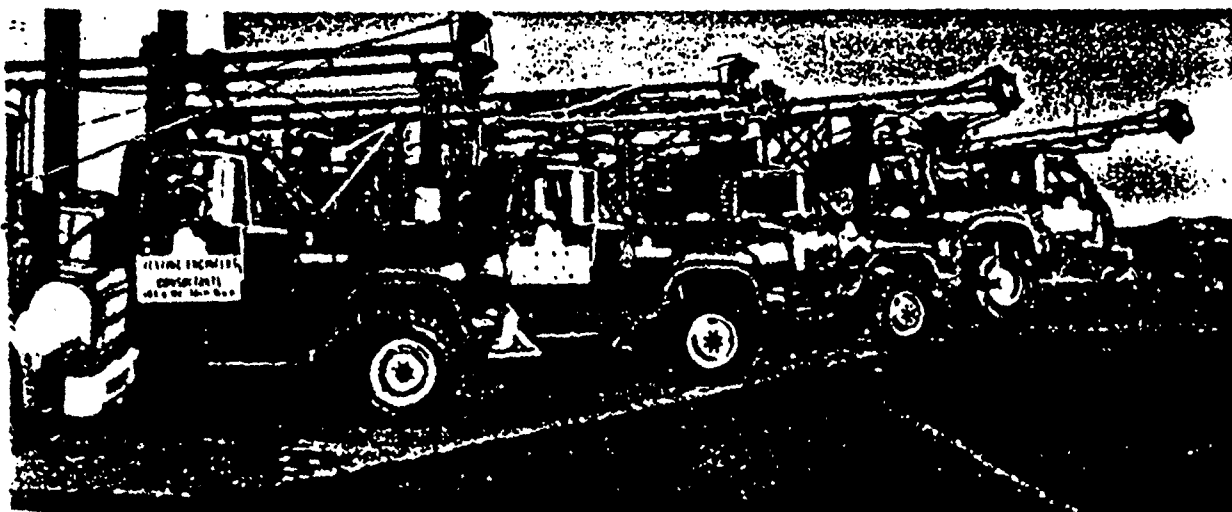
Unconfined
compression
test of
soils.



Track-mounted
drill rig
for
all-terrain
use.



Nuclear
field
density
soil
testing.



Soil
exploration
fleet.

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Testing Engineers & Consultants, Inc., is one of the nation's most established full-service testing firms. Serving architects, engineers, contractors, owners and manufacturers, our total-package services are widely known and respected. Among our vast capabilities are soil exploration, foundation engineering, construction site quality-control, concrete and asphalt testing as well as complete environmental, chemical and physical testing services. Testing equipment is regularly calibrated, traceable to the National Bureau of Standards.

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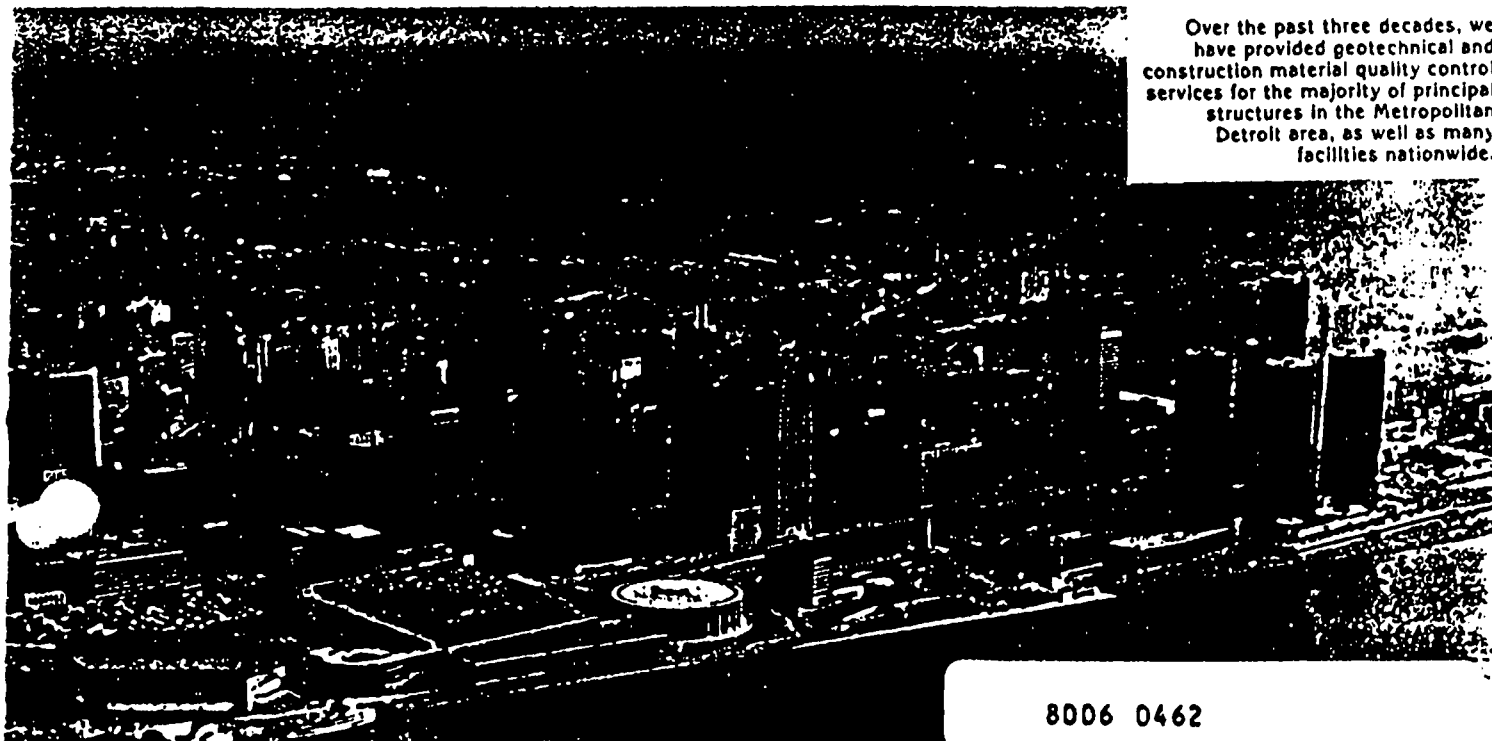
Modern computer compiles and analyzes engineering data.



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Over the past three decades, we have provided geotechnical and construction material quality control services for the majority of principal structures in the Metropolitan Detroit area, as well as many facilities nationwide.

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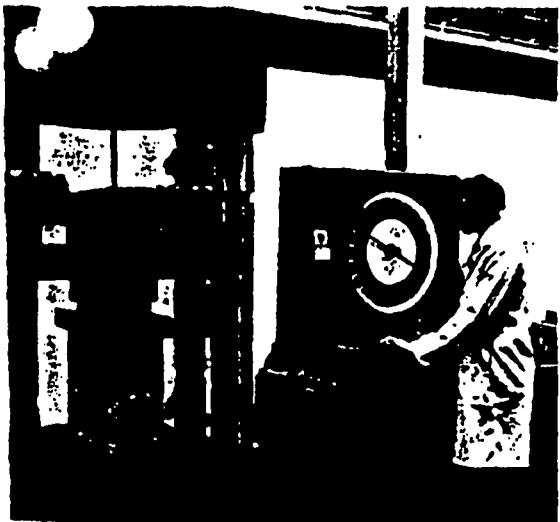
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Complete Environmental, Chemical and Product Testing Services

Environmental services have taken on great importance during recent years. To that end, Testing Engineers & Consultants offers: air, water, soil, noise and thermal pollution sampling, testing, evaluation and consultation; corrosion studies and tests. Our chemical analysis includes: qualitative and quantitative analysis of materials, metals, ores and minerals; spectrographic scans and trace metals analysis. Special testing of products is another function of Testing Engineers & Consultants, a field where we feature: new product research and development; product safety and design verification; load tests on frames, buildings and components; analysis of coatings, sealants and paints.



laboratory analysis of roofing samples.



product testing.



Wet chemical lab sample analysis.

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JOHN BANICKI P.E.
PRESIDENT

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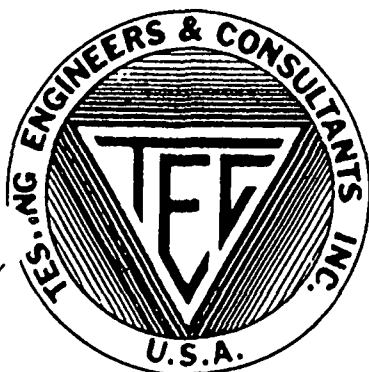
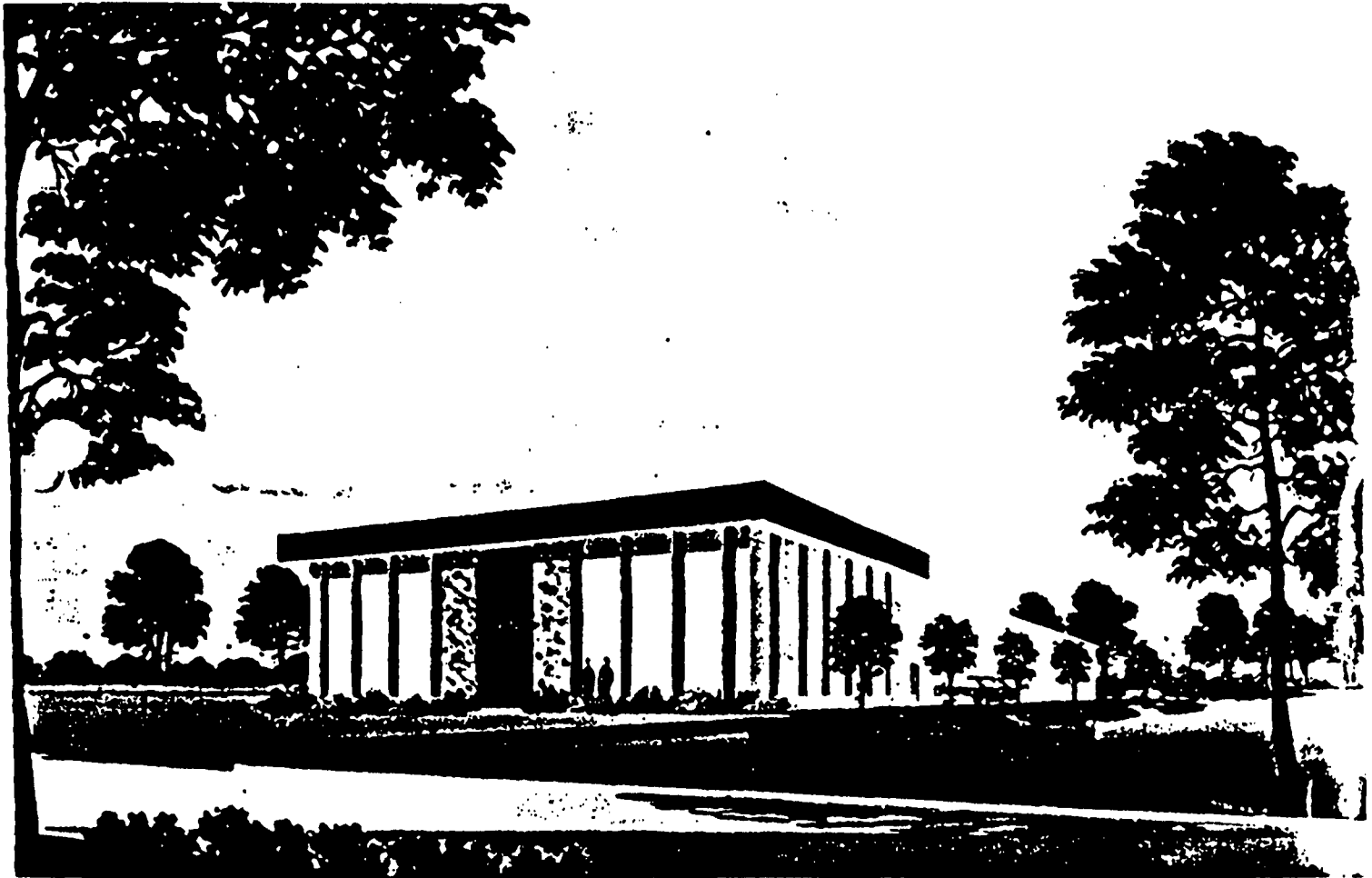
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