

Transcript of Masami Kobayashi's Slide Presentation:
How to Make "Resilient" Built Environment against Natural Disasters? Lessons from Great East Japan Earthquake
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Masami Kobayashi presenting:

Generally when we come back from the West coast and you get up too early, it's hard to spend time maybe. I'm a kind of curtain raiser for Fumiko Maki so I will do a very relaxed lecture [for] you.

First of all I would just like to introduce myself, as Hisaya said, I got a Master's degree from the University of Tokyo and I worked for Kenzo Tange for six years and I worked on several skyscrapers in Singapore and the Capital design for Nigeria. Then I went back to the PhD program at the University of Tokyo and then I went to GSD, not doctoral but masters of design program. Then I came back and I am actually a practicing architect and teaching urban design at Meiji University. I have had several small projects in Hawaii. And my university is doing some collaboration with the University of Oregon in Portland; doing some urban design projects. I'm still the visiting scholar of UC Berkley. So, I feel very familiar with you...that's what I want to say.

This April I had a lecture in Portland, University of Oregon, to do my Tokyo history and about the earthquake a little bit. Nicolai and Yasu were, by chance, there and that's maybe why they picked me [for this]. I'm honored to do that. Today I have less than 1 hour, I want to show, first of all, I'd like to introduce Tokyo's history from the medieval period. Then, we will move on to the Tohoku area.

The title is "How to make 'Resilient' Built Environment against natural disasters". You will see that we Japanese, or Tokyo, have suffered many physical impacts like earthquake or air raids. After that the urban designers and architects [went thru a] very hard, painful time to make the reconstruction work. We are here in Tokyo, Kyoto and Osaka are here and the Tohoku area is the east Japan area, in the north of the main island. Hokkaido was not originally Japan's territory. Basically the country developed around the center of the western areas.

This [slide] is a brief history of the governance. We can see that the modern period started in the 19th century at the Meiji Restoration. Before that the capital was moved to several places Kyoto, Nara, Kamakura is a rather eastern part, Kyoto again. Then, in 1603, the Tokugawa family won all the warlords and they established Edo castle in Edo city here in Tokyo. For more than 300 years the Tokugawa family kept the governance here. And our Meiji restoration shows that the modernization after Perry, from the U.S., urged us to open the country and we set up the Emperor again, the Meiji Emperor. This is a kind of modernization period. And after World War two, MacArthur came and the Emperor was not [governing] at all. The emperor was still alive, but we changed into democratic governance without any blood and struggles.

Larger Impacts to Edo/Tokyo: the establishment of Edo Castle, then Meiji restoration and the Kanto earthquake, this is a very heavy Kanto earthquake, and air raid by U.S. and the Olympic games 1964 was a big change for Tokyo. Then we had another impact, disaster, including Tokyo and more areas in the Northern cities.

This is the founder of the Tokugawa family, Tokugawa government: Ieyasu.

I want to explain a little bit about how he was a very smart guy to keep the government for three hundred years. They set a hierarchy of feudal lords, the boss of the samurais, to order them to bring their wives and children to the capital Edo to stay there as a hostage. The boss should come to Tokyo every other year.

That means that he made a three colored hierarchy. These are the familiar to the government, these are the normal, and these are the ex-rivals or ex-enemies. It means that the boss of samurai comes every one year; comes here and back. They spend a bunch of money. The furthest guy has to become poorer and poorer so they don't have any power to attack the government again. This is a very interesting topographical hierarchy. You can see that, I told you that Kyoto or Nara was the old capital and this is the new capital, you see Tohoku area – there is nothing there. It's mostly the agricultural or fishing or the forestry industry. It was a rather poor area and is still.

This is a Civil Engineering project by Ieyasu and his sons and grandsons he made of Tokyo, it was just a marsh. And he made his group's residences inside (the castle). Then you can see Nihon-bashi, it is the center of the commercial district. Tokyo station stays here. The West side of Tokyo station has a rather imperial feeling; big super-blocks of the old residences but the East side of Tokyo station is more merchants. Maybe they say that we copied the Dutch urban design; so very, very dense area. There is a big difference from West side to East side.

This almost a dam. He actually made a moat; canal, almost like a spiral. It's actually a military town: [designed] not to be attacked ...

This is a very interesting diagram to show the Edo city structure. This is the castle and the moat and these are the major trunks from the local city. So we have many "mon". "Mon" means a gate – a gate means a "check-in". So many times when the people went to the feudal lord, if they came from the local city, they have to pass many gates to be checked in.

This is the only image of Edo castle. Once built, after just six years or something, it was burned down and never built up again. So this is kind of a virtual image for us. Nobody wants to build it up again.

This is the image of the Nihon-bashi. There used to be a fisherman's market here and this is the very dense area of merchant/commercial activities. They say that urban planning always referred to the Fuji mountain; all the streets.

And there was a big fire all over Edo; Meireki fire was the biggest one. They had to change the structure. The residences of the hostages, like the wife and children went out to all of Edo. Next time I will show you the Feng-shui topographic map and the wrapping of that. All these, the old residences were turned into the University of Tokyo here, some universities or gardens. It's a kind of asset as a garden city. It's interesting; all the residences sit on a hill – it's an influence of the Chinese feng-shui

The Meiji Restoration came. Maybe you will go to the Ginza district. Now Ginza is like that, but it used to be a super-block like that. A very big super-block and inside was open space.

This is an image of the south side of Ginza street. Now you can see department stores. This is the north side of Ginza street; this is still residences or lower buildings. So you understand the difference between this one and this one: the north side could get very good sunlight so they could keep as a residence but the south side was the shadowy side so they quickly changed into the commercial buildings.

This is the Otemachi or we called it the New London district. Mitsubishi Company purchased all the government land inside Tokyo station so they copied the London townscapes. You will visit maybe, there is one building restored, rebuilt: the #1 Mitsubishi building is now rebuilt as a museum in this area. But whole other buildings were demolished because the climates were different: in Japan we have a very humid climate so it is very bad to live in a brick, small window building.

This is a very old photo of that time. The people lived in very dense, wooden houses.

After the Meiji restoration, for a military city, they had to change into a modern city. So this is their plan, 1888, so they wanted to make very straight streets; not passing thru this area, but all these are planned. But lack of budget...some are completed, some not.

This is the image of the late Meiji or Taisho era Tokyo. We can see the many garden areas on the hill but all these downtown areas are developed as commercial area.

This is the Nihon-bashi area. We can see the fish market here still. And then we had the Kanto earthquake, the big one. This is the Mitsubishi department store or Mitsui companies.

This is the image of after the great Kanto earthquake; Asakusa area.

Only the concrete building survived; the wooden houses basically burnt down because the earthquake happened around noon so they were cooking in the wooden house.

The refugees came in front of the palace. This is, maybe you can see some plaza in front of Tokyo station between the palace. They stayed here as squatters; like that. This is not Edo castle but a kind of small part of the castle.

The map shows the burnt area after the earthquake. The eastern part of the lower place; actually the topography is the eastern part is lower and the western part is more hilly. So all these wooden buildings were burned down.

After the earthquake, the famous Shinpei Goto, he was the mayor of Tokyo metropolitan government and also he was a doctor. He planned a comprehensive reconstruction plan of the east part of Tokyo. We call it the "big handkerchief plan"; it means that there is no budget. So only some part completed and some part not. This is a kind of history of the layers or accumulation of completed area and not completed area: it's a kind of mosaic of modern and ancient structures. That's the very specific character of Tokyo.

From 1942-1945 we had very severe bombing from the B-29. They were very correct to bombing; so we can only see some concrete buildings; all of these are some kind of primary school and a park or something. After the earthquake, the great earthquake, we tried to make a very rigid primary school against earthquakes. This is the image of, again, the eastern area.

This is near the Tokyo station. Some office buildings survived.

They had to live again so they made this kind of temporary housing. It's a kind of déjà vu of the Tohoku area.

The bombing wasn't very precise so even in the south or west side was bombed because there was some little factories for military goods. You can see some areas survived. Maybe this is part of the difference of the townscape, the old one and the new one.

After World War Two we had a green belt idea to make as a buffer zone, a green belt to avoid all the disasters. But, again, lack of budget: only some completed. This is the history of this kind of repetitions.

This image is a very dramatic change from the post World War Two period to the modern, or more developing or advancing Japan. Kenzo Tange did a design for the swimming pool, gymnasium and this is the basketball gym. I cannot imagine that this is a basket ball gym from the outside; it can be a church or something, or a community center or something. A very beautiful shape. I heard that the average age of the staff was just 20. So in the Tange laboratory at the University of Tokyo, of course the structural engineer was more professional but structural engineer suggested these two big posts here and the wires. Finally they used the steel to do that. If the wire comes that way, the wire is too gentle; so they wanted a [different] curve. I wanted to show inside; you'd better visit inside.

Oh, poor Nihon-bashi. This is Nihon-bashi bridge, the symbol of Japan, it was covered by the [elevated] highway. During the Olympic game period, the government asked the people here and nobody resisted because it was a national project. No one could resist it. There are some projects [now] to get rid of this [highway], to other place.

This is the interesting neighborhoods: this is the imperial palace and Asakusa, Akihabara – the mecca of the [electric goods], Nihon-bashi, Ginza, Tsukiji fish market and Roppongi, we are here. Shibuya and Shinjuku are huge, terminal city: all the private lines come here. For example, Shinjuku station holds 3 million people a day. It's one of the largest in the world. As I told you, there are many gardens, it's kind of reminiscent of the old samurai residence and some are the merchant/commercial areas. So there are very interesting neighborhoods, they are scattered. We call it Salami Pizza Type City, so if you go to Asakusa or Ueno it's a kind of salami or pepperoni, I don't know.

Ok, from now, I need to go into the [recent] earthquake. This is the most recent attack, physical attack. The magnitude was very large and they say it is the fourth largest earthquake since 1900. So it's a very heavy one.

I should say that this is a complex disaster. We had many experiences [from] earthquakes so our earthquake prevention technology is very much advanced. So we can break thru this one any way; actually the damage for the building was not so much in Japan. But the tsunami was kind of unprecedented and a huge amount of damage to recover – so it's a kind of once in a hundred year disaster. And the radioactive issue, oh dear, we didn't think about that at all. And we couldn't believe what happened there and we couldn't believe what is going on. So it is unprecedented and invisible; no one can tell the real exact, you know...I'm just an architect, but we have to believe the government or TEPCO (TEPCO is very, very famous in the world). I should say this is a three times complex disaster.

This is the magnitude; these areas it was very heavy but also they were attacked like that. But in the media they picked up all these areas.

This is not a good map but the red is hard damage and the blue and other colors are not so much. Its focus is here, on the coast here.

The Kamaishi (sp?), all these names, some are larger cities and some are very small villages but basically all these areas...so southern part is not [too] bad, but they suffered from the earthquake or tsunami.

This is the report from the government. We have a self-defense force; I didn't know that in 2008 they had a very good training drill about this kind of disaster so they could very quickly work. On the same day as March 11th they could deliver all the helicopters and they worked very well. We didn't know that.

Regarding the infrastructure: to my memory, in April most of the highway was recovered. With the help of the American U.S. armed forces we could recover the Sendai airport. You can see this is the tsunami but finally it was recovered on March 29th. Thank you.

This is a kind of good news that all the foreign delegations or helpers came to get in the small cities. It's not announced well through the media, but I was very surprised and thankful to the foreign countries.

This is the very recent factual numbers. Restoration: most of the disaster waste around the residential areas are mostly cleared. Most of the life-lines have been recovered. Refugees are approximately 900 people still in shelter. Most shelters are closed, the temporary shelters are closed. And infrastructure: Shinkansen and airport is recovered very quickly. And ports are partially open. Highway and major trunks are mostly ok. But still the local railway, which runs according to the sea shore is all damaged and it is very hard to recover. And now, before 470,000 people wanted refuge, now around 71,000 are still in the temporary housing and 900 in the shelters. We built social housing nationwide like this [16,658] unit, private housing nationwide like this [62,685] and local temporary housing is 51,000 units: they say these are all covered, but it's not in the statistics [but] many people went to relatives [which is] not counted we guess.

This is the major cities; rather large or very typical cities. I went to all these cities in April and I will show you the images. Maybe you had better note that the type of the section; Natori or Ishinomaki is a rather flat area, and Kasen-Numa from this part to this part is a more steep [cliff]. The section topography is different. We cannot find a common solution; we have to think about the different type areas.

This is a kind of record of the damaged area. The flat land was a very, very long (stroke?) damage, but the steep area was a very shallow damage.

This is Arahama, southern Natori. This is a kind of buffer, green area for the sea. Maybe it was restricted to construct housing here [beyond the buffer] but sometime they started to develop here. That's why all these are gone. Almost nothing is there and the buffer didn't work for the strong tsunami.

This is another; Yamada is a rather northern city. There is a height difference. This is the higher part and this is lower. The lower part is all gone, but some parts could survive. There is a very famous story...they had experienced a big tsunami, I don't know, 80 years ago or something, so the ancestors wrote a notice that said 'don't live in the lower place, live in the upper place' but it was neglected because most of the younger people wanted to live in the lower place.

This is the typical narrow village surrounded by mountain [Koshirahama]. So like that, [you can see] the difference in the levels: the upper level could survive. And more miserably, they had a kind of 5 meter or 10 meter sea wall already. And they say they were told, "Ok, this is very safe". The notice said that the tsunami will be 5m high, so they felt easy. They didn't evacuate because they believed this works, but actually it was broken and all these are gone.

The same [as that] Kirikiri. The water went deep in the riverside and river basin.

This is more flat. Maybe this is reclaimed land for industry in Oduchi. It's mostly gone. Some houses could survive here.

This is a very shocking photo, near Sendai, all the villages went down. It was in a magazine, I was very shocked... "where is the land?" finally, it is now coming up. But totally, the average of 75cm to 1 meter, the land is lower. It's another issue that happened.

Natori is a rather flat area. All these are rice fields that are filled with water. This is the Sendai airport; it's an April photo so almost all ok, but this is the runway for the real plane [which was] still like a pond.

All the rice fields are filled with salt water so it will take about, I don't know, about 3 years to have all the salt washed [out]. You can see some infrastructure were broken and all the strong water came in.

This is the image from April. All the cars were there and the defense forces were helping to get rid of the disaster debris. The electric pole was broken like that. You can see that the sea wall was very easily broken.

The factory couldn't work, but the upper part was ok, the first and second floor was all damaged.

This is the warehouse near the port. This shows the very strong strength of the water.

This was a bridge and the roads are not connected. The transportation was all shut down; it was very hard to get to the site.

Ishinomaki is a rather larger city with industry: marine and paper industry. This is very flat land, all the residential area and there is a school. It's gone like that. There's a very gentle hill, the people who live on the hill were safe. The water came and [some people at first] refused to leave the playground of the elementary school but finally all the water came; it was very, very bad. But nobody [was] killed so it's ok. This is the view of the area in April so the existing housing...

This is all the disaster debris, stacking and the Japan forces are cleaning up. It took 3 or 4 months to get rid of all this [up to] the shore line. The defense forces had painful work. The cars were burned.

This is the view from the hill. You can see all the long stroke of the housing land, maybe it was reclaimed land; all gone. So if you visit now, there is a hill of disaster debris.

This is the Google earth street view of the elementary school but it was like. [When I first saw it] I was very shocked, but later I heard that nobody was killed so it was rather ok but still shocking. All the cars are left here and burned down. This is the view from the air. It's very interesting, or strange that, the back side of the hill or all these could do their lives as it is but here, it's hell. And on the hill it's ok, so it's a kind of difference of the places where they lived.

Kasen-Numa is a more industrial town, like ship-building. These are ship yards, and these are the ships still burning.

The earthquake was very bad in the mountains. Some wooden buildings were [broke] down. This is the garbage from all the houses. This is a very desperate guy; they don't know how to deal with this disaster.

And this is a very strange view; ships and cars are everywhere. Huge ships are on the ground. They already [had done some structural shoring] treatment [to keep them from falling over]. Some ships will be kept as a museum or something but some people resist, it's a kind of controversy [about] the memory. And cars are everywhere. It's hard to bring a car like that. Ships and cars, and houses are [upside down]. I couldn't believe it was a real thing.

This is more northern area, Echizen-takada, still the wider, flat area is all gone. This is very severe. The City hall was there but it's gone so it is hard to do the governance. Fortunately the high school and some elementary schools are on the hill so the children were saved. I will show you later but the Civil engineers or government want to make a very high sea wall like 15m – it's nothing. So we have to fight against that kind of idea. This is their school.

It's like a desert.

The people went into a shelter like the gymnasium of all the schools. And the roof top of the open market, the super market, was there even in April so the life is coming back.

And they were making the temporary housing like that. It's a construction site [which you must be] familiar, huh? It's like a barracks of the military; it's not a place to live. Recently, we're in November, it's becoming more [cold] so they are worried about the heat.

This is the temporary police and some offices. I think it is good for this kind of administrative people to live together or work together. I don't know your cities but in Japan, it's very perpendicular between police and...it's very, very hard. Sometimes it's good to do it like that.

This is a graph of the volunteer people comes every weekend, many, like 2000 volunteers come to help and it is still going on. There are many networks of NPO groups. At the civic level, we are very ready to help all these young people who are very serious about [helping].

This is the Japan Civil Network, it is the largest network of these kinds of activities, 675 NPO groups subscribe and registered and the members help every week or every month. There is a place and an activity [identified for volunteers as to] what they can do. It's a kind of website, so if they want to go to something close to some group and they can help. It's a rather sophisticated network in a grassroots level. I must say that government level is terrible.

This is the estimation of the repairing cost: will be 17 trillion yen, means \$130 billion. And this, the forecast of the macro-economic impact said that, you know, in 2008 we had the Lehman Shock [same] as you altogether and this is the downfall and we came up like that. And this is 2010, and this is the earthquake, but the private economists estimate this kind of curve (rising) still. They don't know the exact curve, but they say that the economical damage was not so deep. It means that this is a kind of characteristic of east Japan (Tohoku). East Japan didn't have a very

heavy industry like Kyoto or Osaka or Tokyo. So it means that the damage was not big. That's the very controversial issue: we to pour a bunch of public money to recover this area. But they are a rather poorer group, all the elderly...the cost performance of the disaster prevention is a very hard issue to discuss.

Controversial Issues not limited to [only that] but maintaining the existing community – it's very important and difficult. One group wants to relocate, but one by one [they don't] want to relocate, but as a group they want to relocate. And keeping the beautiful landscape: we cannot break all these original, beautiful landscape but the Civil engineer wants to break it. And the life-support business, the fishery or forestry or agriculture we have to encourage. And again, we don't know when the next tsunami comes; in a hundred years means next year or in two years; we cannot estimate. This is the typical discussion: "relocate to a higher place" or raise the land or just "stay at the original place" with a sea wall or something. The cost is very different. This is a kind of very hot issue here. So [wrapping up:] Disaster prevention versus Quality of life is a very severe point.

I have to rush. Some architects did some good work like Shigeru Ban or Archi+Aid is a kind of a network of architects and Nikken Sekkei is a large firm. And I had a charrette workshop with the students. And Kengo Kuma, Toyo Ito, Seijima, Yamamoto, Naito: they made a group to encourage the reconstruction. Takeuchi is a young professor; he did a real construction of a hut for fishermen. Toyo Ito did a workshop and I did a workshop again in Ishinomaki. And Shigeru Ban realized a three story temporary housing with the containers.

Shigeru Ban is a very interesting guy. He developed the paper tube buildings or shelters and recently the containers. They are developing this kind of partitions and container building like that.

This is Nikken Sekkei company collected the Tohoku students for 2 weeks and did an analysis of this kind of topography, typology. And the company helped the students to think about that.

And this is the group KISYN, KISYN is [an acronym for Kuma, Ito, Seijima, Yamamoto and Naito] they are very famous for young people, I don't know if you may know or not, they're a kind of star architect. It's ok, star architect can do this for picking the interest of general students. But we have to remind [people] that there are other, more serious architects.

And Ito did a presentation. You know, it's good, it's good; the media picks this kind of topic but; yeah, it's the media's issue.

Takeuchi, young professor, made a self-built (with the students); this is actually an illegal building because it is in a building-restricted area so they say it is a temporary (forever temporary) [project].

This is the completion of the 3 story Ban's idea. It doesn't look like container but the concept is the same.

I was in charge of this charrette workshop with the students in Tokyo and Ishinomaki. Charrette workshop as you know, is a very intensive, very quick workshop to do a project. In April we had, in Tokyo, very severe electric savings so we had to turn off the lights.

We had an analysis of the Tohoku area, how to connect more resilient network and topography analysis and the evacuation or relocation patterns. The workers for the factories can live far from the area but the old people want to live inside or agricultural have to live near [their farms]. There are several different patterns of the people.

This is a different kind of pattern analysis.

In Ishinomaki city we went in August and we stayed in downtown. This the Hiyoriyama mountain, a very safe place; [while] this place is all gone. We had to deal with how to revitalize the downtown. This is the area devastated by the tsunami so it was designated as a building restricted area. It will be as a park here, kind of a memorial park. There's a trauma to live again there so it's hard to use that; so the local government wants to use it as park. So we had to do this commercial area.

Oh dear, this is the vision from the government or Civil engineers: a very high sea wall like that. A double sea wall and they will be protected, theoretically.

You can see: one sea wall, then road, people and this is the key – an evacuation building. On quick notice they have to go to the building. It means that they cannot see the sea. Strange.

We had an interview with the local people who had experienced the tsunami and we did a town survey, and all night working on a charrette and a hearing with the local people [for] five days. And we went into several groups: Scenery simulation, future plans, urban planning, central city revitalization, and area management.

These are the areas they tackled. This is the kind of image of how to revitalize this area [to make] it more safe. The students want to lead the people to go to a very safe area quickly, Hiyoriyama mountain and also [provide] for tourism – how to revitalize downtown area.

This is another group's pick: the old shopping mall and how to reuse the old historical house as a restaurant and how to revitalize or bring in more tourists.

This is another guy: did the connection between the existing and new buildings and using the existing parking lot as a refuge place. So it's a kind of connection of the existing buildings.

Other groups picked the sea wall issue. Originally Ishinomaki city was a river port so there was no sea wall at all. [since the last earthquake] the level was lowered almost 1 meter; at full tide [ground level] is 1 meter under the water. So anyway, we will need to build a sea-wall here. This is a simulation of a 7 meter sea wall, it is designated by the prefecture – they have to do this because the tide wall should be continuous. This is [what] the local people want: more lower and a gate – so there was a really hard discussion about that.

The students proposed different types of building sea wall-type and lower sea wall type: I asked the local people to discuss about that. The mayor listened to the students project; [it is] still undecided but local people, of course they want to see, they want to connect to the river. The government is still sticking to the higher, safe [wall].

So, ok, five minutes...

The federal government did [it] very slow, but very recently they decided to [spend] 11 trillion yen, on dollars extra supplemental budget in this fiscal year by March. This is the role of the national level [government]: Infrastructure restoration, Project basic finance, Subsidy for the temporary housing, research subsidy of \$9 million to consultants. Generally this is Civil Engineer consultants so they propose [those] kind of awful plans. The Prefectural level is still shaky; they are just managing the temporary housing – not much power [local government: basic reconstruction plan and community development]

This is the final budget [table]: In 5 years the government will [award] 19 trillion yen, in 10 years, 23 trillion yen. The demand is all of these: project subsidies. "Others" means, not reconstruction – very different. And "resources" [means] the bond. We need to discuss if it is worth pouring that kind of money to that heavy structures.

This is a typical diagram of relocating to a higher place or making new land or you can see, this is funny: the evacuation building. And this is the one we saw in Ishinomaki. They are cartoonish images by the consultant. We architects need to fight or discuss what the engineer [proposes] for what kind of mitigation treatment.

Finally I show you the image of the nuclear plant. This is the radius; this is just a radius; we are from more than 200 km from [there]. But actually, I don't know, the winds blow this way. Only this part [of Fukushima] had very specific evacuation area. Not here, only here and here: very strange.

Ok, I have to tell one very bad episode. After the electricity issues; TEPCO had the scheduled power break in Tokyo area or Kawasaki area. We had to stop our electricity [for] 3 or 4 hours a day. Some skyscraper residents had to carry his kids 26 floors by stairs or old couples cannot go back [up] so they just stayed at the entrance. This building is ok; so Mori made an extra battery or generator downstairs – it is a very special building; you're ok. Generally the skyscrapers...I don't know if the price, the real estate value is coming up or not, but they are very, very sensible about that. This complex disaster made us realize: how much our life style depends on electricity or artificial energy; how much we have over-trusted our technology. Again, the Civil Engineers still making another one. And how much we forget our respect for Nature. So we need to think seriously in global scale! Thank you.

Notes:

Transcription done by Jeremy Altman

Some corrections were made or information added for the sake of clarity and are shown in brackets[].