Water Front Developments in Tokyo: Tokyo expanded to vanishing Tokyo-wan bay

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Preface:

Throughout the 19th and 20th centuries, Tokyo has been constantly growing, except temporally population loss in the early Meiji era, from 1.2 million Edo of 10 kilometers in diameter to 30 million gigantic Tokyo Metropolitan Region of 70 kilometers in diameter. In its expansion Edo/Tokyo has three frontiers of expansion, namely suburban areas, the sky which used for high-rise and high density buildings and Tokyo-wan bay.

Edo/Tokyo located at the most inner part of Tokyo-wan bay unlike most of American and European Capitals which are located in inland area or at the estuary of big rivers. Tokyo-wan bay is rather shallow sea having only 30 meters in depth at the center of the bay (Fig 1) and had wide tideland because into which three big rivers; Arakawa(Sumida-gawa), Tamagawa and Tongawa(present Edogawa), had been continuously carrying a large quantity of earth and sand. Reclaiming the shallow sea, Tokyo have been expanding to Tokyo-wan bay since 17th century when Shogun Ieyasu founded the feudal capital Edo and even now. Consequently, Tokyo’s waterfront moved to the center of Tokyo-wan bay about 10 kilometers from Edo’s original water front line and have made new land of more than 24 thousand hectares or one fifth of original Tokyo-wan bay of 110 thousand hectares.

In this paper we will outline the long history of reclamation of the shallow sea and creation of land in Tokyo-wan bay and the history of plans and planning for reclamation, and then discuss issues on the recent waterfront development projects such as Minato-Mirai 21(future of port in the 21th century) in Yokohama city, Makuhari New Urban Center in Chiba city and nearly bankrupting Tokyo’s Waterfront Subcenter. Furthermore, we will also touch upon environment problem that is vanishing natural waterfront, and tideland, and problem of refuse landfill in the Tokyo-wan bay which will be difficult to stop even in the future.

1. Edo expanded to filled inlet and reclaimed sea:

The history of Edo's development which often called 'Tenka-Fushin' (development projects planned by Tokugawa Shogunate) had close relation to water works, improvement and change of river flows in Kantoh region, reclamation of swamps and shallow sea and construction of many canals and moats. These water works had done intending to prevent repeatedly flood disasters, to establish a water transportation system and to enlarge available land for agriculture and urban use. Edo's urban planning which was characterized by reclamation of and expansion to Tokyo wan bay and by creation of many canals and moats network and turned Edo into a waterfront city similar to Venice.

Filling up of Hibiya inlet which laid between Edo castle (present Imperial Palace) and Edo-maejima was the first development project in Edo period and land for Daimyo koi (Daimyo's residential quarter and correspond to present Hibiya-Marunouchi area) was created and flourishing Machi-chi (townsmen's area) such as Nihonbashii, Kyobashi and Ginza were reallocated following traditional and systematic Machi-wari (subdivision) method. Since then and through out Edo era,
Edo gradually expanded into Tokyo-wan bay. Until Meiji restoration, reclaiming sand banks of Sumida-gawa river, new Shitamachi (low section) areas such as Tsukuda-jima, Ishikawa-jima, Tsukiji; Hamacho and Reigan-jima, the eastern half of then Nihonbashi-ku and Kyobashi-ku, had been developed. During the 17th century the shallow sea to the south of Onagi-gawa canal which constructed in 1590 to transport salt from salt fields in Gyotoku area (present Ichikawa City) were also reclaimed for Shinden(new paddy fields) by private investors, however after 1661 when Ryogoku-bashi bridge opened and connected central Edo and Kotoh area, land use in this area gradually changed and at the end of Edo period the western parts of the area were totally for urban use(Fig 2.3).

In this period at the same time of reclamation, many canals and moats were constructed in the inner area of Edo and Edo became to have a splendid transportation system by water composed of a network of canals and rivers and landing places along banks.

Unlike Osaka and Nagoya where reclamation in feudal age were mostly for creating new paddy field, reclamation of Tokyo-wan bay in front of feudal Edo, especially in the Shubikichi(areas inside of red line which showed Edo's city boundary on the map) were mostly for urban use and this indicated strong urban land demand and shortage in Edo.

2. Unfinished Tokyo Port Projects in Meiji Era

In Meiji Era Yokohama had been the only international trade port in Tokyo-wan bay area and many attempt to develop a international trade port at the waterfront of Tokyo in place of or additional to the port of Yokohama. There were two alternatives to make a new Tokyo port; by reclaiming waterfront of Tokyo-wan bay and by digging dockyards on riverside of the Sumida-gawa river.

The first plan of Tokyo international trade port was proposed in 1880 by the then governor, Michiyuki Matsuda. His proposal is believed to have been influenced by Ukichi Taguchi, one of famous economists in those days. Taguchi insisted on necessity to diminish the economic loss caused by the barge transportation between Tokyo and Yokohama. In those days about two thirds of the cargoes reached to the port of Yokohama loaded barges and transported to Tokyo. In Tokyo the barges conveyed them to the warehouses and factories through rivers and canals. Some of them were transported to so far as various places in Kantoh region and partly in the northern pacific coast of Honshuu. So the cost of barges did not account negligible amounts.

Taguchi thought that Tokyo had to construct a port with piers for diminishing such costs. The problem was where it should be constructed. The Sumida-gawa river carried much soil and the mouth of river became shallower and shallower by years. So 'Kakoh An(river port plan)' although it had a merit of close location to the heart of Tokyo's business and commercial districts, had a inevitable demerit of continuous dredging as well. On the other hand the plan to construct a port at the south-west coast of Tokyo named 'Kakoh An(seaport plan)' which could avoid the dredging problem, was confronting with huge estimates of construction costs.

Technological consultants from the Netherlands such as Anthonie T. L. R. Mulder, Johannes de Rijke proposed the latter but the government could not bear such a great expense. Some Japanese civil engineers planned the port to be constructed at the mouth of Sumida-gawa river, which seemed to have more feasibility. However the movement against the Tokyo port project by Yokohama City for protecting their vested interest from the Yokohama port, exerted influence upon high rank officials of the central government and stopped realization of the plans.

At the time of the reconstruction programme after the Kantoh Great Earthquake, the plan of the port of Tokyo was again proposed, but it also could not be materialized because of another strong opposition by Yokohama City. Finally the port of Tokyo opened in 1941 during the World
War II under the military support\(^{(4)}\).

3. Pre-war reclamation in Keihin industrial zone:

Keihin area\(^{(1)}\), the waterfront area from Tokyo through Kawasaki to Yokohama, was composed of alluvial low land and very shallow sea. In Edo and Meiji era, the low land was used for mainly paddy fields and partly salt fields and the shallow sea was used for inshore fishery and growing laver. During Edo era the main purpose of reclamation in Keihin area was for agricultural use. It was true in the central area of present Yokohama City\(^{(4)}\). After the open port of Yokohama to foreign trade in 1859 land use of already reclaimed agricultural land gradually changed to urban use such as the expansion of foreign settlement\(^{(17)}\), commercial and amusement quarter by Japanese merchants and governmental uses. Yokohama's present CBD in Kan' nan, Isezaki commercial district and the present Yokohama station\(^{(19)}\) are all on reclaimed land in Edo era.

Japan's first railway from Tokyo to Yokohama finished and began to operate in 1872. The railway which was constructed through Keihin area partly along the waterfront gave stimulus to industrialize the area and to develop new reclaimed land. In fact some parts of subbase for the railway were constructed on newly reclaimed land.

Almost all of pre-war reclamation in Keihin area was for industrial use and not a small part of them promoted by private companies. At the beginning of 20th century, Yokohama City and Kangawa Prefecture as well had an idea that Keihin area would be developed to industrial area, so the projects of reclamation by private companies basically were encouraged. The first reclamation for industry in Keihin area of 496 hectares was planned by Soichiro Asano\(^{(19)}\), one of the famous Japanese businessmen in Meiji era and completed in 1928. He planned this reclamation in 1908 to move his cement factory in Fukagawa Tokyo, which had been blamed by neighboring citizen for the air pollution of cement dust. In the reclaimed land by Mr. Asano many factories including the ironwork of Nihon Kohkan Co. in 1913, the new factory of Asano Cement Co. in 1917 were located and so called Keihin industrial zone gradually came in sight\(^{(20)}\).

Reclamation of Keihin area was accompanied with digging of many canals between reclaimed islands. Keihin Canal which was planned to connect these canals and simultaneously to make a new rout from Yokohama to Kawasaki and Tokyo\(^{(21)}\) was planned by a private company headed Mr. Asano and nearly completed at the time of the Kantoh Great Earthquake Reconstruction Programme. Both sides of the canal have developed into the typical heavy industrial area in Japan.

The reclamation projects in Keihin industrial zone accomplished after 1930s were mostly planned by Yokohama City and Kanagawa Prefecture. However the purpose of those projects were also to supply the industrial sites for private companies.

The reclamation for industrial use in Chiba Prefecture was also planned in the 1940s and realized very small area in front of Soga\(^{(22)}\), however the realization of Keiyoh industrial zone was postponed after the end of World War II\(^{(23)}\).

4. Tange's 'Tokyo Plan 1960' on the Tokyo–wan bay:

Famous architect Kenzo Tange proposed in his visionary 'Tokyo Plan 1960'\(^{(24)}\) to construct a new urban center on the Tokyo–wan bay with his original 'Circular Transportation System' running from existing Tokyo's CBD to Kisarazu locating just opposite side of the bay(Fig 4). His plan was far ahead of other plans proposed before or after his plan\(^{(25)}\), in clearness and stimuli. He proposed in his plan some important conceptual changes of Tokyo's waterfront planning. First of all his proposal was not to reclaim the shallow sea of Tokyo–wan bay but to construct urban spaces on
pilotis basing on the deep foundation bed and standing upon the sea and form bridge like constructions. Consequently his plan did not be limited to the shallow sea but extended to the center of the bay where depth of the sea reached 30 meters. Second; his plan was to create urban spaces not for industrial and transportational use as before but mostly for CBD. Third; conventional reclamation projects added only a small part to Tokyo but Tange's plan intended to add enormous urban spaces to Tokyo and to change Tokyo's urban structure itself. Moreover and of most importance, he affirmatively proposed a possibility and propriety of the ten million gigantic city Tokyo.

Concerning the evaluation of Tange's Tokyo Plan 1960, Dr. Claire Gallian in her stimulus article made a pertinent remark on the role of Tange's plan in the planning of Metropolitan Region saying that nevertheless the monsters named 'inevitability of gigantic metropolis' which Tange released from Pandora's box have been widespread all over the world and done serious harm of uni-polarization in Tokyo, the hope to cope effectively with metropolitan problems which Tange believed to find and proposed in his 'Tokyo Plan 1960' has been remaining in his box alone.

In fact, the monster made a raid on Tokyo Metropolitan Region especially on the Tokyo-wan bay during the next two decades and filled up and made many artificial islands not systematically equipped as Tange proposed.

5. Large scale reclamation in the high economic growth period:

The National Capital Region Development Act which was the first legislation to cope with metropolitan regional planning in Japan was enforced in 1956 and the First National Capital Region Plan was authorized in 1958. This plan is famous for its planning concept of a green belt and satellite towns and is often said to be modeled on the Greater London Plan of 1944, but was a follower unworthy of the model. However, the most important and powerful planning measure that the plan introduced was the Act to Control Industry and Other Functions in the Built-up Area of National Capital Region. In the first National Capital Region Plan of 1958, Tokyo's wards area and city area of Musashino, Mitaka and Kawaguchi were designated as the Industry and Other Functions Control Area in which manufacturing industries and higher educational facilities restricted to establish new facilities and to expand its functions, consequently these institutions wanting to extend their activity should remove their facilities from the designated area or had to make branches out of the area. It is noteworthy that this act is outstanding planning system in relation to its powerful planning measures and also to its long life in the fickle Japanese planning policy. At present 40 years after its enforcement the act is still valid and yet has the unchanged effect. In fact many factories and many universities moved partly or entirely out of the designated control area. For instance, many industrial factories moved from Kotoh Ward and vacant sites changed into housing estates and office use; Chuo University's Main campus moved from Chiyoda Ward to Hachiohji city and vacant sites were bought by an insurance company and changed into business use. However it is doubtful that the act have obtained expected result to check limitless accumulation of urban functions and population in Tokyo ward area.

One of causes of contradict results is that almost all of 'Atouchi(vacant sites)' of moved universities or factories were used more intensively. And another and more important cause is that reclaimed land in Kanagawa and Chiba prefectures, not only already reclaimed but also newly reclaimed after the act enforced were excluded from the designated control area. This may be regarded as overlooked loophole of the system, however the fact that reclamation works promoted strongly in the next few years prove the intention of exclusion was to accumulate heavy and chemical industries to the Tokyo Metropolitan Region using rather low cost reclaimed land.
After the end of World War II, especially from 1966 to 1975 just in the high economic growth period, in almost all coast of Tokyo-wan bay, enormous reclamation projects were strongly promoted (Fig 3 and Fig 6). During thirty years from 1945 to 1975 nearly 20000 ha of reclamation land were completed and more than half of them was in Chiba prefecture. 55.8% of total land reclaimed during these 30 years was for industrial use and in the decade of after the enforcement of the National Capital Region Development Act, planning concept of which was to control expansion of the National Capital Region, the ratio of industrial use increased. It is surprising that out of 11343 ha then on going reclamation projects in Chiba prefecture only 1383 ha or 12.2% of total was authorized in the first National Capital Region Plan. Tange and his follower's 'New Tokyo on the Sea' plans in the beginning of 1960s seemed to be only encouragement to construct new industrial sites on the reclaimed land.

Reclamation projects in the high economic growth period resulted in location of heavy industries including three gigantic ironworks, many oil refinery plants and many petrochemical plants (Fig 7) and in almost completely loss of natural coastline (Fig 8) in Tokyo-wan bay.

Professor Miyamoto summarizing the lessons of post war waterfront development in Japan proposed three principles that (1) it should not be for the profit of certain industries, but for multiple purposes; (2) it should be 'sustainable development' with respect for the conservation of the environment and landscape; and (3) it should be 'endogenous' development based on public participation. 33)

6. Filling up the Tokyo-wan bay by all types of waste:

Not a small part of reclaimed land of Tokyo-wan bay has been filling up by waste from Edo period to the present. Nevertheless Edo was said to be a highly recycle society turning garbage and night soil into fertilizer in suburban rural areas. 29) the waste such as debris after frequent big fires and big earthquakes was used for filling up waterfront and making new land. In 1655 an order on waste disposal was enforced which prohibited waste disposal into rivers or canals and designated Eitai-shima or Eitai-ura which was a shoal at the mouth of Sumida-gawa as a waste disposal place. 33)

It was also true after the Great Kantoh Earthquake and air raids during the World War II. In fact many canals were filled up after World War II by debris of burnt Tokyo. 36) Since high economic growth age, Tokyo-wan bay has been most important place to dispose waste of large quantity and many quality; general waste from households and urban activities, sludge from sewerage plants, ashes from incinerator plants, debris and surplus earth from construction and reconstruction works and others (Fig 9). Disposed waste have been dumped and created large amount of reclaimed land such as 'Yumenoshima in offshore of Kotoh ward. The word 'Yumenoshima', which means literally 'dream island', and is ironical another name of the Landfill No. 14. During the high economic growth period and at the outbreak of mass-production and mass-consumption age, Yumenoshima had been only one place to dispose rapidly increasing garbage. To tell the truth Yumenoshima was not a dream island but a dumping ground of leftovers in dreamlike mass consumption. In 1973, Yumenoshima became the battle field of so-called Garbage-war between Kotoh Ward and Suginami Ward 35) and the name 'Yumenoshima' became the most symbolic keyword of garbage disposal problem in Japan. 36) Today, most of Yumenoshima turned into a metropolitan park and in a corner of the area huge incinerator plants were under construction and partly in operation. At present waste are dumping in outer area of central breakwater locating 10 km from originally water front line. Yokohama and Chiba are the same situation in waste disposal problem (Fig 10).

Waste was being generated in growing quantities until 1989, but since 1990 has been
decreasing. It is believed that the diminish of waste concerned with the collapse of so-called economic bubble. The quantity of refuse dumped in landfill site by year shows us that the total amount of refuse and general refuse gathered by TMG are decreasing but waste from urban renewal(debris and surplus earth from construction and reconstruction works) and ashes from incinerator are increasing remarkably(Fig 11). Nevertheless total quantity is decreasing, TMG is trying to reduce the city's total garbage output not only to curtail expenditures but also to save limited land fill site. It is reported that the planned sites will serve for only fifteen years or at best twenty years. A plan of huge landfill site in Tokyo-wan bay named 'Phoenix Plan' was once proposed but still remains uncertain.

Today, TMG and many citizen's organizations and progressive companies as well are making many efforts to recycle resources and to reduce the amount of waste, however it is difficult for urban life to decrease waste to the zero level. To cope with increasing waste, especially sewage sludge, ashes from incinerators and debris from urban renewal, it would be inevitable to disposed them in Tokyo-wan bay and consequently reclaimed land would be created from now on. Moreover if a great earthquake hit Tokyo Metropolitan Region, it will be serious problem to deal with huge debris because there would be no space in Tokyo-wan bay to dump them.

7. Changing land use of reclaimed land:

As mentioned earlier more than 64% of pre-war reclaimed land was for industrial. This remained unchanged after the War and in the high economic growth period except Tokyo port area where industrial use was controlled by the National Capital Region Development Plan. Ratio of industrial use of reclaimed land completed in the first half of the 1960s in Tokyo-wan bay area reached more than 80%, however land use of those completed in the next decade changed gradually and thereafter industrial use drastically reduced(Fig 12). Industrial land use in the first half of the 1980s was less than 10% and land use for urban functions increased to more than 30%. It is noteworthy that land use for traffic functions also increased remarkably. It is because the waterfront area of Tokyo-wan bay have been attached much importance in a road and railway network system in the National Capital Region(Fig-13). The waterfront traffic network, which nevertheless not so grandeur as Tange's 'Circular Transportation System', has many traffic lines, not only those intra-connecting urban functions located in reclaimed land, such as Shuto express ways, a monorail to Haneda Airport and a light rail to the waterfront sub-center, but also those bypassing the built up area of Tokyo Metropolitan Area, for instance JR Keiyoh line from Tokyo Station(underground) to Soga Station Chiba prefecture and Wangan(waterfront) line of Shuto express way running through waterfront of Tokyo-wan bay from Yokosuka via Yokohama, Kawasaki and Tokyo to Chiba. Moreover there are the railway yard of Shinkansen bullet train in the reclaimed land in Shinagawa Ward.

As mentioned above, land use of newly reclaimed land after 1975, especially in the first half of 1980s, changed drastically to those for urban function site, urban renewal site and recreational use, and land use for these three covered more than 70% of total(Fig 12). The changing land use was reflected nothing but the end of high economic growth period and simultaneously the start of restructuring in Keihin and Keiyoh coastal industrial zones. The change in land use was not limited to newly reclaimed land. Land already reclaimed and left unused or used for relatively low utilization, for instance factories and warehouses, were redeveloped and changed into mostly office use and commercial use to correspond to overestimated office space shortage and partly for housing.

Among many renewal projects of reclaimed land in this period were, for examples, 'Ookawa-bata River City' project in Chuou Ward which redeveloped a shipyard in Tsukuda-jima,
one of the oldest reclaimed land in Edo era and 'Tennouzu Isle' project in Shinagawa Ward which is the first example of applying Redevelopment Type District Plan and both of them characterized by super high rise buildings and too much high floor area ratio.

In the 1980s, plans of three big development projects, any of them are a complex of office, conventional facilities, hotels and commercial facilities, made their appearance. Makuhari New CBD project in Chiba and Minato Mirai 21 project in Yokohama are core projects of two advancing cases in five Regional Business Center Cities which the third National Capital Region Plan proposed as a key planning concept in restructuring the Greater Tokyo Region. On the other hand, Tokyo's Waterfront Subcenter project is the third and belated big development projects in the waterfront area and has been promoted by so called Multi Urban Centers Plan of Tokyo Metropolitan Government. We believed that Tokyo Waterfront Subcenter Plan was inconsistent with the third National Capital Region Plan which planned to control Tokyo's wards area and it would cause serious problems whether successful or not.

In this occasion, architect Kenzo Tange and his associates proposed the version upped 'Tokyo Plan' of 1986 which had not such stimulative role as its old version 'Tokyo Plan 1960' because Tange was the head of then governor Suzuki's supporting group, so he could not neglect 'Multi Urban Center Plan' and the on going Waterfront Subcenter project by the governor Suzuki[40]. Group 2015 headed by emulous architect Noriaki Kurokawa which was free from TMG' plan proposed a 'new capital island' of 30 thousand hectares in the middle of Tokyo–wan bay[41]. However, projects of two groups and many followers which were outcomes of planners' merrymaking in the bubble economy period, were as a matter of course fruitless. On going three big projects Makuhari, MM21 and Tokyo's Waterfront Subcenter have been competing each other yet and after so called bubble economy period each of them get into a difficulty. Especially Tokyo Waterfront subcenter project is nearly bankrupted and would leave severe debt to Tokyo Metropolitan Government and citizen of Tokyo.

8. Future of Tokyo–wan bay; vanishing or recovery of nature

While officers and planners responsible to the three big Projects yet boast of the plans[42], careful scholars criticized the too hast decision making and pointed out necessity of consideration on a long–range prospect and flexibility of policy to change the substance of the project according to the changes in the future including environment problems[43].

Almost all natural beaches, tideland and shoals which are essential to migratory birds for resting their wings, to small shellfishes and crabs for their nest holes and inland sea fishes for spawn places, have been vanished from Tokyo–wan bay by continuous reclamation except south of Cape Futtsu(Fig 8). Many seabirds, shorebirds and waterbirds, most of them are migrants and some are residents, could be seen all over the Tokyo–wan bay, at tideland and shoals and surrounding inland swamps where even Toki(Japanese ibis), only one old female of which alive in the cage and will definitely extinct in very near future, were in Tokyo's suburb until early years of Meiji[44]. At present among seabirds and shorebirds, snipes and sand pipers may be in most serious situation losing tideland where they rest and feed in every spring and autumn on the way of their long journey. On the other hand Yuri–kamome(black headed gull) a symbol bird of the Metropolis of Tokyo and the pet name of the light rail train to the waterfront subcenter, may be in luck to find their food easily at the waste landfill in Tokyo–wan bay, however it is very sad to see so many gulls flying over dumped garbage.

Citizens' campaign for reservation of hardly remaining natural environment in Tokyo–wan bay, such as Yatsu–higata tideland, Sanban–se shoal and Ban–no–su tideland, all in chiba prefecture and consequently reservation of birds, shellfishes, crabs and inland sea fishes, have been
protesting further reclamation (Fig. 14, 15, 16).

Discussing the future of the nearly bankrupted Waterfront Subcenter project by Tokyo Metropolitan Government, not a few members of the Reviewing Committee propose to change use of the land which are already served by heavy infrastructures for parks and urban woods or even propose to leave it without any development and to be back to nature. And final report of the Committee could not decide a final proposal and only proposed two contradict alternatives. However, Tokyo Metropolitan Government decided recently on June 10th of 1996 to maintain the project only making slight deceptive changes and slowing down its development procedure. The investment for the Waterfront Subcenter project are said to reach to more than thousand billion yen in the future and Tokyo’s taxpayers have to pay TMG’s debt even if the land would be used for open space or would be left without use.

Moreover, as we touch in earlier section, if Tokyo could not find new final disposal sites of debris, sludge and ashes other than Tokyo–wan bay or measures to recycle them, reclamation of Tokyo–wan bay could not be stopped.

Tokyo’s water front problem is nothing but one of key problems of over concentration and uni-polarization phenomena in the capital city Tokyo.

Notes and References

1) This is also true in other Japanese metropolises such as Osaka and Nagoya.
2) Among European and American capitals and big cities, St. Peters Borg and Copenhagen may be exceptional examples which are located along the Baltic Sea and has been expanding to the sea by reclaiming rather shallow sea.
3) The Sumida-gawa river was once the lowest reaches of Arakawa river and carrying large amount of earth and sand into the port of Tokyo and Tokyo-wan bay, however Arakawa Hosuuro (the Arakawa diversion channel) had completed in 1923 after 10 years’ work and main reaches changed to the diversion channel.
4) At present the river Tone-gawa, Japan’s biggest river has its mouth at Choshi city and flows direct into the Pacific but before Tokugawa Shogunate made big improvement works it had another low reaches and flowed into Tokyo–wan bay. Old low reaches of the Tone-gawa River improved and changed to the present Edo–gawa river. In 1947 the big typhoon Catharine hit Kanagawa region with heavy rain fall and bank of the Tone–gawa broke at Kurihishi point where the root was changed and water of the Tone–gawa run down its old river way and caused serious flood in Shita–machi area of Tokyo. See, Ookuma, Takashi “Kouyou to Chisui” history of flood and control of water” Tokyo: Heibon–sha, 1988.
5) As is generally known, during Edo era Japan had two capitols; one was Shogun’s capital, Edo and the other was Mikado (emperor’s) capital, Kyoto.
7) Before Tokugawa-era, present Ginza–Nihombashi area was called Edo-maejima. Unlike its name, Edo-maejima was not an island but a peninsula or a sand bank opposite to Edo castle across Hibiya inlet. From 1315 to c. 1600 Edo–maejima had been in possession of Enkaku-ji, a famous Zen-temple in Kamakura, and was a trading center in south Kantoh region. See, Suzuki, Riset “Maboroshi no Edo Hyoku-nen (unknown one hundred years of Edo)” Tokyo: Chikuma–shobou, 1991: pp.71-86.
8) Ibid, pp.115–119.
10) A chinese letter ‘tsuki’ (月) means to construct and ‘ji’ (地) means land or ground consequently Tsukiji means ‘to construct land’ or ‘land newly constructed’. The name of ‘Tsuki–shima (月岛)’ which is the name of land reclaimed in Meiji era also includes ‘island newly constructed’. Tsuki (月) literally means the moon, however in this case is used in place of ‘tsuki’ (月) because of having a same pronunciation.
13) Johannis de Rijke (1884–1913) stayed Japan from 1873 to 1901 as an invited technical expert of the Ministry of Home Affairs, and was consulted on flood control, irrigation and construction of ports especially the port of Osaka. Anthonie T. L. R. Mulder (1848–1901) also stayed Japan from 1879 to 1890 as an invited technical expert.
of the Ministry of Home Affairs, and was consulted on flood control and construction of ports and canals.
14) The old Japanese Army supported the Port of Tokyo, on the contrary the old Japanese Navy backed up the Port of Yokohama.
15) Keihink area covers the area between Tokyo and Yokohama. The word Keihin is composed of Kei and Hin which are another pronunciation of Kyo and Hama and consequently Keihin means area between Tokyo and Yokohama.
16) The main part of Yokohama city was an inlet separated from Tokyo-wan bay by a sand bank. The inlet had been reclaimed from 1565 to 1856. There were several reclamation projects the first and biggest one was Yoshida-shinden project from 1655 to 1667 for creating about 120 hectares paddy fields which is the west side area of present Shuto express way including Isezaki district. The reclamation projects of Kan'nan area were completed in 1796 and in 1836. See, Planning and Coordination Bureau, the City of Yokohama "Development Process of Port City Yokohama" Yokohama : the City of Yokohama, 1981, pp.8-13.
17) Yokohama-shiden reclamation was completed in 1796 and changed into urban use from the beginning of the 1860s and now is the Chinese Town of Yokohama. Ibid.
18) The location of Yokohama station changed three times since the opening in 1872. The first was at the place of present Sakuragi-cho station from 1872 to 1914, the second was near the present Takashima-cho station of To-yoko line from 1915 to 1928. See Planning and Coordination Bureau, the City of Yokohama, 1981, op. cit.[16], pp.46.
19) Mr. Asano visited western cities and ports in 1896-1897, and is said to feel keenly importance of the port improvement.
21) Keihin canal originally planned to connect Kawasaki and Tokyo directly but the rout cut off and divided into two parts by the expending Haneda Airport. At the end of World war II Haneda Airport limited to the west side of planned Keihin Canal, however the Allied Forces occupied the airport and reclaiming the canal enlarged the airport to 3.5 times. See, Hiraki, Kunio(1983) "Haneda Kaku no Rekishi(history of Haneda airport)" Tokyo: Asahin Shim bun-sha, 1983, pp.103, 125-135, 156.
22) The earth and sand used this reclamation project was produced by constructing Tone-gawa Housuro(Tone-gawa river's diversion channel) which dose not completed yet. See, Miyamura, Tadashi(ed) "Yokohama no Umeitate(reclamation in Yokohama)" Yokohama: Bureau of Port and Harbor in Yokohama City, 1992, p.17.
23) Reclamation of about 300 hectares in front of Soga, southward of Chiba city, was planned and began in 1943 and a aircraft factory was located in the half done reclaimed area. The completed reclaimed land is now used for the site of Kawasaki Ironworks Co. See, Yamaguchi, K(ed) "Nihon Zushi Taikai, Kantoh II" Tokyo: Assakura-shoten, 1972, pp.2-7 and Nihon Kagakusha-kaiga "Tokyo-wan (Bay of Tokyo)" Tokyo: Ohtsuki-shoten, 1979, pp. 87-90.
25) There were many plans proposing new urban area on Tokyo-wan bay, for example 'Shin Tokyo Keikaku(new Tokyo Plan)' by Hisaro Kanou the then president of Japan Housing Corporation in 1958 and 'Neo Tokyo Plan' by Sangyo-keikaku Kaigi in 1961. The former was a diagrammatical plan to propose filling up of the east half of the bay and creating land for industrial area, residential area and wood, something like Miyusin's linear city concept, and the latter was to fill about 60,000 hectares. 40 thousands hectares of coastal industrial landfill and 20 thousands hectares central landfill for a new capital. See, Nihon Kagakusha-kaiga, 1979 op.cit.[23]. 1979, pp.95-97 and Congress of Tokyo Ward Offices(ed) "Tokyo-irou Shiryou(compiled materials on the ideas on Tokyo's future)" Tokyo: Congress of Tokyo Ward Offices, 1989, pp.195-200.
29) Built up areas of Yokohama city and Kawasaki city were also included in the Built-up Area of National Capital Region but not included in the Control Area.
30) Ishida, Y. 'The results fell far short or even contrary - the dispersion policies of Tokyo from the 1870s to the 1990s and in the future' unpublished paper read in 7th EAJS Conference in 1994, in Copenhagen.

34) It is very famous that the park Yamashita in Yokohama was filled by debris after the Great Kantoh Earthquake, and outer most and Sanyuakukan—bori canal which surrounded Ginza area was filled up after the air raid during the World War II.

35) Garbage—war was a campaign by Kotoh ward against Suginami ward where citizen were protesting the construction of incinerator. In March 1973 citizen of Kotoh ward leading by mayor and members of assembly stopped disposal trucks from Suginami ward carrying garbage in Yumenoshima.


37) Total amount of wastes from the Hamshin—away Earthquake was estimated to be 18.5 million tons or 15.5 million cubic meters. Wastes from Kobe city area was estimated 843 million tons, 219 million tons of combustibles and 624 million tons of incombustible. See, Naitoh, Sachihio "Saigai Haikibutsu to Shinsui (Earthquake wastes in Environmental Society)" Journal of the Japan Society of Civil Engineers", Vol.80, no.8 (1995). It is difficult to determine the extent of damaged areas. However, if the Rebuilding Promotion Area designated by the Act could be understood as the damaged area, incombustible wastes from unit damaged area could be estimated 106 thousands tons per hectare.

38) Nihon Kugakusha—Kai, 1979, op.cit. [23], p.91

39) Land used of reclaimed land for urban renewal site means land allocated to companies or institutions forced to move from urban renewal project areas.


44) An English surveyor, Colin Alexander M'cvean, who worked as the chief surveyor of Japan's Ministry of Works and concerned of the famous redevelopment project of Ginza district after a big fire in 1872, reported that he met with Japanese ibis frequently in the marshes and paddy fields in his article titled 'Notes on the Ornithology of Yedo' in "Proceedings of the Royal Physical Society of Edinburgh" Vol.4 no.2(1877) pp.144–154.

45) TMG decided a reviewed plan of the Waterfront Subcenter project which basically maintain the original planning concept and only intend to postpone the completion for fifteen years, and to reduce planned population about 20% and total costs from 3 hundred billion yen to 2.5 hundreds billion yen, see, Asahi—shinbun June 8, 1996. However, it became clear in the discussion of the Prefecture assembly that the changes of plan are deceptive ones, see, Akahata June 26, 1996.

Sources of Figures

Fig.1,13: Society of Engineering Promotion "Daitoshi—shuuen Rinkaibu no Kassei ni kansuru Chousa—kenkyu Houkousho"(report on revitalization of the waterfront in peripheral area of the large cities) 1991.

Fig.2,23: Bureau of Port and Harbor in the TMG "Zuhyou de miru Tokyo Rinkaihu(what has become of waterfront in Tokyo; showing by figures)" 1987.

Fig.4 (1)(3): Architectural Institute of Japan "Tokyo—wan Waterfront Kaitatsu—Keikaku no Genjyou ni Manabu(lessons from the present condition of the waterfront development projects in tokyo—wan bay)" 1986.

Fig.4 (2)(4): Gallian, C. 1992, op.cit. [26].

Fig.5—8,12,15: National Land Agency "Tokyo—wan Hito to Mizu no Fureai wo Mezashite (Tokyo—wan bay; for its comprehensive use and preservation)" 1993. Fig 8 & Fig 14 partly modified.

Fig.9,16: Bureau of Port and Harbor in the TMG "Tokyo—kou—shi 1 kan(history of the port of Tokyo, Vol.1)" 1994.

Fig.10,14: Shakaitou ni Seisaku wo Teigensuru—ka(group proposing policies to SP) "Tokyo—wan Kaitatsu heno Teigen(proposal on the development projects in Tokyo—wan bay)" 1988. Fig 10 partly modified.

Fig.11: Bureau of Public Cleaning in the TMG "Tokyo 23—ku Gomi Hakusho(white paper on waste in Ward area)" 1995.
"New Tokyo Kanou Plan" (1960) by Hisao Kanou

"Tokyo Plan 1960"
by Kenzo Tange

"Tokyo Reconstruction Plan" (1967)
by Group 2025

"Tokyo Plan 1988"
by Kenzo Tange

Fig. 4 Several Plans Proposing New Urban Area on Tokyo-wan Bay