



**PDHonline Course G419 (3 PDH)**

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## **Basics on Forensic Engineering - Part II**

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**2020**

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# Basics on Forensic Engineering

## Part II

*Ruben A. Gomez, P.E.*

### 1. Introduction

On Part I we examined the many skills and attributes that are necessary to become a successful forensic engineer. Each one of those listed qualities are indispensable for a rewarding practice, however, none is as important as the factor *experience* in the particular chosen field of endeavor.

Very true that many colleges and universities have made a plausible effort to institute forensic engineering programs geared to form qualified candidates for that field of practice, and they are to be commended for it, unfortunately, experience is not a quality someone can learn in the classroom, nor can it be bought as a prescription pill, it needs to be earned in a hands on engagement.

This author recommends that young engineers out of college, and those with limited experience, say from 0 to 5 years, to abstain from becoming expert witnesses, for this reason: plaintiff's attorneys are a mean and recalcitrant class of people, and if they discover the expert witness as being "green", they will have a joyful day tearing him apart with no mercy. They love to ask questions such as this one: "Mr. Youngblood, I have had the opportunity to read your curriculum vitae and seen you earned your bachelor's degree from the University of Arlington, and after that you earned your master's degree from Camden University, very impressive indeed. Now, Mr. Youngblood, please tell this Court about the experience you have had in similar cases such as the one that brings us here today. From your recollection, how many of those cases have been tried having you as an expert witness?"

The opposing attorney will continue to hammer the witness away until he gets him to admit to his inexperience, and that will mark the beginning of the end for the young novice engineer. By the way, it is important to know that although we have said before that the practicing forensic engineer should treat all and every case as if it was going to land in court, however, statistics show that only about 2 to 3% of those cases will end up being challenged in court. From those few cases some would get settled or withdrawn out of court and only one-third would go to trial. Consequently, for an expert witness to be able to say in Court: "I have in my portfolio 10 cases adjudicated by a judge and/or jury....." he would probably had to handle over a thousand cases altogether.

Given those circumstances, what should a novice do to get established as a practicing forensic engineer with the proper credentials and experience to compete in the open market? The author's recommendation is, whether he is graduated from a forensic engineering program or any other engineering discipline, that his first step be to get a job as an trainee (or engineer-in-training if you would rather call it that way) with an established practitioner and start "learning the ropes" as in any other profession. The second step is to get under the wing of the right mentor who would take him by the hand and walk him through "the small to the large and from the narrow to the wide" until he becomes the man of his dreams.

By the way, there is plenty of work for a novice in a forensic engineering office. Just to mention a few, field data collection, photography, labeling and preservation of evidence, witness

interviews, case analysis, strategy pathways, preliminary reports assembly, proof reading, meeting coordination, and so on.

## 2. SUBROGATION

A large portion of the forensic engineer's case load comes from claims assigned directly or indirectly by the insurance companies, and because of that continuous and permanent relationship with them, it is extremely important for him to know as much as possible of what is going on "behind scenes".

Unknown to the general public is an activity with a constant flow of credits and debits amongst insurance companies which is due to a process called *subrogation*. As a matter of standard procedure, an insurance carrier will proceed to pay a claim and then, if the case warrants it, look for another party who may be the ultimate responsible to pay for the incident or occurrence, to recover the monies which have been already paid out to the claimant.

One common example which brings this principle to the open, is the case of a house fire which may have been started, as determined by the forensic engineer and/or the State Fire Marshal, by a malfunctioning appliance. Under such scenario, the homeowner's insurer would pay the claim and then subrogate against the appliance manufacturer's insurance company to recover the total cost of the claim plus its handling fees.

## 3. PRESERVATION OF EVIDENCE

Anytime evidence is obtained or entrusted in the hands of the forensic engineer, it must be treated with the utmost care so as to prevent loss, alteration, damage or spoilage. There are some rules of procedure which should always be observed carefully, such as:

1. A piece of potential evidence must be judged by its relevancy. Naturally that is better to have excess evidence than the lack of it.
2. Evidence should not be removed from the scene without the approval from the owner or the responsible person in charge.
3. Should destructive testing become necessary, authorization from the responsible party must be secured first.
4. Before a piece of evidence is removed from the scene of an investigation, it must first be properly photographed in its original location and position; it should also be measured and mapped if necessary.
5. If the forensic engineer finds it necessary to take possession of the evidence, he must be prepared to protect it very carefully, for he could be held liable if it is lost or damaged.
6. Once the evidence is in storage, it can only be removed, borrowed or transferred under the appropriate order from the responsible party and receipts signed accordingly.

Evidence may come in many forms, sizes and materials, they could be written documents, pictures, samples, notes, fingerprints, spalled finishes, hairs, fingernails, fluids, blood, metal or dry paint fragments, etc.

When obtained, retrieved or accepted as such, evidence must be accompanied with photographs taken of it and a full description of the evidentiary item(s), including models, serial numbers, and any other identifying marks that makes them distinctive and unique, so they can be logged properly and integrated as part of the office database and updated as it could be the case.

All items accepted by the evidence custodian should be bagged or boxed and marked with the proper identification tag before they go to rest in the evidence storage room.

#### **4. SOURCES OF WORK**

In average, some 60% of the forensic engineering jobs come from insurance companies, the rest come from litigating attorneys, independent adjustors, risk managers acting on behalf of large corporations, government agencies or individual plaintiffs.

Given such a spread, it would be needless to say that the largest portion of the forensic engineer's promotional budget must be dedicated to the claim departments of the insurance companies. Although they are hard to "penetrate" at first, once they know the engineer as an efficient, dedicated, confidential, prompt and attentive operator, they will keep on calling back and keeping him busy.

The second largest work source is composed of those litigating attorneys dedicated to personal injury and property damage. Consequently, it should be the purpose and aim of the engineer to look for all those names appearing on the yellow pages in the Internet and flood them with promotional leaflets and introductory letters.

Lastly, there is a popular Adjustors Directory which is an excellent promotional vehicle, for they reach every active adjustor in the market. A smart forensic engineer must be sure to advertise on those pages, although not cheap, they are worth every penny spent.

#### **5. THE ART OF REPORT WRITING & PREPARATION**

A report may come in many forms, however, there are certain requirements as to form and content which should always be kept in mind and followed while engaged in its preparation. Once a particular format is adopted, it should be kept constant and uniform through time, unless there are good reasons to change it or make exceptions.

There are certain general rules that should be observed:

- a. Never use the "I" form, statements should be made in a "third person" form.
- b. Try to avoid using the words "insurance", "claim" or "claimant" (see comments below).
- c. Since you will be referring to events that already took place, always write in past tense.

A practicing forensic engineer will eventually find during the routine performance of his duties that someone will ask him not to use or avoid altogether use of the following words:

“Insurance company, Claim(s) or Claimant”

Why is that? you would ask. We can only guess, it seems that the members of the industry prefer to conduct their business under a veil of secrecy and even mystery. Some may even assert that they have a legal mandate to do so.

The following format seems to be the most preferred form for most large forensic engineering firms:

Title Page  
Table of Contents  
Introduction  
Case Background  
Field Investigation  
Analysis & Discussion  
Conclusions  
Recommendations (if applicable or asked for)  
Appendices

Before a written report is prepared in its final form, it is always a good idea to provide a client with a verbal report of the findings and give him (or them) a decisive idea of what the conclusions are going to be. Sometimes, when the report is contrary to the Client’s best interests, he may opt to request the report not be prepared and even that the files be destroyed, that way he could escape the inconveniences of “discovery”.

That brings up an excellent point, what is discovery?

## 6. DISCOVERY PROCEDURE

The Federal Rules of Civil Procedure provides for the Rules of Discovery as a set of procedures which allows any party to a lawsuit to obtain information bearing on the case. In fact, discovery allows both sides reciprocal access to each other’s evidence with very few exceptions.

The practicing forensic engineer in his role as an expert witness should know that the three basic tools of discovery allowed by law are: a) the interrogatory, b) the subpoena and c) the deposition.

## 7. CASE HISTORY

The case presented on this Part II is one of the typical *slip & fall* occurrence. This type of case can be very convoluted; especially those which have been perpetrated by professional claimants, people who make a living by orchestrating accidents with the intent to defraud the insurers.

In this case we had a claimant who was a renter in the insured's property. Such claimant allegedly after hearing some suspicious noises went down to the kitchen where he slipped on a wet linoleum surface and fell on the floor. As result of such event, he sustained enough injuries to his hip to need emergency treatment, immediately after he was admitted in a hospital where he was subject to surgery and later to physical rehabilitation. As result of the mishap, he seemingly lost his job and then decided to present his claim to receive compensation for his expenses, lost time, income loss, pain and suffering.

The job assignment of the forensic engineer was to examine the whole scene and based on the physical evidence at hand, find either confirmation of the Claimant's contentions or find inconsistencies in the story likely leading to denial (or subrogation) of the claim on part of the insurer.

There were some inconsistencies in the claimant's story that made his case a little suspicious so as to the accuracy of the events as described by him:

1. He was a 44 year old able body in apparent good health; noticeably, the accident site had plenty of vertical surfaces to grab on, which at least could have been used to soften the fall and probably prevented the described fracture.
2. He claimed that the floor was wet....how come? Some plumbers came to fix the leaking pipes, then they left a wet floor without warning the resident about such danger which would make their company liable for any possible accident, is that a reasonable expectation? If that was the case, why wouldn't the renter go and checked the work and if so needed why didn't he cleaned up the wet floor? To help his cause, he could even have claimed that the plumbers' work was defective and that the leaks continued after their leaving the scene. Naturally, that would have made the plumbers liable a second time.
3. After 6 days the floor was still wet and nobody seemed to have been in the kitchen for all that period of time. Then, the renter fell, was treated and in the middle of his recovery moved to another house, at that point he decided to present his claim within the statutory time limitations. It is apparent that the claimant's story was filled with (albeit defensible) inconsistencies and unreasonable behavior.

Those were the thoughts going in the forensic engineer's mind at the time as he prepared the strategic justification of the case.

Since the forensic engineer was not asked to decide whether the claimant was right or wrong, or whether the case was real or not, but just to point out his findings, that was exactly what he did and so he described in his report.

For the benefit of the reader, there is another point that needs clarification here, some of the players in this report may have been called by more than one designation or name: the insurance company has sometimes been called *the insurer*; both are one and the same. Mr. and Mrs. Randolph Deegan, who owned the townhouse and at the same time were the holders of an insurance policy on said unit, could also be called *the insured*. On the other hand, Mr. Jonathan T. Dodge, who was a tenant at the time of the accident and has at one time or another herein been called *the claimant*, both terms refer to the same identical person.

Here is a reproduction of such report as originally prepared and submitted to the Client in November 1996. Please bear in mind that some of the names have been changed or transposed to

protect the privacy of the participants.

**PRELIMINARY REPORT**

ON OBSERVED FIELD CONDITIONS AT THE SITE ON AN ALLEGED

**SLIP & FALL**

TAKEN PLACE AT  
11465 Fort Caroline Lakes Drive North  
Jacksonville, Florida 32225

OWNED BY

MR. & MRS. RANDOLPH DEEGAN

PREPARED BY

Ruben A. Gomez, P.E.  
1713 Penman Road  
Jacksonville Beach, Florida 32250

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\*Photographs #4, 6, 8 and 9 were found to be in poor condition and irreproducible after 16 years in storage.

**1.0 PROLOGUE**

1.1 On November 5, 1996 our office received a request to examine the site of an alleged *slip & fall* occurred in a townhouse located at 11465 Fort Caroline Lakes Drive North in Jacksonville, Florida.

## **2.0 BACKGROUND**

2.1 According to the information furnished by the client's representative, the dwelling which address appears above, was under a lease agreement at the time of the alleged accident.

2.2 As he was on the second floor of the apartment, the tenant claimed that he heard "noises" coming from downstairs and decided to investigate. As he went down to the kitchen, he slipped and fell to the floor sustaining an injury.

2.3 The tenant also claimed that the kitchen floor was wet as result of water runoff left behind by the plumber after completing a pipe repair on the second floor.

2.4 The tenant also added that on his arrival to the kitchen he found out that the source of noise was produced by "fallen ceiling plaster". Allegedly, as the ceiling was weakened by the water saturation left behind by the plumber.

## **3.0 ASSIGNMENT**

3.1 Our office was specifically asked to visit the alleged slip and fall site and examine the conditions to determine the cause probabilities, strictly within the context of the physical evidence found at the site.

## **4.0 FIELD EXAMINATION**

4.1 On November 6, 1996 the subscriber of this report visited the property and performed an advanced cursory review of the general conditions in preparation for a more detailed examination in the presence of the owner's representative.

4.2 The subject property as examined consisted of a two-story wood

framed structure built in 1985 (Picture #1), with a living room, dining room, kitchen, pantry, half bath and garage on the ground floor (see Exhibit A), and three bedrooms and two bathrooms on the second floor (Exhibit B).

4.3 During this first visit a few photographs were taken in the kitchen area (Pictures #8 and #9) and the garage area where the water heater was located (Picture #14). Profuse water stains were observed coming out of the water heater indicating a leaky unit. As determined later during our investigation, the broken water heater was a prior event and unrelated to the current incident.

4.4 After obtaining more detailed account on the alleged fall from the Claimant's interview held on November 21, 1996 (Appendix I), a second visit to the property was arranged and conducted on the following day (November 22<sup>nd</sup>).

4.5 Following the Claimant's statements, the alleged path prior to the fall was then examined. Pictures #2 through #5 depict the stairway which led the tenant to the downstairs area. Picture #6 shows the opening passed by the tenant on his way into the kitchen area.

4.6 Pictures #7 and #8 show the location of the alleged slip and fall as described by the tenant on his interview as transcribed on Appendix I.

4.7 Exhibit C depicts the path allegedly followed by the tenant on his way to the kitchen and unto the fall site. Interestingly enough and in spite of the tenant's effective arm spread of 61½ inches shown on the same exhibit, he fell within a narrow space of 30 inches between the wall and the countertop (Exhibit D).

4.8 Picture #10 shows the location where the plumber, or more appropriately Seminole Plumbing Company, cut through the wall to locate and repair a section of a leaking pipe. Field collected evidence indicated that the water supply and distribution system was installed using copper pipes. Such material although successfully used in many areas of the country, in Jacksonville and South Georgia it is known to fail at the joints. A request filed with the utilities company came to verify such a condition which is clearly indicated on their statement letter dated November 16, 1996 which has been enclosed herein as Exhibit E.

4.9 Areas around and in the immediate proximity of the plumbing wall (where the plumbing stack was allegedly located) were carefully examined for water damage or water stains, none was found. Both, ceilings (Pictures #11 and #12) and floor (Pictures #6 and #13) showed no evidence of water damage

nor any indications of “fallen plaster” were detected anywhere within the described site.

## 5.0 CONCLUSIONS

5.1 Based on the foregoing examination and analysis, as well as onto a reasonable degree of engineering probability, this office concludes as follows:

A. As result of our field perusal and examination, no unsafe or unstable place or condition were observed within the premises.

B. The description and causes of the alleged fall, as stated by the tenant are inconsistent with the observed conditions and the evidence collected at the site.

Respectfully submitted,

Ruben A. Gomez, P.E.

**APPENDIX I**  
Interview

## INTERVIEW

In order to learn about the details and circumstances surrounding the alleged slip and fall incident covered on our report, an interview of the subject was arranged and held on November 21, 1996 at the Law Offices of Johnson & Johnson, located at 7077 Bonneval Road in Jacksonville, Florida.

The male subject stated his full name as: Jonathan Theodore Dodge

Date of Birth: June 30, 1952

Height: 5 feet 8 inches

Weight: 165 pounds

His arm spread (fist to fist) was measured as: 61½ inches (see Appendix II, Exhibit C).

Regarding his medical record, Mr. Dodge stated that he had no personal doctor and answered on the negative when asked if he had any past history of arthritis, emphysema, osteoporosis, faint spells hypertension, ear infections, epilepsy or unexplained seizures. However, he said that in 1992 (four years earlier) he had a plate prosthesis implanted in his left shoulder.

He stated his marital status as: divorced.

Home address: 3333 Monument Road, Apt. 301, Jacksonville, Florida.

He described the address of the alleged accident as: 11465 Fort Caroline Lakes Drive North, Jacksonville, Florida.

Site of the accident within the address above: the kitchen area.

Date and time of the alleged accident: July 31, 1996 at 1:30 AM

He was asked to describe the accident, both verbally and graphically, for which he was handed a free-hand drawing of the dwelling's ground floor lay-out.

Verbally he indicated that "he heard noises coming from the kitchen area and he came downstairs to investigate". At the same time he marked down his footsteps along the stairway and into the kitchen. His markings have been redrawn and reproduced on the enclosed Exhibit C, as the subscriber's interpretation of his version.

He continued his description by saying that as he entered the kitchen he realized that the "noises" have been produced by "fallen ceiling plaster", then suddenly he stepped into a "six inch diameter puddle of water" that had accumulated on the kitchen floor, slipped and fell on the floor at the shown location.

When questioned about the possible source of the water on the floor, he blamed it on residual run-off left behind after a pipe leak had been repaired by Seminole Plumbing Company on July 25, 1996 (6 days before).

When asked about his attire at the time, the subject stated that he was wearing shorts and was barefooted. He also affirmed that the kitchen light was "on" and there were no witnesses to the occurrence. The only other person in the house was his 17 year old son,

and he was upstairs when the alleged accident took place.

After the accident and responding to a 911 call, a rescue team took the subject to the Baptist Medical Hospital where he was examined and diagnosed by a Dr. Young, as having sustained a left hip fracture.

According to his statements, hip surgery followed on August 5, 1996 and after that he spent the following six (6) weeks in convalescence and physical therapy. During that time he had to use crutches to move around. He moved out and vacated the townhouse on September 8, 1996.

Before the accident the subject was employed by Sears Roebuck & Company, however, at the time of the interview he was unemployed and unable to work.

**APPENDIX II**

Exhibits A through E



File No. 0196-041-0041

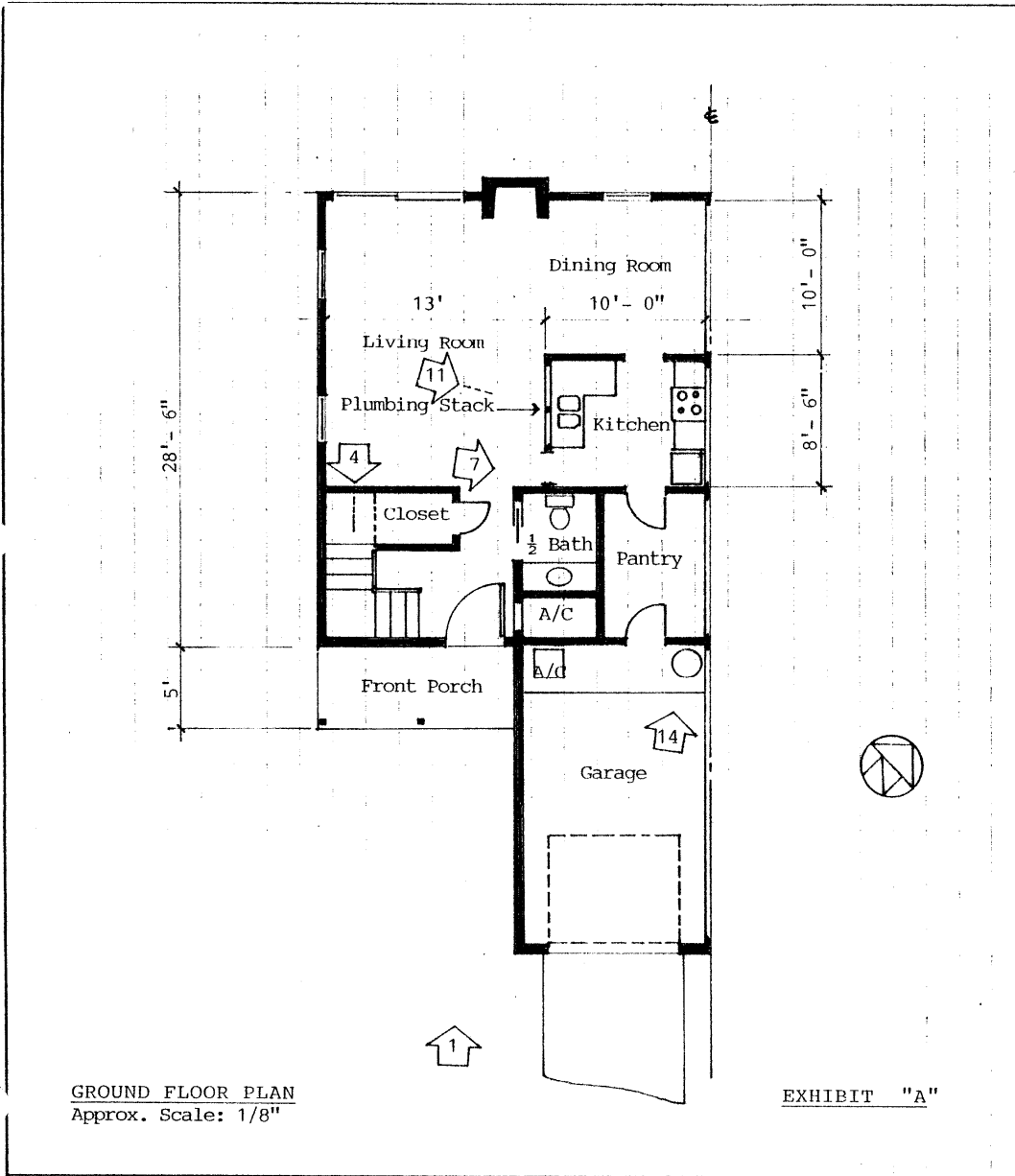
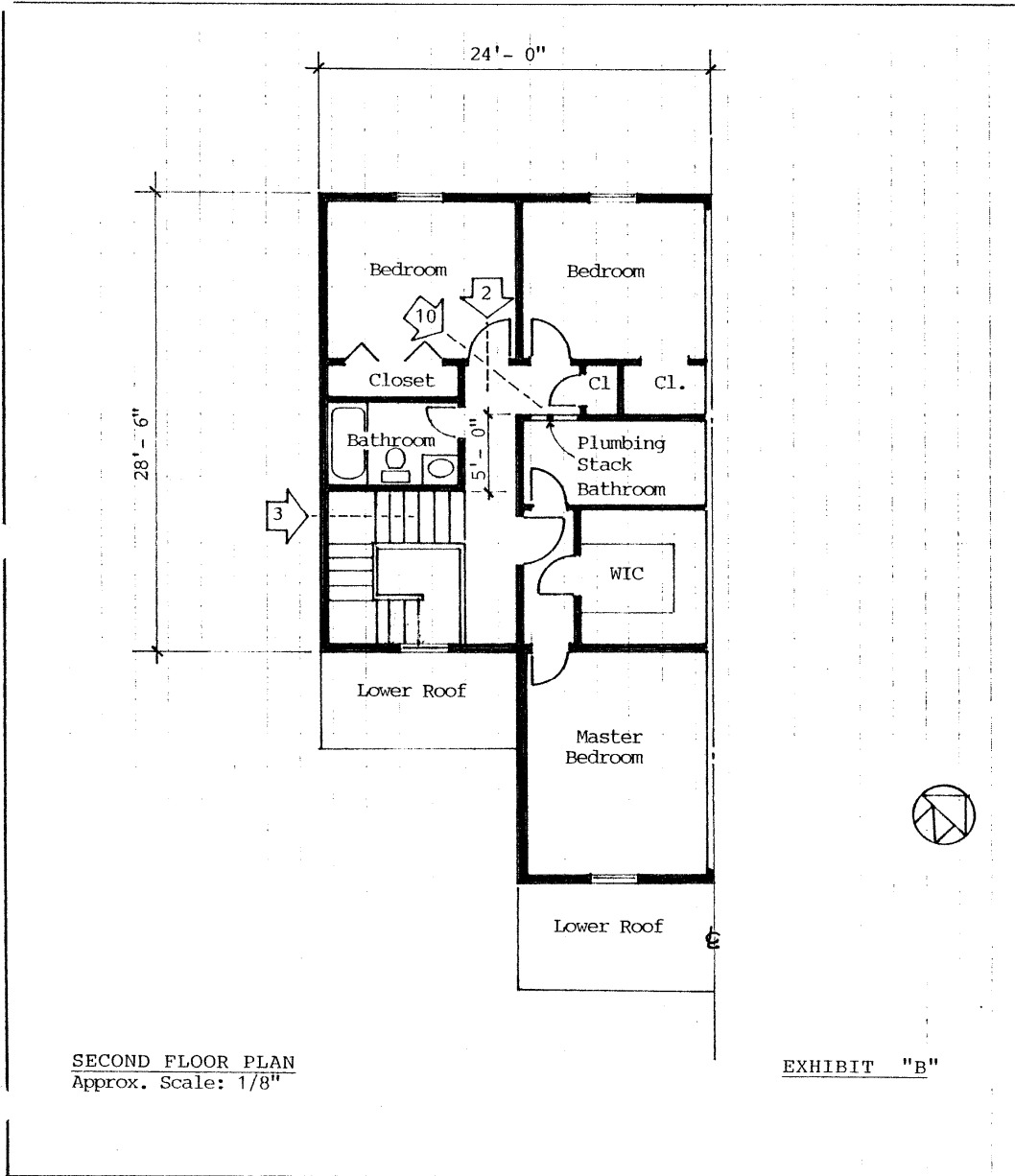


FIGURE 1-1041, N.E. 1111/1111, Garden Mesa, 01471

File No. 0196-041-0041

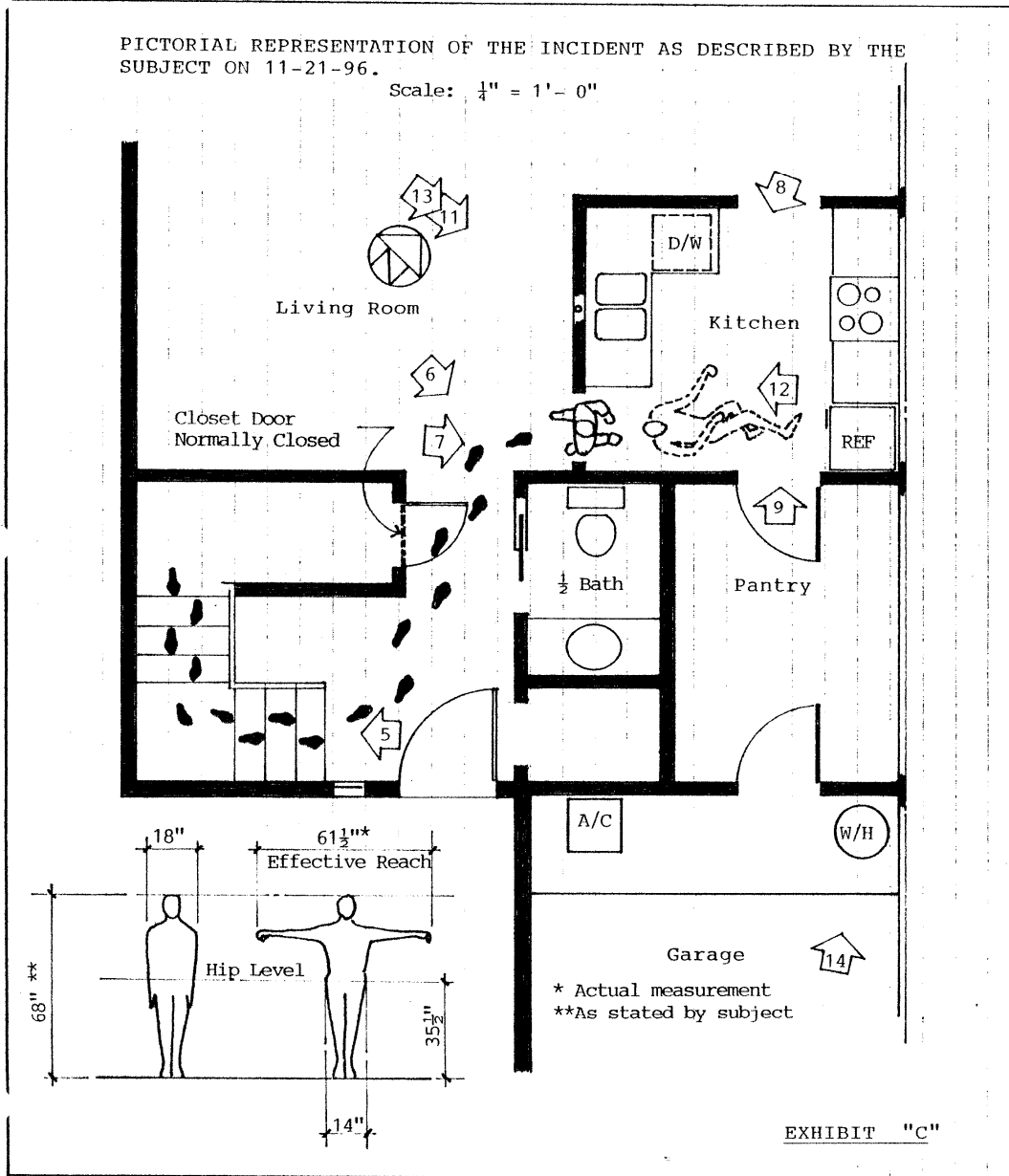


0196041-0041 - See also the Exhibit Mark 01473

File No. 0196-041-0041

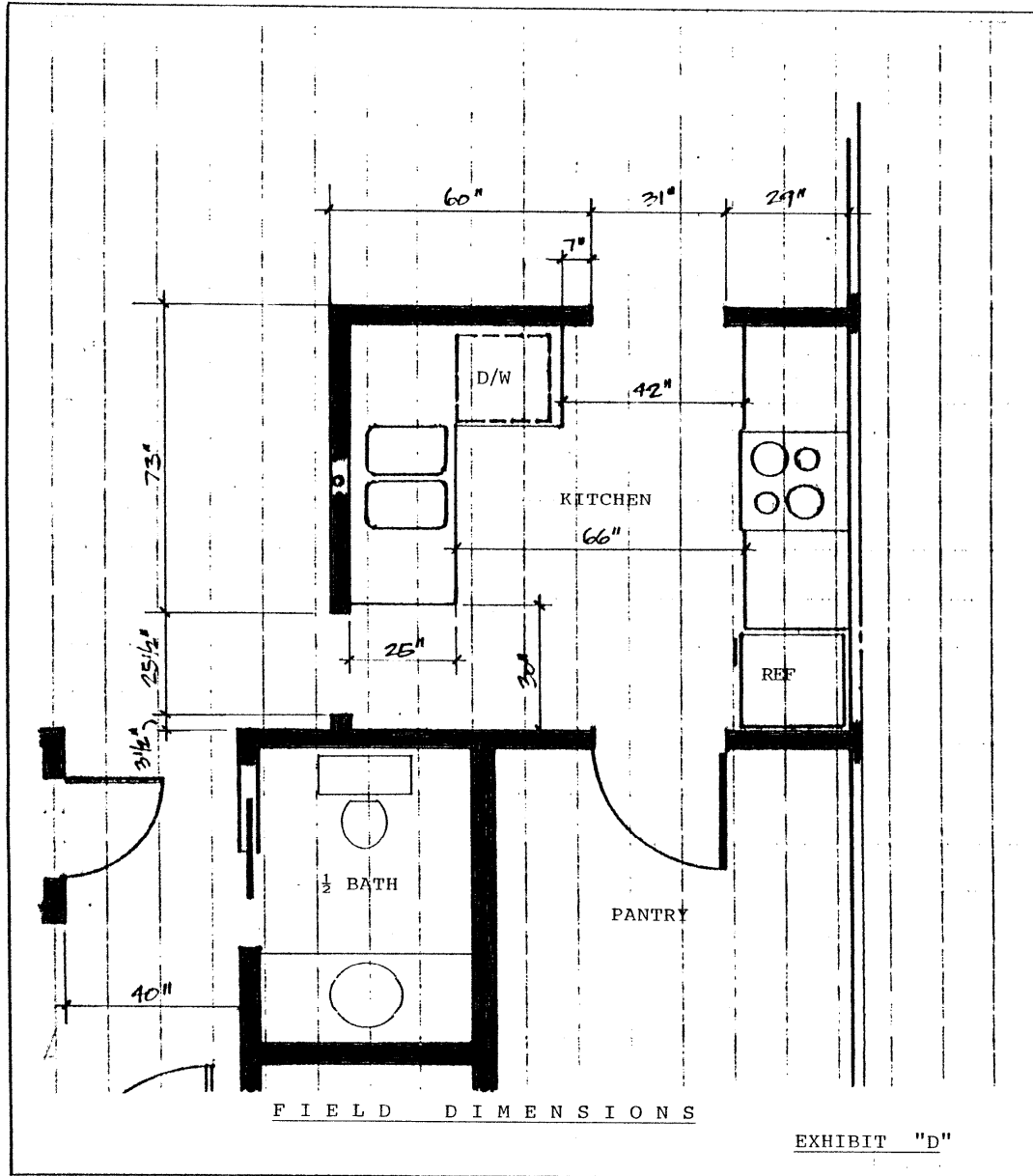
PICTORIAL REPRESENTATION OF THE INCIDENT AS DESCRIBED BY THE SUBJECT ON 11-21-96.

Scale:  $\frac{1}{4}'' = 1'-0''$



150041-0041, No. 11/2/96, Boston Mass. 01471

File No. 0196-041-0041



**Jacksonville Utilities  
Quality Control Division  
Telephone: (904) 630-0573**

DATA COLLECTED ON CITY WATER

Sample Source: Fort Caroline Lakes Drive

Water samples were taken at random and showed relatively high contents of:

Calcium  
Magnesium  
Phosphorous  
Iron  
Sulfur  
Chlorides  
Nitrates

Water samples taken from copper piping installations also showed undesirable amounts of copper oxide. Visual examination of those same water supply lines depicted green staining caused by copper oxide.

This agency does not recommend copper piping, particularly if lead solder is to be used. We presently encourage use of PVC or CPVC piping.

November 16, 1996

  
Lab. Director

NOTES:

As result of surveys and inquiries conducted by this agency in housing developments and subdivisions in the area, namely: Cobblestone, Wellington and Seabreeze, where copper distribution lines have been used extensively, the following historic information has been obtained:

1. Within the first two (2) years, green copper oxide deposits were observed in pipe joints under sinks, toilets and water heaters.
2. Within the following four (4) years, joint failure had occurred in exposed piping and microscopic perforations developed in underground pipelines.
3. After ten (10) years of service, more than 50% of copper installations had to be abandoned and substituted by overhead distribution lines.

Exhibit "E"

**APPENDIX III**

Pictures #1 through #14



PICTURE No. 1

Date Taken: 11-22-96

Camera Facing: Northwest

Subject Description: Front view of townhouse at 11465 Ft. Caroline  
Lakes Drive North, Jacksonville.

Project:

File #0196-041-0041



PICTURE No. 2

Date Taken: 11-22-96

Camera Facing: Southeast

Subject Description: Second floor hallway. Arrow indicates location of stairway leading down to ground floor.

Project :

File #0196-041-0041





PICTURE No. 3

Date Taken: 11-22-96

Camera Facing: Northeast

Subject Description: Upper flight of stairway.

Project:  File #0196-041-0041



PICTURE No. 5

Date Taken: 11-22-96

Camera Facing: Southwest

Subject Description: Stairway lower flight.

Project : File #0196-041-0041



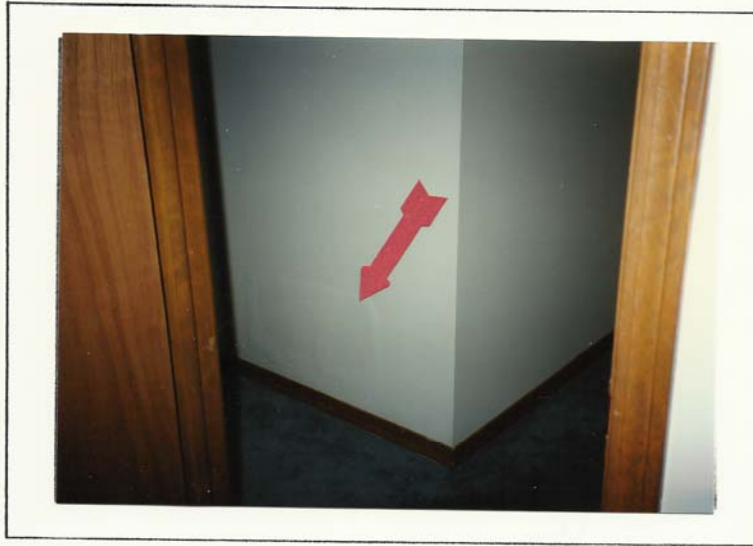
PICTURE No. 7

Date Taken: 11-22-96

Camera Facing: Northeast

Subject Description: View of kitchen from the living room. Arrow indicates location of alleged fall.

Project : File #0196-041-0041



PICTURE No. 10

Date Taken: 11-22-96

Camera Facing: Down

Subject Description: Second floor hallway. Arrow indicates location of plumbing repairs.

Project:

File #0196-041-0041



PICTURE No. 11

Date Taken: 11-22-96

Camera Facing: Up

Subject Description: Ceiling condition in the vicinity of the plumbing wall. An arrow indicates approximate location of the plumbing stack.

Project: ~~Waterproofing~~  
File #0196-041-0041



PICTURE No. 12

Date Taken: 11-22-96

Camera Facing: Up/Southwest

Subject Description: Condition of kitchen ceiling above location of alleged fall.

Project:  File #0196-041-0041



PICTURE No. 13

Date Taken: 11-22-96

Camera Facing: Down/East

Subject Description: Condition of carpeting in the adjacent areas to the plumbing wall.

Project:  File #0196-041-0041



PICTURE No. 14

Date Taken: 11-06-96

Camera Facing: Northwest

Subject Description: View of water heater.

Project : File #0196-041-0041