February 17, 2020

Update from the Head of Construction of the Sweden pavilion

Marketing- and Communications Director *Jessica Bjurström (J)* meets *Staffan Schartner (S)* from Omniplan, Head of Construction of the Sweden Pavilion at Expo 2020 in Dubai, who tells us where we are now in the construction process.

J: Staffan, is the plot ready to be built upon now?

S: You could put it that way. We started digging a bit late but we have dug a hole and raised a crane. And we have finally put down the first layer of what is going to be underneath the building.

J: Ok, so there's a layer under the building, what does that consist of?

S: It consists of something called *foam glass* that is recycled foam glass that is normally used for insulation but in this case is used for pressure distribution.

J: Ok, so there will be sand on top of that?

S: No, the sand is underneath.

J: So, first there's sand?

S: First there is the sand that was there from the beginning and then a layer of gravel that is compacted.Then a new layer of sand will be distributed so that it will be completely flat, like when you are putting down slabs in a garden. And on top of that is the foam glass.

J: Is this a new method, a new construction method?

S: Yes, you could say that. This layer of foam glass we didn't really need. Had this been in Sweden we would have used the material for insulation purposes. In Sweden we would have used plastic but you can ask yourself how good it is to use plastic insulation and put plastic in the ground? I am sceptical. The foam glass is quite a bit more expensive, but naturally it is much better in many ways. On top of this is a layer that will keep water out – not that there is much water – but there is always some condensation in the ground and two layers of plywood that are sprayed with "boric salts" so that termites that dig into the water barrier cannot start gnawing their way into the wooden foundation.

J: Is that the same type of product as *Woodsafe* that is used to waterproof our wood logs?

S: It is a similar product but it isn't used to protect against termites in the first place. It is used as a flame retardant, but luckily it protects against both fire and termites!

J: So, is this good in the long run?

S: Yes the important thing is that we keep the boric salts as dry as they are water soluble. If they become moist, they start to disappear over time.

J: Now I have to ask a question, we have talked about us being in the sustainability district of the Expo area and we are constructing a pavilion out of wood and we have a promise that what we are doing now will be about maintaining sustainability throughout the entire process, could you comment on that in regard to the foundation layers?

S: Sure. We are trying to create a physical barrier against the termites in the ground that are trying to get into the building. Normally what is done by almost everyone in Dubai even when building a cement structure is that they use a poisonous pesticide in the ground surrounding a building, containing a substance called neonicotinoids. Neonicotinoids are very controversial as they kill off bees and other insects or at least cause them such confusion that they die. We have said that we are not going to poison the ground or use neonicotinoids. We are instead aiming at only the termites and then only if they try to gnaw away at our building. Otherwise they are not affected.

J: Ok that feels a lot better. When we handed in the drawings for the pavilion, I know there was a problem with encoding our materials. Could you talk briefly about this?

S: You mean the approval of materials for Dubai?

J: Precisely. Which is also partly the reason for the delay.

S: It´s not the materials as such, it´s more the basic wood construction, which is difficult to calculate according to the standards that are used in Dubai . This led to a long discussion about what standards are applicable and now most recently there has been a very long discussion on how stress is transferred from the wood to the ground underneath. This is why there has been the need for the layer of foam glass in between.

J: I know that we finally decided to call the wood we are using "new material" instead.

S: Yes, that is one element of the whole story, but that is not the whole thing. We were also required to do rather an extensive research on the flattened area underneath - to truly verify whether the material could support the weight we have. It's a bit strange I think as we are building a very lightweight construction, since we're using wood and not concrete and it weighs only about one-fourth of what it could have weighted…

J: You mean that our pavilion weighs about one fourth of what a cement construction would weigh?

S: Yes, exactly.

J: I was thinking when I see photos of the construction site, as we have photo loops that are rolling and that we could attach a link to our newsletter so we can see what is happening that for example there are large black cement or iron stumps. What are those?

S: In some places we had to put some shoring in place as we are building so close to the sides of the pavilion.

J: You mean close to the neighbour?

S: It´s actually the front and back sides of what is Expo land. Our neighbours on both sides, Brazil and Lithuania have accepted that we are encroaching a little bit on their plots.

J: That was generous.

S: So that also took some time and was another reason why the start has been somewhat delayed.

J: But for that we can thank Lithuania and Brazil?

S: Yes. And we also have a number of large steel pipes that we have drilled into the ground to keep the tree trunks in place that are free standing around the property. You can also see those in the picture.

J: I know that we have planned to disassemble the pavilion, and assemble it somewhere else after Expo. How does that affect our construction process now? Can building a pavilion like this be compared to building a Lego building?

S: When working with massive wood on this scale, some measures that facilitate the disasseble process are already taken. But there are of course a few things that we do that are special in this case. For example, we are putting a plywood layer around the structure where we are placing the moisture barrier so that the gunky asphalt mud will not affect the pavilion as such. So, we put in a thin layer of plywood that becomes gunky. We also make sure that we are assembling the wooden parts in a way so that the screws can be removed afterwards, which is normally not the case while working with a massive wood construction as the screws are buried in the wooden material.

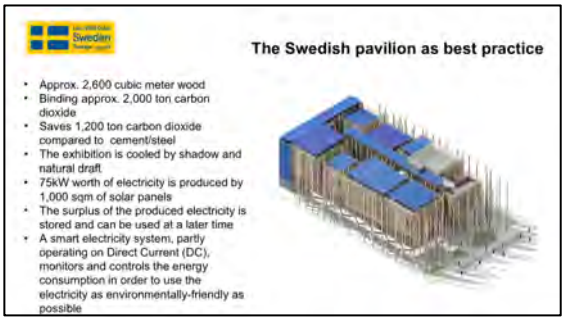
J: I thought we should speak a little bit about ventilation and also about solar panels on the roof. Can you tell us about these two subjects specifically.

S: We have been a bit unlycky with the company that has promised to help us with the installation of solar panels which both function as facade material - which not all types of solar panels do as they normally are not very estetically attractive - but also work as a protection on top of roof terraces where we have the ventilation units. Not all solar panels can function like this either as it would require a special mounting to make a roof out of the solar panels. That firm's parent company in Germany has gone bankrupt and the subsidiary that we were in contact with do no longer excist.

We have found anew supplier for the solar panels but this has caused us some extra work and some added stress levels.

J: How does this affect the time schedule and finances?

S: It depends on how the commercial part of things works out. Hopefully, it will be a deal that is similar to what we had before and with products similar to what we had before. Most suppliers of solar panels are not able to match the standards that we have. And then theree are complications such as a full-scale tests are required by the Dubai fire



authorities, as they are very concerned about having solar panels on the facades for fire hazard reasons. And instead of doing the extensive tests in such a small area we are planning to put sprinklers in behind the solar panels.

J: Then approval might get expedited perhaps?

S: Yes, it should be fine.

J: The bottom floor is open to the public exhibition area with no air conditioning, but the second floor with the conference area will have air conditioning.

S: And in the shop and café.

J: And there we have a collaboration with among others, *Systemair*. Are there any other companies you want to mention here?

S: Systemair is the large supplier. They work with a company called *Camfil* that manufacture the filters which are attached to all the a/c units. Camfil will also be providing the air purifiers for the air intake which needs to have the sand filtered. The sand in Dubai is so fine that you almost can't call it sand. It's almost like dirt or something in between sand and clay, like silt.

J: I'm a little curious about the elevator that will go from the bottom floor up to the conference section? What's the plan there?

S: There will be two elevators for the visitors. They are normal elevators that will bring our guests and employees up to the conference and office spaces.

J: And then there is a staircase up to the rooftop terrace.

S: Yes, there is also a staircase all the way up from the bottom floor and I would recommend all visitors to take the stairs because they will be spectacular. There will be a very nice hall where the stairway is located and uniquely designed stairs, which will also be made of solid wood.

J: And what about the flooring outside in the play area and on the bottom level?

S. There we have a challenge as a firm would like to sponsor us with a product called *Corkeen* that is made of 90 percent cork. In the future the product that will be used to bind the cork together will be lignin, a wood-based binder, but until then we will have to put up with the binder being made of plastic.

J: Like old-fashioned "cork o plast"?

S. Not really, it will be more like rubber asphalt that you see at playgrounds. However, that is very synthetic and sometimes a toxic product. This cork-based flooring is much nicer and has such a beautiful colour.

J: It sounds like you'd be stepping into a kind of forest!

S: Yes, though we haven´t really landed in the technical aspects.

J: There's a lot of talk about how you need cooling when you have a lot of technology and there will be some of that in the risers of the pavilion's exhibits, right?

S. I don't think it's going to be a challenge as the air flow will be quite good and the heat that the technology will be generating won't be such a problem.

J: How many people do you think there will be in the conference area at once?

S: Roughly 250 at a time.

J: The flooring in the conference sector will be provided by *Kährs* och *Nordic Homeworx.* Tell us a little about that.

S: There's not so much to tell only that the floors will be very beautiful! We have had a bit of an issue with not knowing what requirements the floor would have. There, too, there has been a concern about fire but it seems to have worked itself out so we can go ahead and use the floors we have planned.

The pavilion, design by *Alessandro Ripellino Arkitekter + Studio Adrien Gardère + Luigi Pardo Architetti*

J: So now that collaboration will be getting started?

S: Well, it will take some time before we can get started on laying the floor because of all the installations. So, it won't be until this summer when we can put the floor in place. It's going to be very nice. And we have planned on using wood flooring everywhere we can. And we've been a bit bold in using wood floors even where it on occasion may be rather wet.

J: We are talking about different materials and when they are going to be delivered. This brings us to the subject of the wood for the pavilion itself, are the shorter pieces on their way soon?

S. You mean the lumber? I think it might be here alteady....

J: How long does it take to send a container from Sweden to Dubai?

S: It takes about a month.

J: So, the short pieces are available for delivery?

S: They have to be on site since before we start building the tree houses. The long trunks are placed in between the tree houses and outside the pavilion. That will be the last thing that is built – they would otherwise be in the way during the construction time.

J: I have also been in contact with the company that will be supplying the glue-based material, in other words, the cross-laminated products. Tell us a bit about that.

S: It's a fairly new material developed after 2000 in Graz, Austria. It has been mostly Austrian companies that have produced this earlier. *Martinsons* were the first with a factory in Sweden and now *Stora Enso* have built a factory as well. And there are also a couple of more factories on their way in Sweden.

J: The companies that you mentioned are participating companies to the Swedish pavilion.

S: Yes, we purchase *engineered timber* – where you glue together the wood beams. For one hundred years we have been producing in Sweden glued laminated timber (glulam beams) from both *Moelven* and from *Setra Limträ*, As well as the glulam beams from both Martinsons and Stora Enso.

S: We have sent wood that is not engineered timber such as the short trunks to a company in Västerås called *Woodsafe.* They work primarily with fireproofing wood. Which is also a form of termite-proofing.

J: No mosquitos are going to nibble on the wood!

J: With respect to this very special building, do you expect that people who are particularly interested in construction from around the world will visit this pavilion and say that it is something unique?

S: Some certainly may but not all. I don't see it as being a world sensation; however, it is indeed unusual to build a wood foundation on this large scale. In earlier days it was done in old cities such as Venice and Stockholm´s old town ("Gamla stan"). The cities also had foundations of wood but then they used oak timber poles that stand in the water. It's a totally different principle; here we are trying to keep the wood dry. There is something that was used historically, called brush mat which was a way to build in marshland, where you also have wood that is put in a wet area but you would have natural stone that you place on the brush mat. And then when the foundation reaches land level you put the wood logs on top of the stone.

We will use the cross laminated wood planks and we have methods to keep it dry. That makes it possible for us to use it for the foundation.

J: What you just said makes us feel so secure about you being in charge of the construction. I would like to say thank you for that. And I would like to round things up now and we can return to the discussion when we have more news about the construction at a later stage. Anything more very briefly that you would like to add?

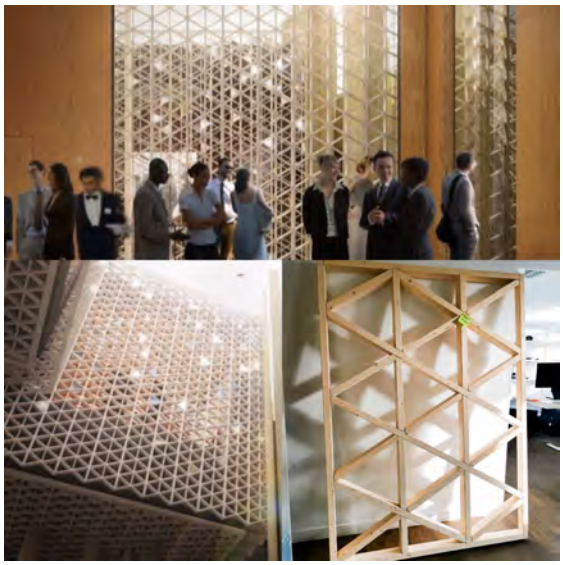
S: I would like to say just a word or two about how we are doing in terms of timing, as I believe this is of interest. We are going to start with the frame, the basic foundation next week. Around February 10. And that is about five weeks later that we had planned to start.We believe that it will take about ten weeks in total to assemble the pavilion. No one really knows as this type of construction has never been done before. But we are estimating that it will take ten weeks and after that we can get started with the exterior. So for all of you who will be delivering things when we are done with the frame can know that after that, there will be ten weeks until the building is up.

J: So, you mean ten weeks from Monday 10 February?

S: Yes, and then we will continue with the insulation on the outside and put up the panels and mount the *Mashrabiya* screens that we are having made in Lithuania.

J: Ah yes, the screens with the Arabian design on the windows for the upstairs?

S: Yes, which all the tree houses are covered in.



J: How long did it take to have the Mashrabiya made – it's fine carpentry?

S. Yes, it's very extensive. It will take about ten weeks to get them all done. It is advanced work since many of them are individualized and a lot of logistics. We are also expecting to be able to start the work inside the tree houses in about ten weeks. That brings us to the middle of April.

J: Thanks for this, Staffan!

To be continued....

Status of the Construction, February 17,2020