

CURT MORENO: Hello. I would like to welcome you all to standards for developing standards, a how to for busy CAD managers. My name is Curt Moreno. I am the Kung Fu drafter, and we've got a couple more people filtering in, but I want to thank all of you for joining me. And I want to start off with a little prelude or introduction. My name is Curt Moreno. I am the Kung Fu drafter. I've been working with AutoCAD and Autodesk parts for 28 years. I started before I could drive, and over the years, I've been exposed to a lot of different industries, a number of companies, and a plethora of working styles. In all those years, I've developed some ardent opinions about what works and what doesn't. Especially in the area of CAD standards.

Now, what I think is going to be a little bit different about this is that I share my experience by way of making every mistake known. If there is a way to do it wrong, I have done it, and I've corrected it. And what you are seeing is the end result of a lot of boo-boos. But the good part about that is that now I've developed what I believe is a good framework that is repeatable. You can reproduce these results. You can reproduce these results, because I have, and I know that they work in a variety of environments.

So we're going to talk about who this class is for. At the end, I'm going to remind you about your class surveys, and then I want to let you have an opportunity to know about our AUGI general meeting. So let's get started. You already know what the class summary is. I'm going to try and not read off the screen and bore you, because I assume, knowingly, that everybody attending AU is literate. But what I definitely want to instill is that this course is for everybody. OK, whether you are a top level, a sea level, member of your organization or you are just, for lack of a better term, a CAD monkey-- you're at the bottom of the poll. You're the guy they just scratched a smiley face on and stuck in the dirt for the totem pole. This is going to be for you.

So we have some key learning objectives, and again, not going to bore you with this, but I do want to point out that we're going to identify who should develop a CAD standard. Because maybe not everybody that you think should, should. We're going to outline some major milestones, we're going to talk about stakeholders in your support team, and we're going to learn how to identify some major pitfalls, because that's where I'm good. That's my area of specialty.

So let's start off by discussing the importance of CAD standards. Obviously, almost 200 of you think it's important, and really and truly, I think a much larger population of our industry

believes it's important. But before we start, just by a show of hands, who in this room has already invested resources, either currently or in the past in creating code standards? All right. See I like that. Now let me ask a follow up question, and I'm going to warn you that each time I ask this question, I fully believe that I'm going to see fewer and fewer hands. OK. Who feels that, that investment was worthwhile? OK. Still a good number of you. I like that, that's great. You know that is a, actually, much better response than I normally get, so you guys go to the head of the class, because everybody wants CAD standards. I mean it makes sense.

Are you going to do something sloppy, or are you going to do something in a uniform regulated manner? Oh, I don't know. Let me think about that. So everybody wants CAD standards, but not everybody does them really well. Whether you're a mom and pop shop with one office-- by the way, I'm from Houston. That's why that little star was there-- or you're a large corporation with offices all over the country, chances are that somebody in your organization is saying Jill, the rest of-- we met at the board. We're thinking these CAD standards sound pretty good. Why ain't we got none of those Jill?

Well, I guess, you know, their number of why we don't have them varies as well as the industries that can apply them. Because whether you're making architectural plan sets and your actually building buildings, or you're involved in the design and manufacturing of machines or whatever falls in between, chances are that you can benefit from CAD standards. And really why shouldn't you? The list of benefits goes on and on whether it's sustainability of your design quality, your reduce network stream, your IT costs. I mean, I could spend the rest of AU up here telling you why CAD standards are good. And then I wish I could sell you a product, but I can't.

But when you ask me-- and I probably shouldn't tap the table while I'm on mic-- they really come down to 2 things, efficiency and continuity. Out of the entire realm of benefits, efficiency and continuity are where you hang your hat when you talk to your boss about CAD standards. Efficiency isn't just-- it's not just a nice word. OK. We all want to be efficient. We hear efficiency, be efficient, be more efficient, how efficient are you all the time in the office? But efficiency in terms of CAD standards has some pretty obvious Rols. Obviously, you're going to speed up production. You're also going to reduce your errors. That in and of itself sounds fantastic, but there are some knock on effects. OK.

The not so obvious Rols are going to be that you reduce your training cost. It literally cost less to get a new person who walks in the door to productivity. It costs less. It's fewer dollars.

You're expanding your production roles. You can push items down the tier to less costly staff. You're reducing your quality of control costs, because now we don't have to check every nook and cranny-- even though you really should. We can just check the nooks. We'll assume the crannys are OK, because we cover that in the standard and so on and so forth.

Now, consistency is important also, because-- I really like LEGOs, and you'll see that more-- consistency achieves a lot of things. It creates a uniform presentation to your product, which elevates your professional image, which instills a confidence in your clients. So because you have CAD standards, your client can feel confident that what they get will be on a consistent level of quality. They won't have to look at the cover sheet to see if their name is right. They won't have to worry that there's-- what should be easy to determine between existing and proposed is not, because you are instilling confidence through your efforts.

So before we begin with CAD standards, we have to ask ourselves a few basic questions. Which firms should develop CAD standards? Should every firm that does design work do this? Should only the big guys do it? Is this really only for the little guys that are scraping by to survive? For the purposes of this discussion, we're going to say that any organization, large or small, employing any number of CAD professionals producing production designs or plan sets will benefit from CAD standards. I told you I wasn't going to read off the screen, but I really like the way that sounds. I wrote that. What that means is that I truly believe, regardless of the size of your organization, that you can benefit from this.

So now that we know who should be developing CAD standards, what are CAD standards? Who here has a confident notion of what CAD standards are? Or do you just know that you need them? Let's get some hands. Who is 100% that they know exactly what CAD standards are? OK. We're seeing fewer hands, the reason being they CAD standards is kind of a nebulous term. It's almost like being healthy. OK. Being productive. CAD standards, again, for the purposes of this conversation, is an umbrella concept. It encompasses a lot of things. And here are just a couple of examples. Your uniform layering configuration, your document production processes, and so on and so forth.

The last one, I think, universal file naming conventions, or nomenclature in general is often overlooked, and I think it's really important. We'll get into a little bit more of that in a bit, as soon as I hit the right button. So right about now you should feel that some of what we've discussed in just the past 10 minutes applies to you. You should be feeling like, oh, well maybe we should be looking at this a little more closely. Maybe we had a different idea of where CAD

standards were. Maybe, we just thought it was about the layers. Maybe, we just thought it was about plotting.

So let's keep going, because we're going to whittle down into this. Let's talk about the stages of standard development. Now when I talk about the stages of development, this is a super structure, because I'm very firmly of the belief that without a grand plan, without a 50,000 foot view, you can't get the minutia out of the way. You have to have a big picture, and our big picture consists of three components. We have the meta stage, the development stage, and the execution stage.

When most people think of developing CAD standards, they only consider the development stage. Well why is that? Because it only seems natural that we are going to decide how we're going to do this, and then we're going to do it. That's what the boss says, and it makes some sense. If you're going to do something, you should prepare to do it, then you do it, then you had done it. But there's something that comes before the doing, And that's the meta stage. This, in my opinion, is the secret to success. And it's the secret that eluded me for a decade. It could have been half a decade, but I'm kind of thick.

So there's some bad news and some good news about the meta stage. The good, or I'm sorry-- the bad news is that the meta stage does not yield anything that you can apply. The meta stage does not create any standard that you can implement. Now the knee jerk reaction to that is, then it's a waste of time. It is overhead, OK, but the good news is that it's overhead that largely only has to be done once. But just like a house, while you're dying to go and frame and paint and decorate, first you have to have a good foundation. That is our meta stage.

So now we're going to talk about, in the meta stage, who is actually going to develop this CAD standard. Not which firms, OK, but actually who in the firm should be doing this. Should it be management? Should it be production? Should it be the janitor? OK, because he's cleaning up all those pages they have red marks on them anyway. He probably knows as well as anybody else what's going wrong. And again, as you can see, now I'm not just a LEGO fan, I'm a nerd because I like Doctor Who.

So I feel that the coordinator is a natural selection, and by the coordinator, I'm using a general term to refer to the CAD coordinator. The CAD coordinator is a relatively new position in our industry. It's more than a CAD manager, it's less than what we might consider to be a production manager. The CAD coordinator is a person who oversees all of our CAD

operations and supports our CAD users. So if this is a position that some large firms already have, and if you already have that, that's fantastic. Because now you can go ha ha, Steve, you're the CAD coordinator, CAD standards are in your job description, so get standardizing.

But if like a number of firms, and again let's raise a hand, who has a CAD coordinator or an equivalent in their firm? OK, again we're seeing fewer and fewer hands. If you do have one great, but if you don't that's no need to fret, because this is an excellent opportunity to create that position. And by the way, the person who suggests the position is usually the one most qualified for it. And B, it's not an impediment, even if you don't have one, even if you just name somebody in practice instead of position. What's important is that there is somebody who's going to head this.

Now let's talk about, if we are going to select a CAD coordinator, there are some important traits. And it's not the person that's been there the longest. It's not the best drafter or the best CAD manager. It's somebody with three key skills. Management aptitude, because creating a CAD standard requires management. There are a lot of kittens to be heard in this project. Adaptability, because something's going to go wrong, I promise you. An enthusiasm, because when it goes wrong, they have to be ready to pick it back up. They've got to be ready to go, hey boss, look nah, no, no, no, that's all part of the growing process. It's cool. We got it. We're working on it. We're making progress. It's going to be OK. Chill out.

So that's the person that this rests on, because it is imperative that there be accountability. OK. Now the next thing I'm going to say is a little controversial. I do not agree with committees. Creating CAD standards by committee is just a way for a whole bunch of people to fail faster than one person. OK. How many of you have tried creating a standard by committee? Leave your hands up for just a second. Now if that succeeded, keep your hands up. OK then. I think you all heard a lot of hands slapping thighs. I'm not a fan of committees. There have been innumerable psychological studies that show that people in a group individually work less than they would individually, and I'm going to tell you why. It's not complicated.

You have the board of directors meeting, and somebody reads the phrase, the CAD operations committee failed to deliver a usable CAD standard. OK. Now at the same meeting, but they read a different phrase. Linda, failed to develop a usable CAD standard. Well one of those is the subject of conversation. The other is a subject that's going to show up on your annual review. OK. The committee didn't do very well. Linda, messed up. All right. And it could be Linda. It could be Bob. It could be Linda and Bob. There has to be accountability, and you

don't have that with the committee. Now, is that to say that only one person should control your CAD standard? Well, absolutely not. OK.

Your CAD standard has to be developed to represent your organization. And unless you are a single person, a single person can't do that, so you need a support team. You need a team that includes stakeholders and CAD leaders. I love this image. I could watch NASCAR pit stops all day long-- that's neither here nor there. The reason that you need stakeholders, is because they are the people that control the checkbook. They're the ones who decide if they're going to authorize this overhead project, and CAD standards are not billable, unless you do some fancy accounting.

The reason that you need CAD leaders is exactly on the other end of the spectrum. Without the input of the people who will put this to the test day in and day out, you will never deliver an applicable standard. You will never deliver a standard that is accepted into day-to-day practice. You have to have the buy in of the people who work with it. You have to have their support. Even if you bring stakeholders and CAD leaders into your effort and one guy feels very strongly that all hidden layers should be bubblegum colored, and you don't agree with that, the mere act of hearing somebody's opinion is a major step to their investment. Not everybody has to have their way, but everybody has to be heard. OK.

So we have a CAD coordinator, and we have a support team. Well what exactly are they going to do? The first thing they do is they look at your organization, and they go through a little bit of history. And they say, this is how we've always done it. Now, that's not in an effort to make sure that this is how we continue doing it. It's an effort to distill and discover the patterns of success in the way we've always done it. Which projects went the best? Which had the fewest road bumps? Which of them had the highest profitability? Which sheet sets looked the best?

We're going to cherry pick all of these things from the history tree, and then we're going to try and document and replicate them. But to do that, we need to look at existing assets. So in the existing assets we're going to go, not just through, in the case of AutoCAD or DWGs, we're going to look at PDFs. We're going to take old plan sets off the shelf, we're going to talk to the people that were involved in the projects. And a very unpopular thing, in my experience, but incredibly useful is the post mortem where you dissect a project and find out what went wrong and what went right in great detail. So at this point, we're at the end of the meta. We're done thinking about the work we're going to do. And we've achieved some important things. We've decided who's responsible for this CAD standard, who actually has accountability. Well that's

going to be, in this example, our coordinator. Who's going to review, approve, and support the new CAD standard? That's going to be management, our stakeholders. OK. Who's going to help develop this CAD standard and apply it every day? Well, those are our CAD leaders. And what already exists? What kind of standards or assets or really good examples do we already have?

Now the reason the meta is important, is because we overlook these things. We just want to jump straight into naming layers and picking colors, but without the meta we don't have a good structure, we don't have accountability, we don't have support, we barely have a goal. OK. So, and more importantly, we're also overlooking everything that already exist. OK. We're overlooking the low hanging fruits.

So now that we're done with the meta, we can look at the beginning. We can actually begin some work here. But what is the beginning? Where do you begin to develop a CAD standard? Now I'm not going to ask you individually, because I think that there would be 180 different opinions here. I will tell you this, that if any of them involve the computer, you're wrong. If any of them involve the plan set, you're wrong.

The beginning of the development stage, when you're done with the meta, is communication. This actually picks up on the last stage of the meta. We have to communicate. We have to make sure that everybody's heard, even if they're not right. And beyond that, we need to start asking some very tough questions. Why doesn't this work? Why did that go bad? Why did this succeed? How many of you have offices where you, I hate to say it, on a regular basis hear the phrase, well what went wrong? But how many of you have offices where somebody says, hey, Tommy, Susan, what went right? We're terribly concerned about not doing the wrong thing again, but we're not terribly concerned about doing the right thing again. And to me that seems a little out of balance.

If you're going to ask one, you should probably be asking what went right. These are tough questions. Now let's take an example. Let's have a theoretical company that says OK, what are our tough questions? I'm going to go to my managers, my CAD managers, my CAD techs, whoever I have. And I'm going to say, what is your biggest pain point? What is the hardest thing about your job? And I'm going to take that all back and I'm going to synthesize it, because I'm the coordinator. And I'm going to identify that standardize plots are an issue. I'm wasting a lot of ink, I'm wasting a lot of toner, a lot of paper. I've got plots that come out that are missing title blocks. We've had some pretty stupid mistakes happening. And it's all about

the physical representation of our designs.

Now if you don't ask some tough questions, guess what? You're going to say hey, you know where we're going to start? We're going to start with standardized plot styles and practices to produce identical plan set plots. And that seems pretty reasonable doesn't it? On the surface, you almost feel like you're ready to open the envelope on clue, but maybe you're not.

In Toyota, they have a practice of the five whys. If you ask why five times you'll be surprised where you end up. So in the case of these plots, well why are plots coming out bad? Well they're coming out bad because lines have the wrong weight. OK. So now we're onto maybe a layering standard instead of just plot processes. Well why do lines have the wrong weight? Well, because they're the wrong color. Oh, maybe now we're on to a drawing standard. Why do they have the wrong color? Well, because Bill keeps changing things by entity instead of by layer. He takes whatever line is there and makes it purple because he likes purple. OK.

So we started out thinking that the problem was at the plotter. We weren't sending things right to the plotter. Then we thought we were arranging things wrong. Then we thought we were drawing them wrong. But it turns out that one guy just is lazy. See, if we don't ask the tough questions we're going to go off on the wrong track. You have to be sure about that first step. So once you're at this point, and you've discerned what your first step is going to be, and we've already done the meta we have our first milestone. And this is very important in creating a CAD standard.

The first milestone tells your CAD-- or I'm sorry-- your stakeholders something very important. It gives them an overview of where your effort is going. OK. It talks about a wide list of things that need to be focused on. It has a general breakdown of how you came to that conclusion and what you plan to do. And you've already hit the major point of identifying the greatest hindrance to your CAD production.

Now we're almost 30 minutes into this, and I know some of you are sitting there thinking when are we going to actually talk about layers and plots and things like that? Well the truth is that we can't do that in this kind of setting, because each one of you would require a different standard. There is no turnkey solution to this. There is no placebo or magic wand that I can wave that's going to say ha ha and you get a CAD standard and you get a CAD standard, because it takes effort. And it should take effort, because just as sure as you can buy a dress or a suit off the rack and it fits OK. If it's tailored to you, you're going to look 10 times better.

Your confidence wearing that suit goes up by an order of magnitude.

So you have to ask yourself and be ready to say, OK, what should I include in my CAD standard? What's applicable to not just my industry, not just my business, not even just my office, but my working style? What's going to work best for my employees and my clients? Now even though I can't send you all home with a standard in a box, I can identify some should haves. In my view, these are the bare minimums. All right. Write them down quick because I didn't put them in the hand out. I'm kidding. Everything's in the hand out. Wouldn't that be horrible?

You should have a file structure. And by the way, to me, this is the funnel. OK. This is actually the way I approach it because if I don't have a file structure, I don't know where my files are. OK. I just don't even know where to find them. Am I organizing by client? Do I organize them by project? Do I organize them by phase? Do I organize them by phase inside of a project? You need to have a uniform file structure that is applied, are you ready, uniformly.

Once we know where the files are going to go, we have to know what they're going to be called. You need a naming standard. I have one that I use that at the beginning looks like you need to have a little Orphan Annie decoder ring, but I promise you it takes about 30 seconds to get used to it and about 45 seconds to just thank me and take me to lunch for coming up with it. Because it doesn't do anybody any good for somebody to open five files to find what they're looking for.

If nothing else, every time you open a file, even if it only takes 15 seconds, and you have to open up five of them, you've wasted a minute. In the average design studio one minute equals 1\$ of billable time for a drafter. The lowest paid person in your production staff, if they waste one minute, they waste 1\$. If I charged you \$1 for every file you opened, you would damn sure make sure you opened the right file. Then you need a layering standard inside of your files. I think layering standards are very important, again, for the same reason that I think naming files is important. But it also has a knock on effect that once we start combining blocks, X roughs, things like that.

We have a natural grouping of where things are dependent on your style. All of our proposed is together, all of our existent is together, all of our sanitarities together, all of our stainless steel is together. It's a natural order that your employees can depend on. OK. So at this point, we're creating drawings using the layering standard. But then we have to annotate them. Well what

font do we use? What size is the font? Is it the same size for existent as proposed? Blah, blah, blah, so on and so forth.

External referencing standards are important, because let's say that you decide you're just going to attach everything. Attaching X roughs is a recipe for disaster. If you don't know it consider that a freebie. Because it leads to circular X roughs, it leads to corrupt drawings, it leads to you wasting time. If you don't take anything else away from this, go home and make a standard that you don't attach X roughs. But then once we had the file out-- I'm sorry-- once we had the file created, we've got to get it out. So we need a plot standard. OK. And really we should have some additional steps to this. What happens to the drawing for signing and sealing? Where does it go? What about record drawings? There's all sorts of things we can look at.

Now there is no comprehensive, as far as I'm aware, text on how to do this. There's no CAD stan-- well I might write a CAD standards for dummies. I didn't think about that till I was up here. There is no CAD standards for dummies. There is no standard in a box. OK. There's no late night infomercial, but there are a huge amount of technical resources on the internet. I am of the opinion that somewhere on YouTube there's a video that shows me how to perform open heart surgery on myself. OK. You can learn anything on YouTube. You might learn how to make your own YouTube, I don't know.

But you've got companies that write excellent, excellent textbooks on the subject of CAD design. You've got, again, Vimeo. You've got training services. You've got blogs. There is just-- open Google. Open Google and just type CAD standard. Start your adventure. If you don't want your adventure to yield really bad things, I would do it in an anonymous window, but anyway.

So at this point, let's talk about the shape of standards. Because-- and I think that this is probably a lot of what people consider the meat-- I think that a standard consist of a minimum of three things. We have drawing templates.

Obviously, drawing templates are our starting point. They're the seed that we're going to grow this mighty project oak out of. And that's actually an allusion to seeing the forest for the trees but anyway--

Drawing standards are like Happy Meals. You go in and you order a Happy Meal and you can count that there's going to be a burger, there's going to be fries, and there's going to be a

drink. If you have a template, you can count on layers are going to be set up correctly. The name on the layer is going to be correct. Maybe my template already has a file naming template for the name built into it. You might even have some metadata inside the file that helps your drafters.

This is a way of replicating and rapidly delivering some of your standard information without having to pull out a three ring binder. Why do you need a three ring binder. Well, because your standard should also include some best practice documents, OK? We need some how to's about this stuff.

You can't keep relying on the oral history of production. That sounds kind of corny, but that's exactly what you've got going on in every one of your offices, OK? And Bob, senior CAD person said onto Karen, the new CAD person, in the beginning, we took these drawings and we copied it over--

It's just like history. At some point, we learned to write for a reason. We need to bring that same mentality and methodology to our CAD standards. We need to document them. On a side note, I neglected to upload it, but I will upload a template for a very thorough-- overly thorough-- best practice document.

And then I think we need detail libraries. Blocks. The reason that we need them is that they're standardized. They're pre-approved as being correct. I mean, who doesn't love something that's already right. And they speed the process of design. There's no reason to draw a fire hydrant 20 times.

Now here is something that you might think about.

The company I work for has nine offices. In those nine offices when I did my due diligence, I found that there was an average of seven kinds of firefighters that were being used. Now you might say to yourself, seven fire hydrants, that kind of sounds like a lot. I wish it was seven fire hydrants. Because I had nine offices drawing seven fire hydrants differently. I had 63 different kinds of fire hydrants.

Who needs 63 different kinds of fire hydrants, OK? I mean, unless you're like having a fireman convention, I don't know. All right? By standardizing my blocks, by putting them where everybody can find them-- now I really only have seven kinds of fire hydrants. OK? And

everybody has access to them and I update them regularly.

So that is actually a little bit of a prelude of our existing standard. Who has an existing standard right now?

OK, so half of you. The other half of you don't have to feel bad because you do. Everybody who's been in this business for even a year already has an existing standard, OK? It's just you don't call it a standard. You call it, this is how we do it.

OK? But it is a standard. Because it's something that you've repeated over and over. It is reproducible.

So let's look at that. Like I said, I did jump ahead a little bit. But when you're examining your existing standard, you have to collect, just like I did, all the multiple instances of details, for example. Then you have to look at them and say, what is this full collection. How many of this collection are repeats. They're duplicates. They're exactly the same for all intents and purposes. Well, then I don't have to look at two of them. I'm only going to look at one of them.

Then once you've narrowed it down and you know that you have x number of individual details for whatever topic you're examining, you actually have to go through and do the monotonous tedious work of examining linework.

OK? Is there duplicate work. Is everything converted from single lines to poly lines. Are our hatches exploded. Is everything the right color. Blah blah blah blah blah blah.

Your life becomes, for a brief time, the Charlie Brown existence. Where you're clicking and somebody comes and asks you to go to lunch and all you can hear is, wah wah wah wah wah wah wah.

Now, we also have to check our annotation. Again, just like we need a standard for annotation, we need to make sure that all of the annotation and the detail-- which is going to be heavy because it's a detail-- is the font right. Is your Mtext, all Mtext is an individual text. The list goes on and on.

As you can see, I have a number of slides-- we were just talking about details-- this is an extensive effort. Do not underestimate the amount of work that goes into this one facet of verifying any part. Whether it be fire hydrants, title blocks. Plot tables. You have to have a methodology. That methodology in and of itself should be documented.

So if-- well, you have your name turned around. That's not fair.

What's your name?

Mitch. OK, so if Mitch is working on this and Carl suddenly comes up light on work, Carl can help Mitch and achieve the same things in the same fashion because Mitch took the foresight to write down the 10 things that he's checking in every detail. Carl can take that and repeat it. OK?

If it comes to a point in the middle of our standards that Mitch decides to move on to greener pastures-- they're never greener-- Carl can pick up the effort. Standards are a company benefit. OK? It's an organizational effort and should be able to be carried out by anybody in the organization.

So now, we finished the two first parts. We've thought about what we're going to do. We do'd it. So now how do we put it out in the real world, OK? You don't just have a child and then kick him off to college and tell him to get a job and be an adult. We want to put our standard on a shelf and make it accessible to everybody, OK? And even though they're all the same in basic context, we need to make sure that everything is done correctly.

So in terms of deploying our standard, that in itself is a standard, OK? What do we do when we deploy a standard. OK, well I'm first of all going to save it to these directories on these servers. I'm going to write an internal blog post that lets everybody know what's been updated. I'm going to make sure they have access to it I'm going to personally call every CAD manager in every office to make sure that they're aware of it and to make sure they're aware that they are responsible for implementing it.

We have to do this and we have to collect all of our notes, OK? We have to, just like everything else about this, to document what's going on in the deployment. Those items in itself-- again, you have a standard within a standard because the standards all the way down-- we want to take all these kinds of things into context. Now again, these are in the handout.

I think that some important ones include, do you need special log in credentials to edit the standards. Are the standards able to be edited. You really shouldn't be, otherwise they're not standards. Do they include the last date that they were updated.

Another important one is what is your renewal cycle. You push a standard-- a set of fire

hydrants out-- well, when are you going to circle back around and look at those fire hydrants again. How do you know or do you have a mechanism for people in application to say, hey, you left out a fire hydrant. We need fire hydrant number eight and we use it a lot. Are you going to add that immediately. Are you going to revisit it in six months. Are you going to tell anybody. Do you have a plan. Who has a plan for regularly reviewing and updating-- not even as a standard-- just their detail collection?

Wow, you win. That's 1%. That's pretty standard-- not to make a pun.

We push these things out and we think that we're done. You're never going to be done. OK? You are Sisyphus. There's always going to be an other plan set. There's always going to be something to tweak. Something to add. Something to make it better. You are constantly discovering, analyzing, and learning in the deployment of your standards.

So we've done it all. In the case of this particular discussion, our fire hydrants are tight. So we're going to let the world know. Because you have to broadcast the good news, OK? So how do you do that. Well like I said, I think that you need-- if your company has an internet, put it in writing. Let everybody know. Take a moment to ring your own bell. OK?

Because if you don't put it somewhere where everybody is going to see it, one-- they don't know. Two-- management doesn't know. Hey, I've been seeing a lot of posts by Curt that he's got those layer standards, that detail standards, the standard standards, the substandard, the squares standards. All right? That guy is hustling. I think that's the kind of guy that needs said more money. All right?

So let the world know. Be sure that you actually put it out there, OK? If you don't feel comfortable about self-promotion, it's a service. They can't use it if they don't know it exist.

So am I done. Man, we've already done a lot. In just 45 minutes, we've done a lot. But we actually skipped over all the hard work of developing a standard. We've just been talking about talking about standards, OK? This is a framework. Imagine what it takes to actually do each one of these over and over and over for all the different aspects. Well no, you're not done.

I'm going to let you in on another secret. One that took longer than a decade to figure out because again, I am thick. When I say MVP, you say yo-- no. When I say MVP, you're probably thinking of this kind of MVP-- the most valuable player.

Well, there's another kind of MVP that's applicable. Because if you don't have one, you're going to fail. That MVP is called the minimum viable product. How many people here think that a CAD standard should be complete before it's pushed into production?

One guy. I think it's a pretty common misconception that it has to be perfect before you use it. The problem is that it will never be perfect because of the very essence that your business evolves. OK? The way your work evolves.

So what your job is to not create a perfect standard. Your job is to create a good standard because a good standard that is functional is the key to shipping a standard. You will drive yourself insane and start wearing top hats at conventions and standing on stage in empty rooms clicking with nobody there if you try to create perfect standards.

It is a fruitless effort. It's a constantly moving target. So what you have to do is create functional standards. Good standards. Standards that handle the task at hand and can be revisited later. Perfect can be pointless. Good can be amazing. Why is that. Because if you have a 99% perfect standard that you never ship, you don't have a standard. If you have an 80% standard that you do ship and has some hitches here and there and you go back and revisit, you've got a standard.

It's really just binary. Do you have one or do you not. And until everybody starts using it, you do not.

So now that we've gone through all of this, I want to encourage you by letting you know that when you're done, you repeat. Over, and over, and over until you've been at the same place for 17 years like I have. But that's OK. Because effort has its rewards. And you should reward yourself.

As a coordinator or part of a team, when you ship a MVP standard, reward yourself. Take half a day off. OK? Go to lunch. Have some tacos. You know what, take a little something out of petty cash, tell the boss I said it was OK.

Because this is a major effort. Do not underestimate the role that you play in the success of your corporation by either shepherding, supporting, or just being part of a CAD standards effort. We've talked for almost 40 minutes to establish a framework of how to do something-- not actually doing it.

Now if we were to take the rule of thumb that it takes 10 times as long to do something as to teach a reasonably intelligent person, then that's six hours. Over six hours to, let's just say, create a layer standard. There's layer standards. Nomenclature standards. There's file naming standards. File structure standards. The list goes on and on. And if each one only took six hours, that would be sweet.

What industry are you in?

Architecture.

Windows, doors, foundations, cross-sections, elevations, floor plans, title sheets, grids. Does a company have a hyphen or a space? Is waterline one word or two words. If you don't have a dictionary, make one.

For instance, let's talk about a standard that people don't really think about as a standard-- vocabulary

I'm in the civil world. I cannot tell you how many times I've passed people having that conversation-- waterline-- is there one word or two words. Oh, it's two words. No, it's got to be one. No, no, yeah. Let's go ask Steve. So now I've got three people at \$1 a minute standing around debating the same thing that they've been debating at least three times last year. OK? Times 17 years. Times nine offices. I could have hired somebody full time for a couple of years and the amount of money my company has wasted discussing whether waterline is one word or two words.

Every one of our companies has done that. We lose tens of thousands of dollars every year over dumb discussions like that. Discussions that can be resolved by a standard.

Hey, is an object line red or blue. Look at the standard. Is waterline one word or two words. Look at the standard. Is there a standard for where I put this file. Well, look at the standards. If there's not one in there, then no. OK?

Also-- and I don't include this because it just really struck me that something I should include-- are the mechanisms for feedback. How does Mitch lead the coordinator know, you know, we really do need a standard for sending plot. Like, if you want half size plots, send them to the copier because they're faster and we don't have to switch paper out of the plotter. OK?

Send your work to the fifth floor plotter because you're on the fifth floor and you're not going to walk up to the sixth floor and stop and talk about the football game on the staircase. There are the little things. Any kind of documentation becomes a standard. It's not just lines. It's not just points. And it's not just clicks.

Now--

Actually, I guess that was some of my conclusion. We have some time. And I'm on the mark because I'm hoping that we have some questions. Please come up to a microphone, ask a question. Because anything that you have to say, there's at least one other person wondering the same thing. And let's get some real world examples. Somebody. Don't make me pick a person, because I will. You.

There we go.

AUDIENCE: So my company has been in an acquisition cycle for the past couple of years. And the original companies basically all shifted over to Inventor, Vaults-- that type of thing. Our UK acquisitions is SolidWorks. I'm not sure what Brazil is. And some of the others are a mix of-- depending on whether we bought them 10 years ago or two years ago-- a mix of SolidWorks and Inventor. And the issue of converting drawings back and forth is a pain. And we're trying to rectify how we set up all our drawings. Because some of the file systems are not exactly the same. Have you ever run into this?

CURT MORENO: I have and I've seen it in my consulting clients. And I will tell you that the key to that situation is not standards. It's leadership. It's leadership and accountability. Now, I will not tell you to go tell your boss, yo, why don't you start being a boss. I will tell you that if you approach the person who's overseeing this and say, I had a thought that maybe we can use this framework, these three steps to determine and make three standardized questions that you ask in every instance like that, that becomes your standard for resolving that issue. If there's not a person over that, then go to the boss man and say, I really think we need to be in charge of this.

So make no mistake, leadership also needs to be standardized.

AUDIENCE: Cool.

CURT MORENO: Yes my friend.

AUDIENCE: I would like to-- and sorry for my English-- I learned it reading comics in my teens. Well anyways, I want to ask you about-- because I sometimes feel that I'm in the repeat cycle. Some And I'm thinking of changing the set up a little bit so that the standards are more of a framework, like you just said, instead of standards. Because we're meeting so many client demands, collaboration demands also with the whole [INAUDIBLE] thing, that I'm actually taking-- for almost all our products-- our standards, modifying them so they fit into the project, delivering them to the project.

CURT MORENO: And just doing that over and over.

AUDIENCE: And that kind of makes the repeat thing seem obsolete because it's not so often that I can just copy paste my standards into the project.

CURT MORENO: So it sounds to me that you have a variety of clients and projects and workflows. In that situation, this gentleman does not have the luxury of tightening things down to the last period, the last block. He has to have a standard that, at its heart, is adaptable.

If you are in that work, then you need to realize you're never going to reach the runway, OK? We started 50,000 feet. Your standard may stop at third and become, as he stated-- and I think really eloquently-- not so much a standard as a framework. And adaptability and iteration has to become part of your culture.

Too many companies, in my very humble opinion, do not value the culture of innovation at the production level as much as they should. You have to be adaptable. I only have two skills in life-- besides being adorable-- and one is being able to tell a good story and two is that I am incredibly adaptable. If you drop me in the water, I would grow gills, OK?

So you have to grow gills and accept that you are never going to have the satisfaction of an exact standard until your workflow and client variety either exists the way it is long enough for you to collect those or normalizes. Both of them are possible. Both of them are great. I think I would rather have a variety of clients and work scenarios than the same thing. I draw fire hydrants. As it is, I work in civil so I draw imaginary dirt.

You know, I think that the realization of your situation is very important. It may be the difference between sanity and insanity. But it can definitely be the difference between you leaving and not. If you feel demoralized over and over because you can't develop a standard that may not be reasonable to expect anyway, you're going to move on. You're going to get

tired of hearing, Mitch, how many hours of overhead did you put in it this week. OK? Because you're doing it over and over and you're wasting overhead and adding to the project.

And then it really gets bad when your coworkers start giving you the stink guy. Mitch is over there working on the standard.

All right.

We've got time for one more question.

AUDIENCE: A quick follow up

CURT MORENO: Yes.

AUDIENCE: I'm very satisfied with your response also to my own mindset.

What I was thinking about was using the time instead of doing the repeat which actually is not really doing anything, use that time and money to train the people on the projects to adapt to the framework. So I'm kind of taken out of the equation.

CURT MORENO: I think that that is the essence of pushing items down to-- I hate to say it-- cheaper staff. Which raises the profitability of a project, which makes you look good. You had a question sir?

Come on down.

All right, go on up.

AUDIENCE: All right, so you said you were consulting different things similar to this with other companies. So you also mentioned overhead a minute ago. Like coming here, we kind of have to provide a reason why this is going to benefit, why we got to shekel out the coins. Do you have an idea how you present to the upper management why I need a week of overhead time to create these standards to save everybody else time and effort?

CURT MORENO: That is such a good question. And you know what, it's so good I'm going to include that in my presentation next year. That is actually fantastic. I've got two and a half minutes and I can tell you when exactly two words. One dollar.

One dollar. If you sit down and say-- and sometimes, this has to be around guesstimate-- we

say that in Texas. OK, we are wasting 10 checked plots a day because we're doing it wrong. We don't have layers on, where it's not rotated correctly. And it takes 10 seconds to open the file. 20 seconds to go through the blah blah of it and print. And 30 seconds of standing at the printer. Because you know everybody does, waiting for the machine.

That's a minute. And let's just assume that we do that once a day and I've got 60 drafters. Times 5 days a week. Times 52 weeks a year. By creating my standard, I'm going to save you \$60 a day, five days a week, 52 weeks a year. With one standard.

Because your boss only understands one thing-- money. OK?

The truth of employment is that he wants to spend as little in your salary and the production and get as much in revenue from his client. That's how you have a successful business and there's nothing wrong with that. Once you realize that, you can tell him I'm going to save you \$20,000 a year in mistaken plots. I'm going to save you \$30,000 a year in waterline. I'm going to save you \$200,000 a year by spending \$50,000 a year in project kicked off meetings to make sure that everybody understands what their responsibility in the project is.

Now, I hope that answers your question because we're almost out of time. Before we go, please, it's very important that you fill out your session surveys. If you have any more questions, please go to the AU answer bar. That's something-- I don't know. And a whole bunch of other stuff. My name is Curt Moreno. I am the kung-fu drafter. Time is limited. Thank you for spending an hour with me. I am very grateful for you participating in this livestream and whoever watched it at home. Have a fantastic Autodesk University 2016.