

Journal for Hurricane Katrina by Steve Chambers

Steve Chambers, an Associate Civil Engineer with CDF, kept a journal while part of a team of 30 architects, engineers and building inspectors sent from California to Louisiana to help assess damage to homes and buildings after Hurricane Katrina in the fall of 2005. Here are his observations.

Sunday - Day 1

I hate to sound like a broken record but just like the reports you probably hear from everyone else who has come to the area, the destruction is great. It is hard to put into words. Pictures don't give you the depth and the news reports can't really prepare you. Of course we are here specifically to inspect the damaged buildings not interface with the residents (victims), so if you don't consider the human tragedy, we are here to see the worst of the damage. We are at 'ground zero' in St. Bernard Parish – roughly east of New Orleans. The parish (county) is broke as well as broken. They have little hope of recovery with no population, nothing to offer the population and therefore no way to earn the tax base necessary to build what is necessary to attract the folks back who could pay the taxes. This is the only county that requested help from CA, so our exposure is only this county.

We are here as part of a program coordinated by California Office of Emergency Services. It is set up and maintained to respond to natural disasters in CA, but also offers assistance to other states. Our team consists of about 30 architects, engineers and building inspectors from all parts of California. Californians make up 100% of the staff working on this specific effort – to rapidly inspect buildings to determine if they are safe to occupy or use. We look at everything from homes to churches, libraries to water treatment plants, Win Dixie to Wal Mart; and yes even fire stations. We do not inspect oil refineries, hotels or similar very specialized facilities that have their own technical staff to handle this. There are about 40,000 buildings in the parish for us to evaluate. The team that was here the first week did about 5,000.

Since I and two other members from Sacramento took the 'red eye' from Sac last night, we arrived around 9 AM local time and after a short detour (yes we got a little lost) we got to tent city by 11. When we located our 'boss' he sent us to DMAT (other than M for medical, I don't know what it stands for) to get inoculated before the inspection crews returned for lunch. DMAT was a field hospital at the high school football stadium. The inoculation center was two picnic tables under the bleachers in the parking lot so I never went back to the tents to see what they had. I believe it was a fairly complete setup staffed by volunteer doctors, nurses and medial support staff that rotate in and out from many states or nearby areas.

After lunch we were orientated around camp and got a quick tour of the major roads in town. Other than our camp, the only other major sign of life in town is the Wal Mart parking lot. It is HQ for the insurance companies' disaster relief teams, FEMA, Red Cross and other volunteer agencies, and another inoculation center and medical clinic. It is a one-stop center for residents. Wal Mart keeps their gas station open via generator and is selling gas for \$2.69. It is the only source of fuel in the area. The stations we passed on the way in from the airport were in the \$5.50 to \$5.99/gallon range. This was one of the ways that Wal Mart was paying back the community. Further, I believe we and other volunteer groups were given free gas.

We made our first run to the field to learn the ropes from those who will be leaving tomorrow. My first exposure to the field is pretty much a blur because we were trying to keep up and absorb all that the experienced members were trying to show us. What I do

recall is looking at one house with a fairly new Ford pickup in the driveway and I thought "What a knuckle-head. This guy left town without his new truck." I looked inside the front door of the house that had been broken open by the search and rescue teams who came through weeks before looking for bodies or survivors. In the dark, dank living room I saw a fairly large TV on top of a pile of living room furniture. It looked like someone put it all in a pot and stirred it up. There was a coating of mud on everything and a heavy layer of muck on the floor that smelled like you may imagine. There was dark mold up the walls and on the ceiling. I looked deeper and saw a Harley in a back room and clothing and other household goods littered about. This guy did not leave his new truck behind, he left everything! That is when the magnitude of the personal tragedy began to sink in.

The rest of our second wave group arrived in time for dinner so we will have the formal shift change tomorrow. We share our camp with local residents who are staying in army style tents housing a family in each of the dozen or so tents. It is a lot like a mini fire camp complete with shower tents, restroom trailers, laundry service, good food and about a hundred firemen and law enforcement personnel. To complete the package there are a dozen or so engines lined up along the road. There is no power or water, so everything is generators and hauled water.

We are in a 400-person tent that is less than half full but very noisy all day long - even over the huge air conditioners that never shut down. The big problem is that everyone has to go through our tent to get to the dining tent and you have to walk through the dining tent to get to the showers. So everyone, including the families, firemen and 100 National Guard troops in the tents next to us, pass thru our tent morning, noon and night to eat.

The troops are here guarding various sites around the disaster area. Sort of ominous to pass checkpoints with soldiers with loaded automatic weapons to get to and from the

areas you work and sleep. The camp has a 10 pm curfew, enforced by the aforementioned armed Guardsmen, so we can't really get into too much trouble since we must be in by 10.

We are supposed to get internet access tomorrow, so hopefully I can send messages out easily.

Day 2 – Monday

We were not able to get the internet installed yet, so as you can see this is becoming more like a daily journal and I'll send it out when I can.

Today we had a full day of field work. I was assigned to one of 5 teams and together our group evaluated about 200 buildings. If each team averages the same, we will maintain our 1000 buildings per day goal that was established when the original team was assigned. We go out to each neighborhood and go door-to-door spending about 5-10 minutes at each property looking at things and filling out paperwork. Our tent city is in the heart of the parish so we can get to almost everything in about 15 minutes of travel time.

This morning our team was assigned an area with a medium size mobile home park. Surprisingly it fared much better than I would have expected. I expected to see trailers tossed about like a toy train, but only 5 or so of 40 were tilted off their piers and only one was fully shifted off the piers. A few had large holes in the roof or the roof torn off completely. The wind snapped nearly half the trees in the park and sent them into about a dozen of the trailers – a few with very serious damage to the roof or side. Then the water rose and took its turn. One end of the park saw about 8' of water (or about 5' inside the homes) and the other end saw only about half that. Hard to say which was worse, the wind or the rain (the hurricane or the flood), because it makes little difference in the end when all the damage is done.

The rest of the day was made up of seemingly endless rows of houses. We new members spent a little time looking at things and trying to absorb the things we are exposed to. Cars tossed around in driveways and carports, littering lawns, jammed up against houses and trees. Boats everywhere; back yards, front yards, porches and patios, leaned up on fences or even on roofs. It seems that there are more boats than cars in this county. I guess many people took their cars to evacuate so it makes sense there are less cars than boats in some areas. Debris up on roofs, kids toys and play sets scattered around.

Day 3 -Tuesday

Our first assignment for the day included our second mobile home park. This park did not fair as well as the last one we visited; it supported the reputation of mobile homes – that they are pretty much targets for hurricanes. We saw many that were moved partially or fully off their foundations and a couple that were moved off the property, almost in the middle of the next road. Surprisingly, most of the trailers in this park were secured with straps to the frame connected to a 2' augers bored into the ground at the four corners. Obviously not nearly enough to hold them where they belong, especially in these soils. I don't recall seeing these anchors in the first park, but the debris was thick and we did not spend a lot of time looking underneath.

At this park too, the porches, awnings and patio covers were either radically removed or intact and badly damaged. There were a few trees that blew into the homes, but not like the first park – mainly because this park did not have the larger, more mature trees. There were as many undamaged homes in this park as there were badly damaged in the fist. Roofs torn off, siding ripped away, and some racked so severely that they were beyond hope. One or two looked like a bomb went off inside where the four walls laid out in four

different directions like somebody pulled the pins that were holding them together like a child's toy.

In the afternoon we went to another residential area with two mini-malls at one end of the street. This area was hit with over 10' of water near the commercial end and about 6' at the residential end of the street. The glass store fronts in the malls were blown out by wind or water and then the water dumped a generous helping of debris and mud in the stores. We saw a telephone pole deposited inside one small shop. Just about every shop had 1' to 3' of swamp grass, debris and mud inside.

Behind one mall was a large open lot that had about 6 new RVs piled up in a corner, smashed up against some houses, as well as a dozen or so spread out across the 5-acre lot. In a mini mart we saw a line of potato chip bags on top of a sign - 10' off the ground; stranded there by the receding water. They looked like they were placed there intentionally. Similarly, a 6-pack of Dr Pepper was hanging from an electrical wire about 8-feet off the ground. There were piles of debris stacked on roofs of houses and businesses. There were small boats tossed everywhere, even on roofs. We see so many boats that we don't really notice them anymore. Some have trailer attached, most have no trailer with them, so they were likely deposited by the flood waters, from who knows where.

We completed our last assignment early and returned to camp. Since we had an hour or two of light left the younger half our team went back out to get a head start on our next area. Before returning to camp again, we toured an area that, according to the early team, saw heavy damage. It was a neighborhood near one of the many drainage canals cutting through the entire region. These areas saw the most damage since they attracted the high water, each was like a highway for the water coming in and going out. What a mess. Debris was everywhere, including appliances and furniture on the

roofs. There were about 5 houses in a 3 or 4 block area that were in the middle of the street, or across the street from where they belonged. It was hard to imagine the amount of force this area was subjected to. I would guess that 20 of 50 of the homes in this specific area were heavily damaged, destroyed, or moved off the foundation or off the property. At least they still had some sense of humor. One of the houses in the street had stuffed leggings with shoes at the end, placed under one edge of the house and a spray painted "WICKED WITCH" on the wall above it. Another right down the block had a large target symbol in the middle of the wall with "D 8 GET ER DONE" painted around it.

Today at dinner we were informed that OES was no longer going to charter a flight to get us home. We are now on our own to make flight reservations over the cell phone, with no phonebook, travel agent or internet so most are calling home to have spouses do the research. Typical government bureaucratic situation: We were told specifically to get one-way tickets because they would provide the return transportation. Then someone at OES decides to save a little money and cancel the charter because there were only 26 of us to fly back. Two inspectors were so irritated by the perceived lack of support that they got the earliest flight home - tomorrow afternoon. Others are scheduled for Saturday and Sunday, so only about half of us will be here for our full term to fly home next Monday.

This decision, in conjunction with other minor mistakes by Louisiana, the parish or OES (no internet as promised, no telephone lines as promised, no tech support for the mini network we created to input data into 5 laptops, complete overall disorganization by LA, OES and the parish) are compounding and could result in this being the last time OES takes this program beyond CA. It may even have an adverse impact in the program within CA because the cooperating agencies that sent us here on behalf of OES feel that they should have included significantly more support to the 'troops on the ground'. Hopefully things turn around before we get

out of here because this program is a huge asset in CA after the big quakes and to the rest of the nation in times of need like this one.

Day 4 – Wednesday

This is the first day that we have seen any significant effort to begin cleaning up the parish. Yesterday we saw a few crews with street sweepers and loaders trying to get the dried mud off the street. We have seen dozer/loader tracks in front lawns we are inspecting, but this is the first day that we have seen any activity (besides ourselves) in the areas that we have been in. As we head back to camp for another assignment, we see a line of vehicles coming into town. They are apparently letting the residents back in. While it sounds like progress, it is not too good for us. The cleaning activity stirs a lot of dust and mold that we don't want to breathe and the residents and vehicles make it more difficult to get around and get our inspections done quickly. There is still no reliable water and power so I don't know where they will stay or even eat.

Our next assignment is an older neighborhood that has a lot of cleanup activity going on. Our streets are blocked by repair teams digging up water lines and a fleet of tree trimming trucks cutting trees away from power lines. They are not hauling the trees or chipping them so the debris along the roads only grows taller. Another street is inaccessible because of the loader and dump trucks doing initial debris collection in the streets and front lawns. I say initial because once the residents come home they generate huge new piles of debris cleaning out their houses, garages and back yards. Ironically, the debris removal is a cause for most of the water line repairs. As they scrape the front yards and streets to collect debris, they displace water meters and fire hydrants; which are frequently hidden by the original mud and debris.

After lunch we returned to the area to complete the street that was not accessible earlier. I look up to see a small column of smoke behind the home I just inspected. Since there are no residents in the area to BBQ or otherwise make smoke, I make my way back to see what the cause is. It is a home that recently burned. I just had enough phone signal to make a call to 911. I told the dispatcher it was a restart of an already burned building, but I should have suggested they send a single engine or anything small with a few hundred gallons of water on board. I could have put it out with a garden hose – but no running water. Within minutes there were about 4 sheriff cars and trucks and about 5 engines and a ladder truck to quell a 6” column of smoke from a softball size flame on a beam in a bedroom window. I’m sure it took less time to saturate the beam than it did to sort out the traffic jamb. Oh well, they got out of camp and got a little exercise today.

Later I learned that it had burned about 3 that morning. Obviously every fire here is a little suspicious since there is nobody living in these homes, no electricity or gas, and 75-85 degree highs with high humidity. Besides that, most everything is still damp from being under water for 6 weeks. It gets down to about 55 at night with a good layer of dew most mornings.

We finish the day back in the newer neighborhoods. About 3:30 I look up to see a large column of heavy black smoke about four blocks away. I start to call 911 but I don’t have enough signal. Fortunately I hear distant sirens so I let it go. They had it knocked down in about 15 minutes. My partners were beginning to joke if I have matches or a lighter or if I know to make fire from rubbing sticks together. The answer to all three is no, but it was a little strange to have two fires in our areas in the same day. My first guess is that these may be residents with no flood insurance but they have fire coverage? There are a lot of insurance adjusters/inspectors here so I’m sure that they will be looking in on it.

We see that more and more activity goes on each day in the clean up side of things. Each day more people come in so there is more traffic each day. We actually have to obey the stop signs and speed limits a little more. No more driving the wrong way on the one-way streets, but we can still park or drive on the lawns if we want.

Our next assignment included a one of the main streets into town made up of mostly commercial properties. One was a bait and tackle shop with the front windows busted out, a hole in the roof and pretty much the entire stock still inside. I noticed shotgun shells up on the shelves, fishing line lying around, hunting gear everywhere, and myriad of lures still on the pegs along the wall - with their bags still mostly filled with water. The next shop was kitchen cabinet sales full of kitchen displays. All the displays were intact, complete with sinks, faucets, and pictures on the walls, but the showroom was covered with the normal disgusting layer of sludge. This area apparently did not see the water elevations as other areas, but was most likely harder hit by the hurricane forces.

Also on this street was a church with a school or preschool. Although the site did not have major damage, there were two casket vaults in the street next to the church. For those who are not familiar, the ground water in the entire region is high so they don’t always bury the dead below ground. Instead they use buildings and above-grade concrete vaults. We are not sure if the vaults were removed from the church to preserve the remains that were previously interned within the church, or they floated to the area from a nearby graveyard. One of the vaults was marked “Rev David Thomas and Mrs. Ida Thomas”, so I guess either is possible.

Later I inspected 6-unit apartment house where a resident was shoveling out mud and tearing out sheet rock. As most people are eager to talk to us and find out what we are doing, he came out to talk and I learned that he owned several houses in the area and across town. By chance he also owned the

building that we saw burn yesterday. He was curious to find out what time we saw the smoke because he heard little news. The police and fire officials are difficult to find with all the stations and offices damaged. Telephones were still out, so I'm not exactly sure how he found out at all. I did not ask him if he had other income sources, but it is clear that he will have no rental income for some time while the mortgage payments would presumably continue – not to mention the cost of repairs. Even if his properties were repaired and habitable now there are not many people to rent to. He did mention that he had good flood insurance, so apparently my initial presumption that the property owner started the fire for the insurance benefit was not valid in this case.

When we do run across residents the first thing they want to know is are we with FEMA. As we were all aware of the FEMA reputation from the continuous news coverage in the weeks following the hurricane, we were quick to point out that we were not and rather we were working for their building official. Typically I began with "How are you doing today?" They predominantly had positive things to say. With few exceptions were happy to see us and talk with us. When they learned that we were from CA, they were very thankful for our assistance. Many offered water or food from what limited supply they had. It was humbling and gratifying. I can't say for sure that I would be able to be so up beat and generous if I were in their shoes.

Day 5 – Thursday

This day included one of the most remarkable sites I had seen to date in my trip. We drove to an area that at first glance included a series of empty lots – maybe 10 in a row. When I took a further look I realized that half the 'empty' lots had piers, skirting and stairs, but no houses. Next I see a fence or two and one lot with a shed or shop at the rear. I noticed a canal behind the houses and an apartment complex beyond that. Finally we see the houses across the canal near or in

contact with buildings on the other side – about 300-400 feet away. Three were smashed up in a corner against two apartment buildings. Strange that so many in a row were carried away, but none at all on adjacent blocks and none across the street from where the buildings belong. I was later told that all were constructed by the same builder. I would not want to be him (or her).

The cleanup effort continues. The tree trimming crews are everywhere. We see a lot of pavement now instead of a continuous layer of dried mud. Some badly damaged buildings are being demolished. The debris removal goes on. The progress is extremely slow and hard to notice given the magnitude of it all.

We have had mild weather so far but today is a bit muggy to say the least. By lunch we found out this was going to be the hottest day so far. I am perspiring just standing still filling out the forms. I am beginning to understand the difference between the notorious "dry heat" of CA and what we are in the middle of now. Fortunately there are a few trees still left standing and a few carports intact to stand under while we fill out the paperwork. The downside is the closer you are to the house, the more it smells and the more mold we are exposed to. Despite the heat we had a good day and we set a new record – 1,800 buildings inspected. Our progress has put us ahead of schedule.

Day 6 – Friday

The day started with a little detour. We told the boss about the 10 displaced houses in a row that we inspected yesterday so he could see the area and report it to the local authorities. He said there was a 'must see' area next to the main levee on Florida St. We headed towards the levee to see it for ourselves. I have said it before, and I'll say it again, this is the most remarkable site I had seen so far. Each day brings a new surprise and a takes it up another level. Florida St. parallels a main canal or river, into which all

the other canals discharge. The far bank of this main canal is the levee that separates (protects) St. Bernard from the ocean. Unlike levees that failed to flood New Orleans, this levee did not fail. Rather it was overtopped by 8'-10' of storm surge, more like a tidal wave. After that, it did suffer damage from the ensuing saturation and erosion.

The houses that were directly exposed to the wave were absent siding – inside and out. The ones still standing looked like they were in the construction phase, as though they were just being framed. Doors and windows were gone. Brick exteriors washed away with the rest of the contents. Others were 'blown over' and lay on the ground in a million little pieces scattered around a large area. Still others appeared to have 'the legs knocked out from under them'. Where the generally intact roof was on the ground, but the walls were gone or laid flat under the roof structure. We went to one slab where the only thing remaining was about ¼ of the bottom plate still on the slab and from which the walls were ripped off. A brass head board, a washing machine, parts of a computer and a few other miscellaneous belongings remained on or adjacent to the slab, but the building was entirely gone. Amazingly, the carpet was still there but we did not recognize it at first because of the layer of dried mud.

Nearby was a large shrimp boat (it is like saying jumbo shrimp, it just does not sound right). It was deposited in the middle of the next street about 150' from the river or about 300' from the levee. Because of the mud and other debris, I'm not sure if it sits where a house used to be or not. Either way it was definitely out of place. I don't believe the opposite side of the levee was navigable, especially for this size boat, so I'm not sure how far it traveled to get here. We did not tour the entire area so I'm not too sure how many houses were destroyed, but from corner near the empty slab I see about 20 that fall into the various conditions I described above.

As we get back to our assignment we had a good mix of commercial and residential

homes. Some homes were quite large and elegant (at least they were before). Many were two-story so the damage was more or less confined to the first floor. We spoke with a couple cleaning up their house. They come home each weekend to clean up, but they are living somewhere else for now. Last weekend they killed 8 snakes in their house and their sister's house two doors down. Thus far our team had seen no live snakes or even any dead ones. In fact I have seen no frogs, cats, dogs, rodents, or any native wildlife dead or alive. The only life I have seen is the fish or pollywogs in every body of water from plastic buckets and ice chests to swimming pools and hot tubs, and the birds which seem to be growing in numbers each day like the residents. According to the residents we talked to, the snakes are staying alive eating the frogs still hiding in the mud inside the buildings.

One residence has a large piece of steel pipe in the front yard. You can see where it hit their roof when the water was high and left a scar where it kept in contact with the house as the water level dropped. The residents said it was a pipe from a nearby refinery or something, but it looked more like a pontoon to me because the ends were sealed up and had a taper like a pontoon. It was about 25' long and 36" in diameter. I can only estimate it weighs well over a ton. I teased the owners about their new lawn sculpture being one of a kind and perhaps it will catch on around the neighborhood. They laughed.

Today I notice that I am beginning to take note of more personal things I am exposed to. Now I notice contents, signs and personal displays rather than building materials. I find myself taking more pictures of the insides of buildings rather than the exterior. Perhaps it is a coincidence, but today I see a home with Christmas items displayed in the front yard, a lawn sculpture together with Santa and a witch, a full-size cardboard Homer Simpson guarding the front door, and a large American flag on a house marked with a parting remarks. I now stop to read personal notes painted on garage doors. Various notes tell

family and friends where to contact them, or that they are fine, or please call if you are OK. One tells the residents that their boat is down the road at this address.

Looking back, the spray painted notes on houses I've seen includes "You loot, I shoot", "Looters will be shot", "Do not Demo". And the other side some humor like "Looters welcome", "Looting encouraged", and the car dealer "89% off, some free". Some say "We will be back", others just say goodbye, still others "Katrina you Bitch". I saw a note on a nasty refrigerator "Free lunch for Alstate". It is interesting how people offer their thoughts and feelings to the world.

As we continue through the day, I am convinced that I am melting. I don't know if my shirt or water bottle has more moisture in it. Like yesterday, it is the wrong day to wear CDF blues. It is much hotter than yesterday and as humid. The only thing I can think of is how good the shower will feel this evening and how comforting the roar of the air conditioners in the tent will sound and feel. It is only about 3 pm but I think I have already had 3 bottles of water and as many Gatorades since 10 am. I make conversation with a resident and am somewhat relieved to know that I'm not the only one affected. They too are hot. So I figure it is OK to feel hot if the natives are hot.

We return to camp just after 5 pm to find the showers out of service again. What a day to be out of service. At other times this past week they have been out of water, out of fuel, or the generator is off line. Today they are taking down the last of the shower tents and setting up the shower trailers that have been sitting here for a couple of days. The shower tents were actually de-con tents. They have three chambers on each of the two sides. The third chamber has an arch with spray heads to spray you off as you walk through. The spray arch is are not really set up for cleansing shower so they began installing normal shower heads in the tents about the time we arrived. As you could guess the ones with actual shower heads instead of spay

nozzles were a lot more popular and harder to get in. There are no drains in the floor, the soiled water ponds at a low spot and it is pumped out. Less than what I would consider sanitary, but at least we have plastic floor grating that keep us just out of the water in the drying/dressing area. Fortunately they had the shower trailers up and running around 6 pm and I snuck in before most found out they were available. The big goal every night is to get in before the 400 or so army guys because the lines are long when they are released to shower. Same goes for meal times - beat the army guys when you can.

Day 7 – Saturday

Our day starts with a group meeting. Again we beat expectations by doing more about 1,800 reports on Friday. The boss is encouraging us to slow down, look around, take some photos and enjoy ourselves a bit. We are way ahead of schedule. I guess he does not want to leave too high of expectations for the next group to show up on Monday? I would rather keep up the pace and get things done while we have favorable weather, but I have not been here for two weeks like the other half of our group. I think the progress will drop considerably and the safety drop at about the same rate if it rains and the mud gets wet again. We have been lucky so far. The next big storm has diverted and is ready to hit Florida instead.

We head out to finish the assignment from yesterday and it is the larger houses in the neighborhood. Again very elegant and they faired much better than the smaller homes because they are predominantly 2-story. Also the owners have the resources to get in early and get it cleaned out so the mold does not take hold. We get to a group of homes that has been cleaned out and I can't believe it. Although the water hit nearly 8' in this area, most of the homes have a 9' ceiling height. The sheet rock and insulation has already been removed to the 8' elevation and the mud and debris are already out. If you look at the home from 8' up, it looks perfectly normal:

Vivid paint, clean fixtures and otherwise normal except for very limited spots of mold on the ceiling. Pictures hang on the walls on the second floor like nothing is wrong. The chandelier in the entry is perfectly clean. I thought if only more home owners could have done the same they could be living back at home in no time. Of course there is still a lot of rebuilding left to do. They have to sanitize the studs to kill the mold, re-insulate, re-sheet rock, rewire all the electrical below 8' including the main panel, and reinstall all the cabinets, floor coverings and finish fixtures. But it is a real good start compared to the other 99% we have seen.

It is evident that the oil cleanup is gaining speed too. The last few days we have seen crews out and about in hazmat suits. We see skimmers in the canals and equipment cleaning up the heavily soiled areas. I read one report in the local newspaper that they lost 8 million gallons of oil and the same report mentioned 1.1 million gallons, so I'm not clear on how much was lost. It is pretty clear that something was released even though the oil companies 'don't know nothin' about any missin' oil.' There is a band of oil on all structures in the entire county. The height varies depending on the corresponding water level when the oil was released. Some areas we see the sludge on the ground and it has a strong odor. Other areas just the stripe on everything from homes to cars, to backyard play sets and trees. One resident I spoke with showed me where it was coming down out of the soffit around the outside of his house – the ceiling had already dropped on the inside. Even after the mud and debris are gone, there will be oil residue to deal with for the next generation or so.

On our way back to camp for a new assignment we stopped and talked briefly with one of the crews cleaning out a layer of sludge in one canal adjacent to the street we were working. They are out in boats in groups of two using shovels, pitchforks and rakes to bag all the contaminated debris into trash bags. We asked about snakes. He replied "What kind and how big you looking

for?" They run into snakes about every hour or two because the snakes hide in the same areas the sludge is stuck in. With the snakes, the sludge and the real hot suits, boots and gloves they have to wear, I'm real glad I don't have that job. I'm not sure how they survived the heat yesterday all covered in rubber.

We finished up the morning with a residential area behind some commercial buildings along the main highway. We stirred three medium dogs, obviously from the same litter. They were very skittish and ran around looking for a place to hide from us invading inspectors. One of the three had a severely swollen rear paw and was running on three. These were the first pets(?) we had seen in nearly a week. Three doors down I noticed an open bag of food that someone had left for them on one front porch. Hard to believe they are still alive with all the hazards, contamination and lack of water and food. Earlier in the week we had a number for animal rescue and we called when we saw animals. About Wednesday the number was no longer answered, so we had nobody to call. We made notes on our inspection forms in hopes someone could follow up on them.

After lunch we headed back out to a commercial area along one of the highways through town in an area called Meraux. It was very near one of the refineries in town so the haz cleanup was active to say the least. The first store I inspected was standing, but 75% destroyed. Most of the damage was from wind, but the water did its share as well. It was a wood frame building with brick veneer. There was not one wall intact, and the roof was gone. The brick was hanging on by a thread on two walls – the walls and the brick were leaning out 6-12". I can't imagine why it would not fall in a strong breeze. It was one of the few commercial red tags I wrote up.

One of the fire stations was along this route. I recall seeing at least three around town, all similar construction. Two-bay with masonry block over metal frame with two-story living quarters/office opposite. As with most metal

frame buildings, they fared quite well, but the masonry cladding did not. They don't really reinforce the masonry there like we do in CA. A little bit of wire, a few clips, but no little or no grouting, little or no rebar. At least on this station the entire masonry walls fell away from the metal frame of the apparatus bays, but it was otherwise intact. We did not go into the living quarters to see how well they fared – just not enough time. I'm not sure what they are using for fire stations for now, but there is a strong fire presence at our camp during the day and especially for meals.

We can't complete our assignment so we head in about 5 pm and call it a day. We are all a bit anxious back at camp knowing we have only one more day in the field, two more nights in the tent.

Day 8 – Sunday

Even with our easy day, we completed 1,180 reports yesterday. Again we are told to take it slow and enjoy our day. We are encouraged to go out and see the Delacroix area of the Parish, 20 miles east of where we have been working. The area was destroyed by the water and has a 'unique' aroma not to be missed. After a group photo and words of encouragement from the boss we head out to complete the unfinished assignment from yesterday.

As we got to the field for our last assignment, I felt a little more vulnerable than I had all week. I hate to compare myself to a soldier because our jobs are not nearly as noble nor as dangerous, but that is what came to mind probably because of a movie I had seen. I felt like the soldier that was diverting his attention to not getting hurt on the last day of his tour. I found myself looking at the other side of brush piles before I jump across, looking into the shadows and mud for snakes and sharp objects, avoiding the down power lines, looking overhead for hazards – you know the stuff I should have been doing all along. I thought that I'm going home tomorrow; I don't want to get hurt now. I don't

want to spend days in a hospital instead of going home to my own bed. Funny how those thoughts enter your head.

My first inspection is the RV sales lot from which the RVs we saw earlier in the week came. The metal frame buildings that made up the sales floor and repair shop did OK. A third building that was a storage building was more damaged from floating debris and RVs. The siding was partially ripped off and a healthy helping of debris was deposited inside. The lot had as many as 100 camping trailers, 5th wheels and smaller trailers. Some looked untouched, but most were tossed, twisted or damaged by debris. All were flooded by 6-8 foot of water. As I look out across the highway, a few litter the median and shopping center across the street. I see the dozen or so in the empty lot and the 6 piled up in the corner smashed against houses that I saw earlier in my inspections. I now know where they came from. I believe that the trailers will be a total loss because of the toxic soup and salt water they were submersed in for weeks.

As with yesterday, our assignment included a residential section behind the commercial sites along the main highway. Typical damage in the homes but a little surprise in our last block. I hear a crying cat two or three houses away. As I work my way that direction I look but see nothing. As I get closer, I cross the street and see a small grey kitten in a tree. He/she comes down to greet probably the first human it has seen in weeks. It is much too scared to get close enough to touch, but calls out loudly none the less. He follows one inspector on that side of the street from house to house as we work our way to the end of the block. We cut a water bottle open and give it water and a bit of peanut butter and crackers that one inspector has with him. Since he did not have the skills down to drink water or chew the crackers we guess that he is about two months old. We are not sure if he is pre hurricane or post. It is possible that its mother has been alive until recently because he is not starving or dehydrated, even after 8 weeks. He is the

only one we see/hear. We tried to catch it and bring it to the animal rescue folks near the medical clinic, but he was not at all used to be touched or picked up. Even though he was small, I can tell you his claws are fully-functioning. He left me with a nasty scratch that I immediately went to clean up to avoid infection. We were forced to scare him away from the van so we could leave. We could hear him cry as we left the area. Hopefully he will get out back up a tree and out of danger. The pack of dogs we saw yesterday were only a block or two away and I know the snakes would have had a good meal of him.

We take a detour to the Delacroix area to finish out our morning. A few miles out of town on the main highway we see a line of vehicles on either side of the road. It appears to be at the top of a local rise in the terrain. I thought, "What a strange place to have a hot dog stand." Even with the limited traffic, it seemed to be a dangerous place to encourage people to stop. As we come upon the vehicles I realize that they are abandoned. It was almost a graveyard. It was apparently highest ground they could find when they were overcome by the flood waters. Hopefully they were all safely evacuated. There were cars, trucks, RVs, horse trailer, school busses and semi trucks, probably about 40 huddled together in a 1/8th mile stretch of highway. A bit ominous even after all we have seen.

Before we get to the area of devastation the boss told us about, the aroma comes out to greet us. I don't know if this is the natural smell or something special Mother Nature put on for us since the flood. The area is 100% swamp and bayou. Water on both sides as far as you can see. A navigable canal/river abuts the road on one side as we get nearer to the area. We begin seeing arrays of telephone poles sticking up out of the ground, spotting the roadside at regular intervals. We did not realize it at this time, but that was all that remained of the houses that used to sit on top of the poles. As we got closer we saw more pole foundations with remnants of houses on them. All the buildings in the area

are up on poles 8-10 feet above the ground. The wind and flood were very hard on these homes. Much like the mobile homes in town, they were treated like targets. Most were either displaced or destroyed where they stood. Since it was basically swamp, it is hard to tell debris from normal vegetation.

The river side was dotted by docks and boat houses. Most were generally intact and had boats in them and/or boats sunk or partially sunk around them. This area was populated by commercial crawfish boats and leisure/fishing boats. There are more people coming 'home' to this area than there were in the city – relatively speaking. These people seem to be more persistent or perhaps they are more tied to the river for their livelihood? Almost each boat dock has some activity. As we get into 'town' there are about 3 houses that are still smoking from a recent fire. I later heard that one of the residents lit the brush on fire to get the debris off his property and it got away from him.

The street ended at a dirt parking lot for a boat launch and large boat dock. No left turn, no right turn, just an end of the road and swamp as far as you can see in any direction. Along the last mile were tractors, riding lawn mowers, forklifts and cars washed into the river. Just the heavier things left behind from what used to make up a dozen or so homes. Maybe four in ten properties had something left behind to recognize it as a residence and of those four maybe one that appears to be watertight and habitable. Fortunately it was a sparsely populated area compared to the city, but still there were probably 60 or 80 homes along the road we drove. And as a follow-up, you get used to the aroma after about 15 minutes and you don't notice it after that. I guess that is what the workers in a sewer plant would say too?

Back at the camp we lost two more inspectors to early flights home, one from our team. After lunch we adopted a member from a team that had 5 and also took one of their assignments that they could not finish by end of day. Since our navigator was now on his

way to the airport, I was "promoted". Not surprisingly I got us a little misdirected because the parish drawn map was not current and most of the road signs were down. A street that was a through road on our map was a dog-leg (like a cul-de-sac) and we had to backtrack to get to around where we were supposed to be.

We began on what looked like any of the other many neighborhoods we had visited this past week. In the rear of the first house I discovered a pool with not one, but two cars in it. I thought, wow, that is a first (for me). In the next house I saw 5 cars piled up in the rear yard of the house I was working and the yard it now shared with the homes behind it. At the next home was another two cars but this time in an above-ground pool. I had not seen or heard of two cars in a pool, now I see two in one block on the afternoon of the last day of our tour. Although the debris or mud was not exactly noteworthy, the amount of cars in the rear of these dozen homes was notable.

As we rounded the corner and began the next street I thought to myself yet again that this was the most remarkable thing I had seen on the entire trip. Strangely, or perhaps arrogantly, after two days you get the feeling that you have seen a sample everything there is to see in the disaster, but each time it adds another dimension or another level that you could not imagine in advance. At this point, what shocked me on Monday did not warrant a second glance by Wednesday. What stopped me on Tuesday did not slow me down on Thursday. And what confused me on Friday was understood without a second thought now. By Sunday it takes something real strange to get us to stop and take note, much less snap a photo. It takes two cars in a pool, not one. It takes a perfectly vertical car on the tip of an eave, not one just leaning on a house. Each time I have seen the worst or most unbelievable, I am surprised by the next site over and over again.

This time it was about 5 homes on the remaining blocks of our assignment that had

moved slightly or entirely off the property and even off the block. What made this so remarkable is that these houses were slab-on-grade and they moved WITH their slab foundations still attached to them. All the other houses we saw off foundation or off the property were either pier footings or they left the foundation behind. This was the first time I saw lots where the house and footing were gone. I don't think I would have believed it if I had not seen it for myself. That is a 20-30 cubic yard concrete anchor!

At least one house moved up and down without really moving away, but it separated at sidewalks and driveways. One house moved about 20' without moving totally off the property. And still another on the very same block moved across the street and down the block about 6 or 8 houses. Around the corner was an empty lot with no sign of the house. We could not find enough debris in our entire area to support a destroyed house especially one with a complete foundation attached. We saw some homes out across a canal in a swamp area but we could not confirm if it was our missing house. That evening we found out from the team that had the streets next to us that our missing house was in the middle of the street about 5 blocks away from where it started the season. This explains the error in the map; the dog leg was created by our house landing in the middle of the street near an intersection and made it look like it belonged there. It was not my navigation skills after all (this time).

For you construction and engineering inquiring minds, the slabs were post-tensioned and apparently included appropriate connection to the walls that we had not seen in most other homes we had inspected. That is how the slab remained intact and still connected to the structure. Nonetheless, it is quite impressive.

The last damage of note was the house at the end of a true dog leg. This neighborhood, being generally close to the levee I described previously, was exposed to the large wave of water. This explains all the houses that left

with their foundations still attached. They were pushed along by the wall of water before the water had a chance to get inside them so they were buoyant. Had the water risen slowly and got inside the houses, they likely would not have moved at all. Similarly, the house at the end of the dog leg was exposed to the wave as it flowed unobstructed down the street. The gable wall facing the street was pushed in at the plate about 2' and a large window below it was blown in. The water rushed inside the house so rapidly that it pushed the brick veneer off the rear wall and the side wall, from the inside out. With the falling bricks it collapsed the carport in the rear of the house. It also explains the observation on the previous street with all the cars in one backyard and the pools. The water washed in so aggressively it collected a few cars along the way and deposited them in the back yards of a few homes. Just up the road by the house that lifted and sat back down the wave took a new truck and perched it perfectly atop a 6' wrought iron fence, like it was done as an artistic display.

This area was also hit hard by the hurricane. There were two, two-story houses that lost half or their entire roof and part of the upper wall. They looked a lot like a dollhouse with a removable roof. The second floor was completely visible from the curb. You could see beds, drawers, chairs and bathrooms - completely intact other than the missing roof. If you look past the fact that these were somebody's homes, it was a good way to wrap up our week in the field. We were exposed to few sites that were otherwise unbelievable.

We got back to camp about 5:30. Personally, I was satisfied with the feeling that we did a good days work till the end. As our last evening in camp began, Hurricane Wilma began to let us know she was coming in and LA was not forgotten. The winds picked up a bit and the temperature dropped. The tent was flapping and groaning. Any who have spent time in a large tent know what a little breeze can do. Hopefully you have not found out first hand what a real strong wind can do.

Fortunately we were somewhere in between where there were a lot of creeks and groans, but it stayed where it was set.

At the end of the evening and we got a heart-felt 'Thank You' from the Lt. Col in charge of the recovery effort. He recently switched from active service Marines to the reserves so he could accept the position. Even though he is a busy man with the huge responsibility he undertook, he came to our tent to thank us personally. As he went on to tell us that without our effort to identify just the extent of the debris on the ground, and that this issue was now recognized by FEMA as a direct result of that fact, I was shocked to see tears in the eyes of a high ranking Marine. He got so choked up he could not finish and had to leave the tent. Not many of us had dry eyes after seeing that. I was touched.

Day 9 – Monday

At long last, it is the final time I crawl out of my bag, remove my earplugs and hear the roar of the air conditioners and the rustling of 50 people in the shadows. That much I will not miss. Like a bad dream the breeze is still blowing in the tent and the walls are still flapping. They were going ALL night long. The breeze inside the tent was so strong that most of us grown men later admitted to reverting to the fetal position in our sleeping bags sometime during the night to stay warm. I don't think I slept more than 30 minutes in a row all night or 4 hours total. I can stand it no longer so I get up around 5 am. It is about 55 degrees in the tent, and I'm convinced 45 with the wind chill. I really wish the camp hosts would have switched the AC units to heat mode. I make my way into the dining tent to write some notes. It is about 10 degrees warmer because someone did switch the AC to heat mode. Still it is uncomfortably cold.

I can't imagine what the two new coordinators who flew in last evening to relieve us were thinking. Of course we played it up at breakfast by suggesting to the new guys that it was the calmest night so far and hopefully

they came prepared. I'm pretty sure that I gave it away because I had every piece of warm clothing on that I packed and I was still cold. It was hard to miss that everyone had a little more of a grin underneath their morning faces and a bit more spring in their step than they had yesterday. We were all looking forward to going home.

After breakfast everyone heads back to the main tent to pack. I'm a generally educated person, but I can't figure out why it is almost impossible to pack the same gear back into the bags I packed it when I left home. It is not like I have a lot of souvenirs to bring home and I'm even leaving behind a few things for the next group to use. From the grumblings in the tent I am reassured that I'm not alone on this. Some are searching the food prep area for boxes to pack their stuff back in.

The boss gathers us for our last little talk. We again did 1,180 reports yesterday which is more than anyone expected with the diversions we all went on. We finish the week with about 11,000 reports for a grand total of 16,298 reports for the two weeks and no injuries. Everyone is happy with our progress. After a group photo outside, we began loading up and heading our different directions. Half of us stragglers will fly out of New Orleans this morning or afternoon and the other half will drive the rental vans back to Baton Rouge and fly out of there. It an experience that none will forget I'm sure.

The daily sites that had become 'normal' to me after only a week in St. Bernard Parish now seem a bit out of place as we cross the 9th ward into New Orleans Parish. As we get closer to the city. I see busses, people walking on the streets and a working traffic light. Wow, electricity and open stores. It seems like we came through a time machine from 50 ago or even a 3rd world country. Hard to believe we were in the USA this last week. We have lost track of time because it all seems to run together in that environment. We have not really seen the news or the outside world in 9 days. I would not know what day it was if it were not for my watch. Of

course that does not apply to the first or the last day because we all know well those days.

We make a short stop in the Bourbon St area to pick up our Katrina T-shirts and souvenirs for family. We stop for a beignet before we go; a must for any visit to New Orleans. Both my traveling companions had never had one, so it is imperative. Unfortunately it is too early to have lunch and we can't wait. I'll have to go without having red beans and rice.

As we fly out, I look down and see the clusters of blue tarps on the city. It is clear that some areas are hit harder than others. There is no discernable pattern to me, other than random. I can't tell where our area was or even if we can see it from our path. It all looks the same now.

8 ½ hours later I have my bags and I'm in the comfort of my own car in Sacramento. Fortunately my wife has come to pick me up because after the rough night in the tent, the long day and the time zone change, I don't think I can complete the 3-hour drive awake. Even now all I can think about is a normal bed to sleep in and a shower with no breeze, no neighbors and no chain to hold the valve open. As we get close to home the horizon is lit by a pretty good lighting storm. We get home to find the neighborhood looks strange but yet vaguely familiar to me – the power is out and everything is dark. No street lights, no traffic signals no lights inside the house. A bit ironic after all. I take an enjoyable shower in the dark and put the long day behind me from the comfort of my own bed.

Epilogue

It is now a week after my return to CA. It has taken me this long to convert my notes on paper into the electronic version you see above. I can't believe it has taken this long or filled this many pages. I have had the opportunity to share my experience with a few people now. It amazes me how people are interested in the silly little stories I have to offer. I have showed the folks at work most of

my pictures that I captured in my tour. What I thought would take an hour to show has exceeded two without getting to them all. I did not realize that I took over 500 images (less 20-30 that are duplicates or no good).

To bore some of you with the analytical side of things: Overall, the masonry veneer, wood-frame dwellings that were slab-on-grade performed well. It is hard to argue that there were many that were damaged, but given the scale of the widespread damage and magnitude of the storm they did well. The houses that had pier foundations and did not have the masonry veneer 'anchor' holding them back were quite mobile; even in the areas that saw only 4-6' of water. The steel frame structures were almost undamaged by the storm, but they may see longer-term issues from corrosion after being exposed to the salt water soup for weeks. Of course the long term water exposure is damaging even to the wood structures. We saw sagging wood beams and rusting nails and framing anchors.

Not to be critical of the building officials in the region, but compared to what we are used to in CA, the buildings we saw were significantly under constructed. It should be noted Louisiana and the New Orleans area have a proven track record with many buildings in excess of 50 to 100 years old that have survived the test of time and numerous hurricanes. Further, even a building that meets CA standards would likely suffer similar damage if exposed to the worst of the hurricane or flood waves as some of the severely damaged buildings we saw. Never the less it is clear that the connection methods for houses to their pier footings needs to be looked at; the thin wire reinforcing in the masonry block is not effective; the brick or masonry veneer connection to the wood or metal frame needs improvement; they should really consider rebar with partially or fully grouted cells for reinforced masonry construction; and the framing anchors, clips, bolts and straps should be much more prevalent in wood construction. We were beginning to joke that

rebar must be too expensive, hold down bolts must be illegal and they apparently don't allow Simpson in the county because we saw so little if any. Hopefully the local codes will be adjusted to reflect these needs and the implementation will become more common in the reconstruction.

After the visions of smashed houses and tilted cars fades, I hope I'll remember the hospitality and generosity of the residents who offered us water even though they lost everything. After the scent of the mud and dampness is forgotten I hope I recall the teary eyes of the Lt. Col. as he thanked us for being there to help, and because of identifying the amount of trash of all things. These two things alone make it all worth while.

Looking back, it was the experience of a lifetime as a citizen, and the exposure of a career for an engineer. As I was coming in to work for the first time last week I thought: I'm really glad I went. I'm even happier to be home. And I'd do it again without hesitation.