



MASSACHUSETTS CULTURAL COUNCIL  
FOLK ARTS & HERITAGE PROGRAM

## AUDIO TAPE LOG

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Fieldworker(s): Maggie Holtzberg

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Brief summary of tape contents: Continuation of interview with Business Manager Dan Kuhs and Regional Council Representative Dave Woodman. Less formal -- Dan puts in several videos that demonstrate various aspects of pile driving. He gives a running commentary, with Dave Woodman chiming in as well. They are much more animated.

Counter/ABS	Contents
	DW: The MBTA Silver Line Project is underway. And that also is a sunken tube tunnel project that's happening and a lot of pepole are distracted and don't know that it's happening.
	DK: That's major. That's a big project. The first phase of that was 90 million. The second phase was 110 I think:.
	MH: When is that supposed to be done?
	DK: The first section is supposed to open, geez, I don't know. Next Spring?
	DW: Well that's comprised of those surface vehicles that you see running from Roxbury that are long with an accordion type center. When they reach that South Station area they'll drive down into the tunnel. There's a stop right at the Seaport area here. They'll surface out here at the new D Street. And also have access to the new convention center.
	DK: (responding to video) That's probably, aesthetically, the nicest thing to come out of this, the Zakim Bridge. We did the foundation work on it. We finished up there, it wasn't even a memory. We were gone before it looked like anything.
	DW: That same design has been used, I was in Savannah a couple of weeks ago. There is a new bridge that's just opened there that same design. And then a

monstrous bridge that goes across the Cooper River in Charleston, South Carolina. I was there for a submarine reunion. But that Charleston Bridge you can see for miles around, it's so flat there.

Did your folks work on the John Hancock?

DW: Both.

MH: I remember in Tunnel Work, back to the danger and losing life, "a man a mile."

DK: They talked about a man a mile on Deer Island. And Deer Island, unfortunately, we had a double fatality out there at the very end of the job in '99. It was, what, five altogether out there?

DW: Five total on that project. So, with all due respect, tunnel workers is very very dangerous but in that work also the technology has changed. As a result the work has become that much safer so the man a mile thing is hopefully very antiquated.

MH: Yeah, it's an old phrase. (referring to video) So what's going on here?

DK: That's some of the heavy bracing that goes into the hole to support excavation. That was over on the piles for the convention center. Some of the concrete piles.

MH: So concrete is used now, not timber?

DK: You'll see timber on docks, waterfront stuff. Small stuff. Concrete lasts a lot longer. It's engineered, it's a whole lot stronger. It's consistent. You can engineer a concrete pile, it's easy to do the numbers on it so you know what the capacities are of it. So that was one of then 5400 piles we drove over there on the Convention Center.

[a very muddy scene] This is typical, if you look at the mud around, of a pile driving job. Now he's cleaning that pile off, he'll splice it and put another one on top of that. But this is over at the airport. You can see the conditions you're working under. Your gear on, they're augering. Everything was in the mud and the water. They'll auger a hole first sometimes and then put the pile in and then drive the pile in the rest of the way.

MH: So do you have crane operators or are they-

DK: No, that's Local 4. We work with a crane operator. He'd be running the rig.

DW: Now those pile, they probably weigh in the area of 225 pounds to the foot. And the hammer is probably a 14 or 15 ton hammer. If a piece of that Boston clay say the size of a softball falls off of the auger from 50 feet up and hits a guy in the head, you know you've been hit.

DK: You can see the can see the conditions. If you have to move quickly, these guys are all shin deep in the mud, you just can't do it.

MH: And how does everybody know what they're supposed to do?

DK: The guys work together. Putting the pile in the ground, there's not a lot of steps to it. It's a relatively simple procedure. So it gets redundant. That job was really messy. It was a real wet job. They had drainage problems over there. That was for the new terminal, Terminal A.

MH: In the old days, like say in the railroad trade, there were chants to coordinate people's activities. Was that ever true in pile driving?

DW: Not that I know of.

DK: The only chant you get is the foreman telling you to pick up the pace.

DW: Maybe after hours, in a bar [laughter].

DK: That's the hammer driving the pile down.

MH: Boy, it's going pretty slow, huh?

DK: That's actually driving pretty good. You'll get times, particularly when you're driving steel, when it'll just keep banging.

MH: But you've already excavated?

DK: Not always. See with concrete piles, depending on the soil conditions, you'll pre-auger maybe 25 feet, maybe 30 feet. And the pile might be 70 long. So you get it in the hole, then you'll start driving. Sometimes you'll splice another pile on top. You might be driving 100 foot, 110 footers, 130 footers.

DW: But they may, because of the augered hole, they perhaps have a free run of 70 or 80 feet. Then there'll be soft driving before they retrock[?] or resistance.

DK: You're not gaining anything by driving it through the soft soil, because a pile, until it fetches up to where it's supposed to be, it's not doing its job. So you can auger through the top 50 feet --

MH: Once it hits the rock, is it actually being driven through the rock?

DW: No.

DK: What you do is you drive until you're on whatever strata you have to be on that's going to support the load you have to. Then there's combinations where it sits on what it's bearing on, plus the size of the pile, there is friction to the pile - that also comes into play. So a bigger pile has more friction, has more bearing, depending on the soil conditions, whether you're using pipe pile, H-pile, concrete pile.

MH: So there's a lot of engineering involved. Who determines what kind of pile you use?

DK: Whoever the engineer for the project is.

DW: There are other piles that are tapered and fluted. And are driven with a mandrel. A mandrel is something that goes all the way down through the center of a thin, metal-walled pile and drives the bottom of the pile.

DK: What happens here now is that sits on to a little groove there. See how it fits into a hole. Then there are little wedges that you drive in that holds it together. In times past you just would do a butt weld all the way around that. This is a little faster.

MH: So it's not really mortise and tenon.

DK: Well it's the same principle. See you drive it with impact on it. Now watch this [chuckles]. Here's an apprentice, right? A young kid, good kid. Now he's only got so much horse power to put into the hammer, right? I think Jeff takes it or Jerry takes it and blows it in in about two seconds. Now watch this.[laughter] He had a bout 200 more pounds pushing on the hammer.

Then when you get all done, usually you'll end up with a cut-off that's sticking up 6 or 8 or 10 feet sometimes. You go along later and cut it off with a cut-off saw. You'll drill holes in it and you'll put rebar in it. Those are cushion blocks. When the hammers driving, it doesn't destroy the concrete.

MH: How do these guys get cleaned up at the end of the day? [DW laughs] No really, I'm serious.

DK: Go look inside one of the trucks. When we worked in the harbor we kept a thing of dish soap and you'd grab a bucket of water out of the harbor and you'd clean yourself like that. . . There's a guy burning a pipe pile.

DW: Well actually, during the winter months, or outside of the summer months, guys wear coveralls.

DK: In the summertime, you usually take a change of clothes. I used to wear a pair of jogging shorts under dungarees, just peel them off at the end of the day and drive home in shorts and t-shirt.

MH: Boy the wives must love the laundry.

DK: Mine used to love it when I'd come home from a week on the road.

That's a pipe pile job. He's driving some sheet pile in right there.

MH: What's sheet piling?

DK: For supportive excavation. This is plastic. [Dan grabs a small section of plastic sheet piling to show Maggie.] This would be steel on the job. This is what a sheet would be. You have a male and a female, a lock.

DW: We have that because we used that to decorate out where you came in the office. On the counter.

DK: This is all how the industry has changed here. Back when I was still out in the field, a man would sit up on top of the sheet pile. Now because of safety

conditions, they like to see you working out of a man lift and people are tied off. See, there's a guy monkeying sheets. That's how we traditionally used to do it. So you'd be up in the air, 50 or 60 feet, now he's harnessed up. We never used to tie off. You just sat up there and grabbed it when it came around. This is on a bridge down in Somerset, near Fall River.

MH: When did that switch, that you had to be tied in?

DK: The 100% tie-off? Early nineties, I think. It's kind of evolved. It went from where we used to just wear a waist belt to wearing a full body harness, to 100 % tie-off with two lanyards. Once again, the Central Artery probably brought all of that stuff to forefront.

MH: Do you think it's a good thing?

DW: Not in this operation.

DK: This operation it's tough. I've done it both ways. And it's real tough to be tied off, because what'll happen sometimes, if you're not tied to the sheets, and you have to clip off on another one, sometimes when you stick the sheets, they'll run.

DW: The one you're sitting on will run.

DK: Right, it'll drop down 3 or 4 or 5 feet suddenly. If you're tied up to something behind you, and you fetch yourself up, you can get yourself in a jam.

MH: Also, I would think among the older members there might be this sort of bravado of "In my day . . ." right?

[They smile.]

DK: Here is that same coffer dam. So, like I was saying, you're working in close proximity, you can't always get away from the load. So if something happens and the rigging fails, something that's totally beyond human control, you can get yourself in a jam real easy.

MH: Now what is that machinery?

DK: That's a hammer.

DW: A hydraulic hammer.

DK: That will vibrate the sheets down. It clamps onto the sheet pile. There's a certain amount of weight to it and it shakes the sheet in.

DW: The steel that it's standing on is a template.

DK: That's called a false work.

DW: They'll stick the steel sheet piles all the way around, just so they have something to attach it to, until they can get the hammer on it and drive the sheets down.

MH: Are there nick names for stuff?

DK: Hammer. Vibrale. It's a vibratory hammer.

DW: There are air hammers, diesel hammers, steam hammers, electric hammers.

DK: So we do a lot of work out of hand baskets hanging off a crane. See, once again, you've got a pile that's 70 or 80 feet, so if the thing falls or something happens, how fast can you run 80 feet? And are you running in the right

direction? It's even more critical when you're working on a barge out on the water and something goes wrong because now you've [got] really limited access as to where you're going to go and you're going to get out of harm's way. So it's just a case of just being alert. Of knowing what's going on around you. Knowing what the next step is and anticipating any problems you're going to have.

MH: And team work.

DK: Yeah, particularly on a pile driving operation, it's usually a four or five man gang. And everybody plays a certain role in that operation. That's a diesel hammer.

DW: Probably the more recent rise in steel prices will have an influence in the type of piles that are selected in the near future. Then you'll see redesign from structural steel buildings to cast and place concrete buildings.

MH: So the concrete doesn't freeze or crack? I don't understand why that wouldn't be vulnerable to freezing.

DK: Well the piles are all pre-stressed concrete piles. When they pour the pile, there's a number of strands of cable in that they take a certain amount of tension on. Then the pile is poured. That gives it a certain strength, certain bearing weight. Certain capacity. When you pick up a concrete pile there is a certain amount of flex and bow to it. If you didn't have the pre-stress cable it would simply break. The old ones had rebar in them, everything now is all pre-stressed wire. That's just a standard, typical pile driving operation.

DW: I don't think weather effects the pouring of concrete today, like it did years gone by, because they have so many additives.

DK: Yeah, I've poured concrete year round, in the winter. A few more precautions with insulated blankets when you do it in the winter time. It's just more of an aggravation. [referring to film] That's pretty easy driving, that's going fairly nice right there.

MH: So at Leverett Circle are any piles being driven right now?

DK: A little of pile work over there but they were doing slurry wall and bracing. There were some soldier piles and lagging, cause there is a fair amount of utility work over there.

MH: What's a soldier pile?

DK: You'll drive an H-pile in the ground, right? A number of them. As they excavate, you'll put timber boards inbetween them; it's a lagging wall. As opposed to driving sheet pile. It's supportive excavation; you're keeping the earth from coming in.

They put the softeners around the straps. You see a lot of Kevlar nylon straps now. They're very strong but they're also very durable for cutting. That load there, that's probably 40 ton of steel there. So if something snaps or breaks, then you have a domino effect. If all of a sudden one sling gets the load, then you have a problem.

MH: Boy the crane operators must have a lot of stress.

DW: Well in this type of a pile driving operation, the crane operator could be using 3 or 4 different drums, cables.

DK: [referring to film, which is now showing a pier site near the Children's Museum site.] These are square timber pile and they have to cut the head down so the hammer fits on top of it. This is over by the Children's Museum, right down Northern Avenue.

DW: Actually I think that's green hard, is it, from South America? That's extremely expensive and that's what will hold up the pier at the Children's Museum at Fort Point Channel.

MH: Do guys wear ear protection?

DK: Yeah, most of them do. Most pile drivers are half deaf from the time they haven't. It's like everything else, the safety, it's taken a number of years for it to evolve. But the job sites are a lot safer now than they used to be. There's a lot more personal protection equipment on than there used to be.

See he has some false work set up there. He sets it on the barge, the barge is in a certain place that'll hold the pile where you want it to be. The engineer will give them a markora location.

DW: Now you watch the friction on the hammer on the top of the pile, will almost set it on fire.

DK: What's going to happen, if the pile is in, you're going to cut this down.

DW: So that's some of the skill we're talking about. Somebody that can use a chain saw when you're building a timber dock. You need somebody that can weld and cut with a torch when you're building a steel dock.

DK: Because not all docks are timber, not all docks are steel, not all docks are concrete, you've got to be able to go from timber to steel.

DW: Which is unlike an iron worker or unlike a carpenter.

DK: You also notice the size of the float the guy is working on. Not the most stable thing in the world.

MH: And he's having to do it level!

DK: Right - you're doing a relatively precision cut there with a chain saw, working on the water on a float like that.

MH: You have to be flexible and resourceful -

DK: Yeah, exactly. Resourceful, very resourceful. Because that timber is extremely expensive. That's been cut to elevation already. So if you mess that cut up, it's not going to accept the timber that's supposed to be on there for the cap. You can't just cop it together.

DW: That type of pile is so heavy per foot that it won't float. And actually when you receive that type of timber on site, if you're not going to use it right away, it has to be stored under water.

DK: It's tough on the chainsaw. You're constantly sharpening the saw. You usually have somebody spotting it, because it's real easy to get the saw, particularly when you're cutting something hard, the saw gets a little bit dull, it won't cut straight. So in addition to being able to make the cuts with the saw, you got to be able to dress the thing up with a chisel, a file in a short period of time. And do a decent job.

MH: So would you say you're the most diverse of all the - it sounds like you need the most diverse skills.

DW: We think we are.

DK: I do, absolutely.

DW: The tunnel worker and the iron worker will probably disagree.

DK: But when you talk to them, tell them you talked to the pile drivers and you agree with the pile drivers. Well just because of the different materials we work with and the different conditions we work under. Maybe it's a rain job, maybe it's a [?] job, maybe under water or maybe you're up in the air. You can't be afraid of heights, you can't be afraid of water.

I actually have a tape of the Third Harbor Tunnel if you want to take a look at it. It shows the construction of the tunnel sections.

DW: He did a good job on that.

DK: Oh yeah, he did a nice job on this. That was a nice job over there, a lot of woodwork on that. The wood jobs -- I always enjoy those the most. Those are the best because they require the greatest level of skill. It's more traditional than what we do. So once again, you have guys out there walking on the stringers. Then you get the piles driven. If they're off line you pull them in. You pull everything in line with a chain fall or come-along. Once you put your stringers on, your deck and everything is tied together, it can't move.

DW: But you see, when I broke in, it took real men to do this type of work because it was all creosote and timber. Versus what's naturally treated here.

DK: The creosote stuff is tough -

DW: That would take the heart right out of you. You know, in July or August, absolutely terrible.

DK: If you're driving creosote piles and when it was hot, the things were always bleeding out. So when you're driving the creosote would actually come out of the pile and splash. Or if you were drilling or cutting, like he was doing, and you had a dull tool, you're sucking the fumes from the creosote -

DW: And if you were blue-eyed and fair skinned, it could burn the skin right off of you.



DK: Or you'd be on the ride home, all of a sudden your arms would start to burn, cause maybe it was July and you didn't wear long sleeves that day.

DW: The cost of this construction here is more expensive than any other type of construction.

MH: And this is part of the Central Artery or no?

DK: No, this is part of the Silver Line. At the Children's Museum, they took what was the existing pier there for the Silver Line. So part of the remediation is reconstructing the pier. That's the Northern Avenue Bridge, with the Moakley Bridge right behind it.

MH: So is that where Hook Lobster is?

DK: Hook Lobster is right across, the other side of the bridge over there.

DW: You can just barely see the federal court house on the right.

MH: Look at his balance - he's just standing on nothing.

DK: Right. And that's typical of the way we work right there. And once again, that's July. If you go in the water in July it's not so bad. But we've done the same thing in January. But the marine work we do is absolutely the best.

MH: When is the last time you did that?

DK: The last time I was in the water? It's been [whistles] probably eight years ago. Here, I'll throw this in quick just so you can see what the tunnel sections look when they're constructing them. This is a promo tape that the joint venture put together. [music and voice over in background]

MH: Were you one of very few marine divers?

DK: In our local, when we did this job, I think there were 8 of us that were diving. In the local here now, we've got probably 50 guys that would call themselves divers. And maybe 20 or 30 that really pursue it actively. That's all I did exclusively when I first came in. Then I got sick of knocking around. My kids started to get older.

MH: How old?

DK: One child is 12, ~~one~~ is 22. She's trying to decide on grad school right now.

This is the old Artery. As much as everybody wacked this project and wanted it to fail - and I live in the North Shore. My commute is 15 minutes shorter every day. Just getting out of town; it works. As much as everybody didn't want it to.

Right here- that is what they dredged the tunnel section with. The big scoop, they dug with, and that's the lay barge. That's what we did all the diving off of. Most of the diving was off the lay barge.

[Talk about Morrison Newton. Then film narration about immersed tunnel sections.]

MH: They were built in Baltimore?

DK: Yeah, then they shipped them up on barge. . . So it's a shotgun, double barreled. . . working inside, doing the road bed. . . they weighed 9,000 tons when they came up. By the time we sunk them, right here, they were 30,000 ton.

DW: And all that outfitting where that took place, right over here on Black Falcon where the cruise ships come in.

film - "the lay barge." DK: That's where I spent all my time. . . . that's the top of the tunnel right there. That's me right there.

MH: That's you?!

DK: That's the [?] The deepest trench in the center of the harbor was 110 feet to the bottom of the trench. When he set the sections down, we used to have to go down and measure. We'd go down and check that there were no lobster pots or anything in there. They sunk them together and then we cut the bulkheads out of the inside. We poured concrete in the water too. That's the best way to pour concrete. You got to pump it, you can't let it free fall. So divers would go down, we had a tremme pipe and stuck it in pockets in the center. You had it hooked up to a pump truck that was on the barge. They'd bring concrete buckets full out and just dump it in. We used to pump, for ballast concrete, between 12 and 1400 yards on every tunnel section. That was the most interesting project I ever worked on. The general foreman was an excellent guy.

So we're out there doing that stuff at two o'clock in the morning, middle of January. We worked some hellacious hours on that job. Good company to work for [MK] safe, work got done on time. This was 91-92. The lay barge, we had ten anchors on it. You'd run the anchors out in different configurations. Then the winches would pull the barge in position, before you set the tunnel section down.

MH: How do you see under water? Do you have a light?

DK: You do on your helmet but usually it's so muddy you can't see anything. It's just by feel. All that stuff we did on the bottom of Ted Williams, you go down between, if you're measuring ledge, you drop down. I know this is two feet, - like that. Most of the stuff, you could only see a few inches.

MH: Was it usually in the right place or would you have to tell them to move it?

DK: When we set the last tunnel section, there were alignment beams on the back of the section. When you set one down it fell into a groove. So when they went to set the last section, it was about eight o'clock at night. They go to set the section down and they had four falls that they lowered the tunnel section down with. They had weight indicators on them so they could watch them, so they know that one's not getting heavier than the other. It was getting light on one end. I was the first guy in the water. So I went down to check it. The horn beam was hitting too far back. You needed to bring the tunnel section this way a little bit. Well it was a closure section, so they couldn't do it. They had no wiggle room.

So, I'm in the water waiting. I said, "You got to pull it to the east." So there was dead silence. So they said, "Measure the horn beams." So I measured it, it was eleven feet long; it was supposed to be nine." So dead silence again. I'm sitting there. These beams are 30 inches by two feet, two-inch thick steel. They're heavy duty steel. So they go, "Measure it again." As soon as they said that I knew -- I said, "It's still eleven feet, it hasn't changed." So, they go, "O.K., you've got to cut two feet off each end of it."

It was a tough burn, just cause of the heft of the steel. We started burning on that, around nine o'clock at night. We were working in 70 feet of water, so we were burning guys up. There were six or eight divers out there that night. So we cut all through the night.

MH: What are you cutting with?

DK: It's a coated metal rod that you blow oxygen through - there are different kinds. These were c-cut rods. It's a round 3/8s inch metal tube and it's got seven steel rods and one magnesium rod inside of it. So when you strike an arc, it's hooked up to a welding machine. You blow pure O<sub>2</sub> through it. So you strike an arc and the magnesium burns at about 10,000 degrees. That ignites the steel rods as fuel. You can cut through anything. So we cut the steel off. We started burning. We saved one guy fresh to go check the other end, cause there were some alignment problems. He came out of the water around five o'clock in the morning. I was running him in the chamber. So we got that all done, got that thing in place. The sun was coming up and I'd been the first diver in on the cutting operation, so I was the freshest guy again. I've been up all night. "It's o.k., you've got to go in and pour ballast concrete now." That started the next day then.

So we started the next day and ended up pouring about 1400 yards of concrete, to weight the thing down, so you could take the falls off of it. That was the day before Thanksgiving. We worked, we finished up around 9:00 that night. We went 39 hours straight.

MH: You were in the water all that time?

DK: No. It's actually two guys, because of the water depth. They limited it to an hour, an hour and a half in the water. So you'd go and do your dive, go in the chamber, get cleaned up, go back out. We had eight of us. We just kept going. Got it in; got it done.

That was the neat part about it. That was a part of the tunnel that nobody else worked on and nobody else had a handle on it. People drive through it and don't realize the amount of work. But when you're driving through it, on either end, when you get into where the walls are rounded, that's where you're going under water.

DW: And actually, that was constructed with a slight slope and a slight curve to the side, which you don't realize.

DK: This whole project has been absolutely fantastic. Like Dave said, you did this right through a working city. It wasn't like you were doing out in a cornfield someplace. Businesses couldn't be impacted.

When we back filled the tunnel, we used the tailings from when they bored the tunnel at Deer Island. That's what we back filled the tunnel with. We took the mud from the Third Harbor tunnel and made a park, took the excavation from the Deer Island Tunnel and buried the tunnel section with it.

MH: Well I've learned a lot. So thank you.

DW: Looking off to the future, instead of sitting around like the Maytag repairman, waiting for a call, Dan and myself have been working very closely with Cape Wind Associates in regard to trying to bring to reality the wind turbine farm that's planned for Horseshoe Shoal off of Cape Cod. And then also, we've been working with representative Martin Walsh from Dorchester in his committee in regards to the L&G storage facility in Everett in the feasibility of establishing an offshore storage facility.

MH: (to Dave) Just give me your name again because when I started my tape I didn't have it running right.

DW: OK. I'm David Woodman, Business Representative for Pile Drivers Local Union 56.