

Research Article

The Response Spectrum Theory of Seismology Is Wrong

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Abstract

The government's new regulatory standards for commercial nuclear power plants stipulate that the standard seismic motion for nuclear power plants is determined by the acceleration response spectrum. This approach treats large earthquakes as a collection of smaller ones and calculates the strength of each frequency of seismic waves reaching a nuclear power plant. The error of this approach is easily apparent when considering the changes that occur as seismic waves travel through geological strata. When seismic waves travel through hard rock, their propagation speed is fast (e.g., 3,000 m/s), resulting in intense vibrations, a short period, and a small Gal number. However, when they enter softer strata, their propagation speed slows (e.g., 200 m/s), resulting in intense vibrations, a long period, and a large Gal number. This is because the distance attenuation formula does not hold. Both the period and Gal number of seismic waves are most affected by the properties of the strata through which they travel. It is surprising that such a simple error has gone unnoticed until now. Even more surprising is the use of the Matsuda formula to determine the design basis earthquake motion (seismic resistance standards) for nuclear power plants. A quick look at Matsuda's graph reveals that the answer is the average value of the Matsuda formula. If the seismic resistance standards were determined based on the average value, half of future earthquakes would exceed the design basis earthquake motion. The design basis earthquake motion for nuclear power plants was exceeded five times in just seven years, from 2005 to 2011. It has been proven five times that if the design basis earthquake motion is determined using the Matsuda formula, future earthquakes will definitely exceed this value. Seismologists not only lack a basic understanding of regression analysis, which first-year university students learn, but they also cannot properly read graphs. For over 50 years, they have been engaged in child's play called research, resulting in the loss of many lives through flawed disaster prevention measures. University research misconduct prevention committees continue to suppress opinions that point out their errors and publish dangerous disaster prevention measures. It is scientifically impossible to establish design basis earthquake motion for nuclear power plants. There is no way to guarantee that nuclear power plants are earthquake-safe. If a nuclear accident were to occur, Japan would become uninhabitable. Nuclear power plants must be shut down and decommissioned as soon as possible.

Keywords

Acceleration Response Spectrum, Reference Ground Motion of Nuclear Power Plant, Mihama Nuclear Power Plant, Matsuda's Formula, Regression Analysis

1. Introduction

The government has stipulated that [1] "the new regulatory standards for practical power generation reactors will deter-

mine the standard seismic motion for nuclear power plants using the acceleration response spectrum." Large earthquakes

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are treated as a collection of small earthquakes, and the strength of each frequency of seismic waves that reach the nuclear power plant is calculated. However, this calculation requires that the distance attenuation equation be valid and that the properties of all the geological layers through which the seismic waves travel are known. Seismic waves are most affected by the properties of the geological layers they pass through rather than by distance. Therefore, the distance attenuation equation does not hold. When calculating the acceleration response spectrum that reaches a nuclear power plant, the assumption is that the underground strata are made up of flat layers of rock with known properties stacked on top of each other.

However, there are several faults running underground at the nuclear power plant, and the geological strata are much more complex. In hard bedrock, the speed of seismic waves is fast (e.g., 3000 m/s) and their frequency is short (e.g., 0.02 sec), but when they travel through soft strata, their speed slows down (e.g., 200 m/s) and their frequency becomes long (e.g., 0.1 sec). The rattling vibration (small gal number) changes to a tossing and thumping vibration (larger gal number).

Even if the strongest seismic waves are emitted in the epicenter, they will be amplified and attenuated along the transmission path, and the strength (gal number) and frequency of the seismic waves that reach the nuclear power plant will change. Although response spectra seem reasonable at first glance, they are based on the unrealistic assumption that underground structures are made up of neatly stacked layers of rock. In reality, there are many faults underground, and the layers of rock are not stacked neatly. There are folds, and soft layers are sandwiched in between like paste, making it a complicated structure. A theory whose premise differs

from the facts is wrong. If we don't know the effects of all the layers of the earth that the seismic waves pass through, we can't calculate the strength of the seismic waves that will reach the nuclear power plant. That's just not possible.

2. Explanation of Response Spectrum

Nuclear Regulation Authority [2] "Concept of new regulatory standards for commercial power reactors" p. 258

"First of all, an earthquake is a phenomenon in which the strain accumulated in the earth due to plate movement etc. reaches its limit and causes a fault to rupture, and the surface of that fault is called the seismic source fault surface. In addition, the fault surface at the source of an earthquake is not homogeneous; it is usually firmly fixed on the fault surface, but at some point it suddenly shifts (slips) and emits seismic waves. Among these areas, there are areas called asperities, which have a particularly large amount of slip compared to the surrounding areas and emit strong seismic waves. Furthermore, the entire area of the earthquake source fault surface is not destroyed at the same time; rather, the fault where rupture begins emits seismic waves and gradually spreads. In seismic motion assessment, a large earthquake can be considered to be a collection of smaller earthquakes occurring one after the other.

"Earthquake motion assessment using a fault model is an assessment method that calculates earthquake motion by setting up a seismic source fault plane, placing asperities on that seismic source fault plane, and analyzing how this gradually breaks from a certain point where the rupture begins and the shaking is transmitted, and is a method that reflects the earthquake generation mechanism described above. p 260 [2]

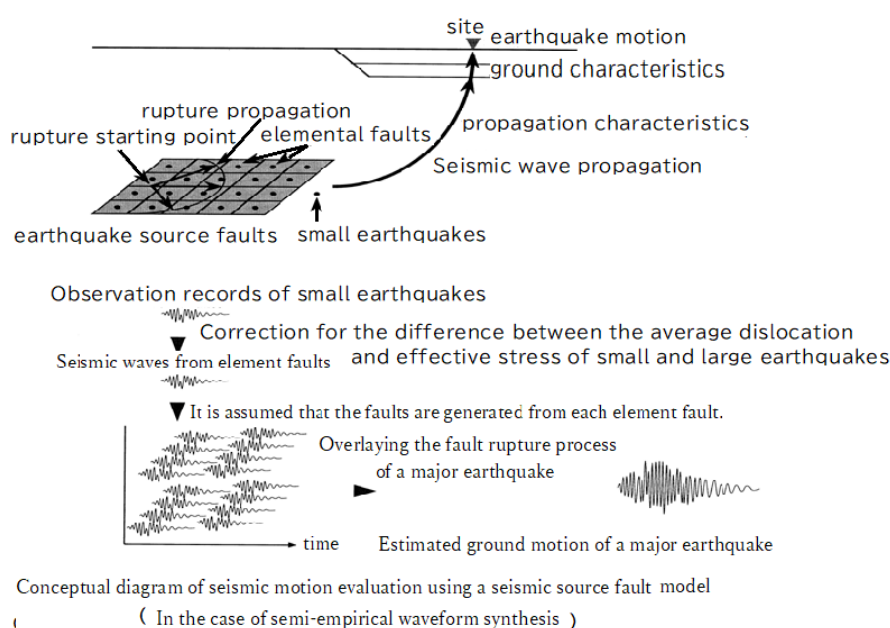


Figure 1. Conceptual diagram of the fault model evaluation method.

As shown in Figure 1, it is impossible to measure the seismic motion of small earthquakes in the order of destruction at the evaluation points. In the case of a large earthquake, the area of the epicenter is large and the difference in the depth of destruction is also large, so the properties of the strata through which the seismic waves caused by small earthquakes pass vary. Furthermore, the strata deep underground are not uniform. There are faults and folds. Due to differences in the propagation speed of S-waves through the strata through which the seismic waves pass, the order, gal number, and frequency of the seismic waves of small earthquakes that reach the evaluation point change.

The basic premise of this method is that the distance attenuation equation holds true. p 270 [2]

["Earthquake motion evaluation based on response spectrum" is a method of creating a response spectrum using a regression equation (distance attenuation equation) derived from the relationship between the magnitude of past earthquakes, the distance from the epicenter to the observation point (epicenter distance), and the magnitude of the shaking of

structures due to earthquakes (response spectrum).]

The basic premise of this method is that the characteristics of the strata along the path of seismic waves are known and that the distance attenuation equation holds true.

However, the characteristics of the strata along the path of seismic waves are unknown, and the distance attenuation equation does not hold.

3. Example of Response Spectrum

3.1. Subsurface Structure Model Used for Seismic Motion Evaluation

Kansai Electric Power Co. Inc. Document 3-3 Mihama Nuclear Power Plant Unit 3 - Stability assessment of foundation ground and surrounding slopes for important seismic facilities and permanent facilities for dealing with serious accidents, etc. - Document collection - p15. [3]

Table 1. Underground structure model used for seismic motion evaluation at Mihama Nuclear Power Plant.

No	P-wave velocity (km/s)	S wave velocity (km/s)	Density (g/cm ³)	Layer Thickness (km)	Top Depth (km)	Qs	Damping Constant (%)
1	4	1.65	2.6	0.06	0	16.67	3
2	4.1	1.7	2.6	0.11	0.06	16.67	3
3	4.2	1.8	2.6	0.03	0.17	16.67	3
3	4.2	1.8	2.6	0.06	0.2	100	0.5
4	4.2	1.9	2.6	0.09	0.26	100	0.5
5	4.4	2	2.6	0.02	0.35	100	0.5
6	4.5	2.1	2.6	0.08	0.37	100	0.5
7	4.6	2.2	2.6	0.07	0.45	100	0.5
8	4.7	2.3	2.6	0.05	0.52	100	0.5
9	4.8	2.4	2.6	0.01	0.56	100	0.5
10	4.9	2.5	2.6	0.07	0.57	100	0.5
11	5	2.6	2.6	0.08	0.64	100	0.5
12	5.1	2.7	2.6	0.21	0.72	100	0.5
13	5.2	2.8	2.6	0.21	0.93	100	0.5
14	5.3	2.9	2.6	0.08	1.13	100	0.5
15	5.4	3	2.6	0.16	1.21	100	0.5
16	5.5	3.1	2.6	0.02	1.37	100	0.5
17	5.6	3.2	2.6	0.47	1.4	100	0.5
18	5.7	3.3	2.6	1.13	1.87	100	0.5

No	P-wave velocity (km/s)	S wave velocity (km/s)	Density (g/cm ³)	Layer Thickness (km)	Top Depth (km)	Qs	Damping Constant (%)
19	5.9	3.6	2.7	-	3	100	0.5

*1 The shallow portion is set at 2.6g/cm³ based on the results of a boring survey on the site, and the deep portion is also considered to be shallow as the geological survey results show that granite of the same quality as the shallow portion is distributed at deeper layers.

*2 The attenuation coefficient Qs is designated as Qs = 16.77 (3% attenuation coefficient) for depths shallower than 200 m, based on a ground heterogeneity evaluation and Q value measurements, and Qs = 100 (3% attenuation coefficient) for depths deeper than 200 m (constant 0.5% attenuation coefficient).

As shown in Table 1, the underground structure model uses a model in which a certain number of layers of rock are piled up in the depth direction.

However, the underground of the nuclear power plant site does not have such an orderly layer of rocks.

3.2. Design Basis Earthquake Motion Created Using This Model

Earthquake motion evaluation based on response spectrum NS direction, EW direction Ss-1 750 gal (1 cm/s²) UD direction 500 gal (1 cm/s²) [3] p 32

An earthquake of 700 gals is a normal earthquake that occurs 1.5 times per year. Earthquakes of 1000 gals or more have occurred 17 times between 2000 and 2020. The standard seismic motion for this nuclear power plant was set at 750 gals on April 22, 2015 [3], and 993 gals five months later on August 21 [4]. [5] The standard earthquake motion at the time of construction is the design limit earthquake S2: 405 gal. The design and construction was based on the condition of design limit earthquake S2, "This is an earthquake that is unlikely to actually occur, so it is okay for the equipment to deform, but radioactivity must not leak." Construction

costs were kept down by assuming that "it is okay to use force that exceeds the elastic limit of the material, causing it to break." The nuclear power plant was built with the assumption that deformation would be acceptable if it exceeded 405 gals, but the standard seismic motion has now been raised by 2.5 times to 993 gals. To increase seismic resistance, 2.5 of the same pillars would be needed. For a single pillar, the cross-sectional area would need to be 2.5 times larger. However, once the plant is operating, it is difficult to reinforce the heart of the plant. How do you reinforce a part that emits intense radiation? In the end, they are just trying to cover it up by claiming that safety has been confirmed through calculations.

3.3. There Is a Fault Line Beneath the Nuclear Power Plant, Causing the Geological Strata to Be Disturbed

Kansai Electric Power (2016): p. 64

As can be seen from Figure 2, there are multiple faults running beneath the nuclear power plant site [3].

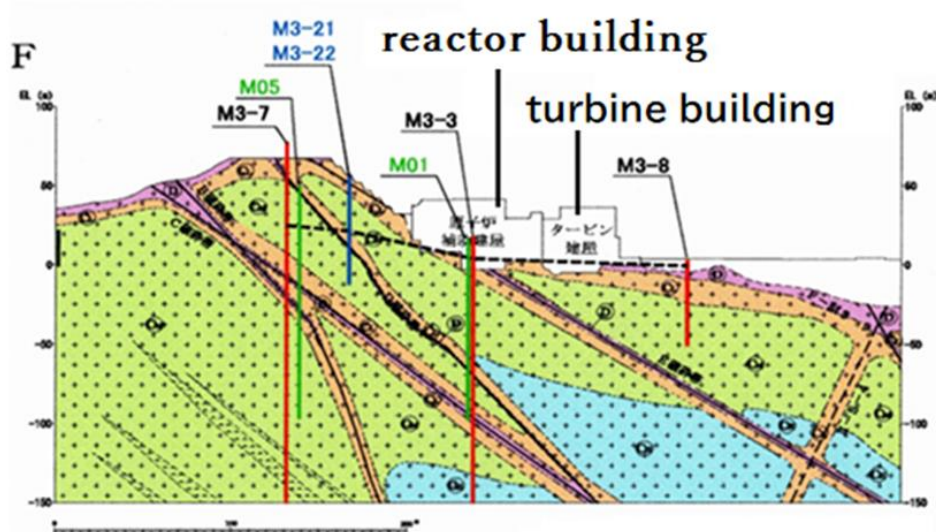


Figure 2. Subsurface structure of the Mihama Nuclear Power Plant.

The underground of the nuclear power plant site is not structured in neat layers.

In addition, the properties of the strata along the path of seismic waves change drastically at fault boundaries.

Depending on the influence of the strata through which it passes, the galaxy number of the seismic waves increases by several times or decreases to a fraction of its original value when they reach the nuclear power plant.

Although response spectra seem reasonable at first glance, they are based on the unrealistic assumption that underground structures are made up of neatly stacked layers of rock. In reality, there are many faults underground, and the strata are not stacked in an orderly fashion. There are folds, and soft strata are sandwiched between each other like paste, making it a complicated structure. Theories based on assumptions that

differ from the facts are wrong. If we do not know the effects of all the layers of the earth that the seismic waves pass through, we cannot calculate the strength of the seismic waves that will reach the nuclear power plant. This is impossible.

4. Materials from the Japan Meteorological Agency Prove That Response Spectra Do not Hold

Japan Meteorological Agency Seismic Wave Spectrum [6]
"Acceleration Response Spectrum of Major Earthquakes at Major Observation Points"

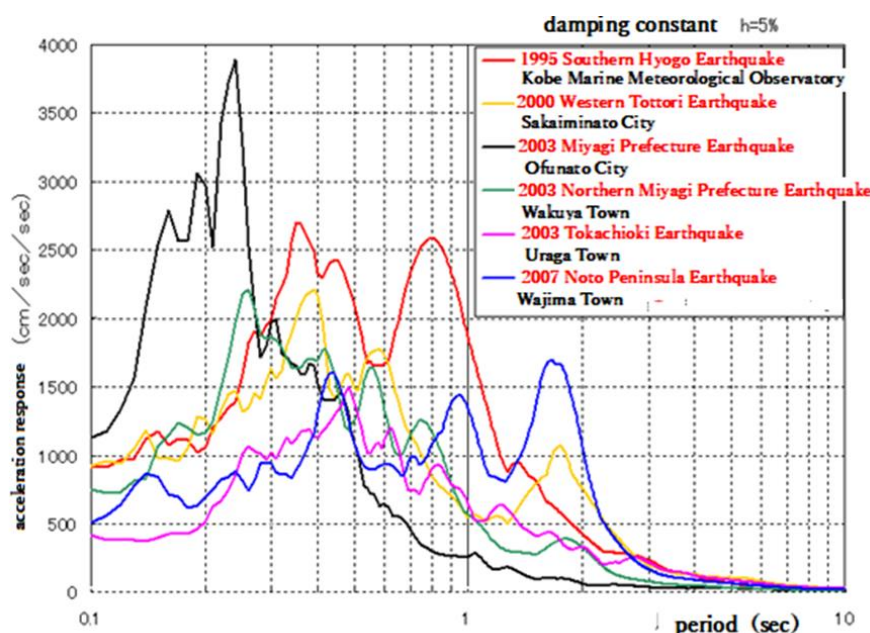


Figure 3. Acceleration response spectra of major observation points for major earthquakes.

Figure 3. shows the acceleration response spectra of six major earthquakes captured at nearby observation points. Each earthquake shows its own unique spectrum and has no commonalities. This is natural because the rupture progression and shape of each earthquake are different.

In addition, the frequency of seismic waves, the magnitude of the Gal number, and the order in which they arrive at the observation point change due to the influence of the strata through which the seismic waves pass, so it is natural that there is no common pattern in the acceleration response spectra of the observation points.

Figure 3. proves that the response spectrum theory does not hold.

5. If the Errors in Seismology Are Left Unchecked, They Will Surely Destroy Japan

Response spectrum theory is incorrect. The frequency and Gal number of seismic waves change depending on the S-wave velocity of the strata they pass through. It is surprising that such a simple theoretical error went unnoticed for so many years. The fact that the distance attenuation formula does not hold is clear when we look at the distribution of earthquake intensity. It cannot be said that seismic intensity is high near the epicenter and decreases as the distance increases. The Noto Peninsula earthquake on January 1, 2024, recorded a maximum earthquake

magnitude of 2,828 gals and a seismic intensity of 7 in Shika Town, 60 km from the epicenter. A seismic intensity of 6-low was also observed in nearby areas, and a seismic intensity of 6-low was also observed in Nakanoshima, Nagaoka City, Niigata Prefecture, as far away as the earthquake [7]. The operating permit documents for Kansai Electric Power Company's Mihama Nuclear Power Plant contain Table 1 and Figure 2. At first glance, these two are clearly contradictory [3]. What is the Nuclear Regulation Authority looking at? Even if they guarantee the safety of nuclear power plants, they are not safe.

I visited the area a month and a half after the earthquake. What surprised me the most was a cliff jutting out about two meters from the flat rice fields near the epicenter. This is the planned construction site for the Suzu Nuclear Power Plant, and detailed surveys of the fault were being conducted there. However, a cliff jutting out as much as two meters was found in an area where there was no fault. Fortunately, construction of the Suzu Nuclear Power Plant was halted due to strong opposition from local residents. If the Suzu Nuclear Power Plant had been built and operated, it would have suffered a serious accident, scattered deadly ash, and made Japan uninhabitable.

The Fukushima nuclear disaster devastated Japan [8]. Three nuclear reactors melted down, but miraculously, the reactors were kept under a nitrogen atmosphere, preventing the hot nuclear fuel from coming into contact with air. As a result, the amount of nuclear material released in the Fukushima nuclear accident was 77 quadrillion becquerels, which is equivalent to 15% of the 5.2 trillion becquerels released in the Chernobyl nuclear accident. Had the nuclear fuel been burning, each reactor would have released 5.2 trillion becquerels, the same amount of lethal fallout as the Chernobyl disaster, or the equivalent of 400 Hiroshima-type atomic bombs. Nuclear power plants were abandoned and deserted, with six reactors at the Fukushima

Daiichi Nuclear Power Plant and four at the neighboring Fukushima Daini Nuclear Power Plant bursting into flames, spewing deadly ash equivalent to 4,000 Hiroshima atomic bombs across Fukushima Prefecture. If the eruption had continued, other nuclear power plants would have been abandoned, eventually resulting in around 50 reactors across the country going up in flames and covering Japan in deadly ash equivalent to 20,000 Hiroshima bombs, making it uninhabitable. If a two-meter-high cliff juts out onto the site of a nuclear power plant, it will be impossible to prevent an accident. Seismology is still in its infancy, and the term "active fault" is merely another name for the giant underground catfish that was once thought to cause earthquakes. Dangerous nuclear power plants should be decommissioned as soon as possible.

6. Mistakes in Seismology

6.1. The Formula Created from the Data Is not a Law That Applies to all Earthquakes

I realized the mistakes in seismology and tsunami countermeasures after the 2011 tsunami and nuclear accident. I was truly shocked when I learned that the Matsuda formula was used to determine the standard earthquake motion for nuclear power plants. I'm 83 years old now, and toward the end of my career, I taught experimental design and regression analysis at my company. When I teach regression analysis [9], students always make a mistake. They mistakenly believe that a formula created from data represents a general law. A formula created from data is merely a formula that represents only that data. This mistake was easily understood when I explained it to elementary school students.



Figure 4. A row of older and younger children (the children's faces are depicted in watercolor to prevent identification)

If we gather 20 older children and use that data to create a formula to calculate height from age, can we use this formula to calculate height from age for all elementary school students? If we gather 20 younger children and create a formula using that data, we will get a completely different formula. Both formulas represent only that data.

Matsuda makes the same mistake [10].

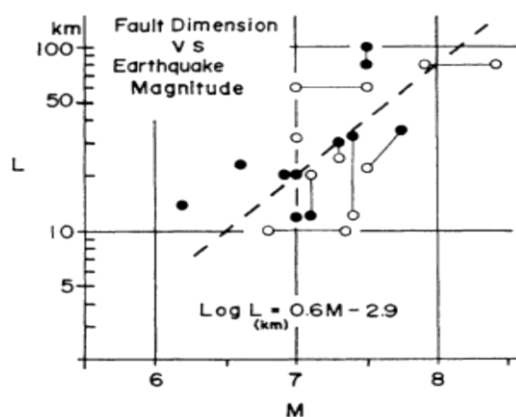


Figure 5. Matsuda's graph and Matsuda formula.

The dotted line running diagonally through the center of the graph is Matsuda's formula.

$$\text{Log} L (\text{km}) = 0.6M - 2.9 \quad (1)$$

L: Active fault length (km) M: Earthquake magnitude (M)

6.2. The Matsuda Formula Is a Formula That Matsuda Made up Himself and Has no Scientific Basis

p 271[10] [$\log L = 0.6M - 2.9$ [Dotted line in Figure 1a, inland Japan] (2) In this paper, we focus on active faults in inland Japan, so we use equation (2). The coefficient and constant of M in equation (2) were determined from Figure 1a as $L = 80$ km for an M8 earthquake and $L = 20$ km for an M7 earthquake (corresponding to the dashed line in Figure 1a).]

It is dangerous to use the Matsuda formula, which has no scientific basis, to determine the standard seismic motion for dangerous nuclear power plants.

6.3. If the Standard Seismic Motion is Determined Using the Matsuda Method, Future Earthquakes Will Definitely Exceed the Standard Seismic Motion

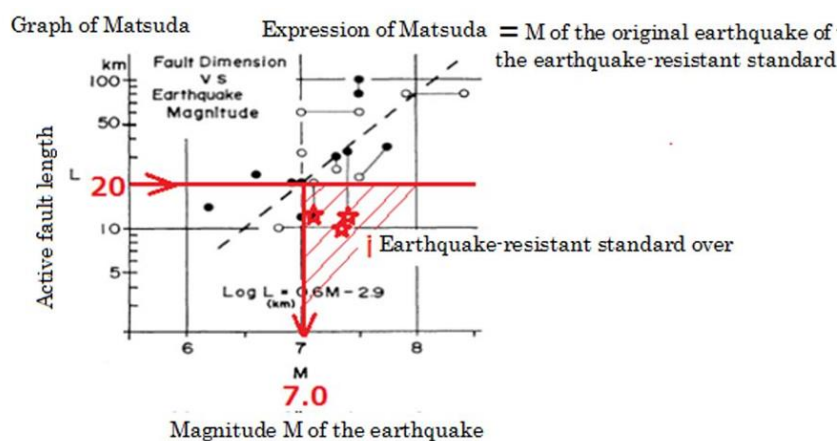


Figure 6. Danger zone of Matsuda's graph.

As shown in Figure 6, when the active fault is 20 km long, the answer according to the Matsuda formula is M7.0. The design basis seismic motion for nuclear power plants is determined based on the seismic motion of this earthquake. However, even with an active fault less than 20 km long, five earthquakes of magnitude greater than 7.0 have occurred in the past: M7.0, M7.1, M7.1, M7.3, and M7.4. If a similar earthquake were to occur in the future, the design seismic motion for nuclear power plants would definitely be exceeded.

Electric power companies say, "Nuclear power plants are safe because they overestimate the length of the underlying active fault." However, even if we double the length of the active fault to 40 km and use a magnitude of 7.5 as the answer to the Matsuda formula, magnitude 7.8 earthquakes have occurred even when the active fault is less than 40 km long. The Matsuda method's danger zone will not disappear.

This is a fundamental mistake in determining the design basis earthquake motion based on a scatter plot. As shown in

Figure 6, the scatter diagram is divided into four regions, so if the design basis earthquake motion is determined using the scatter diagram, there will be a danger zone where a future earthquake will definitely exceed the design basis earthquake motion.

When the length of the active fault is L_x , the answer to the formula is M_x . However, in the area on the lower right, past earthquakes exceeding M_x have occurred even when the active fault length was less than L_x . Since what happened in the past will surely happen in the future, the standard earthquake motion will always be exceeded by future earthquakes.

The standard seismic motion for nuclear power plants has been exceeded five times: 1) August 16, 2005, Miyagi Prefecture offshore earthquake, Onagawa Nuclear Power Plant; 2) March 25, 2007, Noto Peninsula earthquake, Shika Nuclear Power Plant; 3) July 16, 2007, Niigata Prefecture Chuetsu offshore earthquake, Kashiwazaki-Kariwa Nuclear Power Plant; 4) March 11, 2011, Tohoku Pacific Ocean earthquake, Fukushima Daiichi Nuclear Power Plant; and 5) March 11, 2011, Tohoku Pacific Ocean earthquake, Onagawa Nuclear Power Plant. It has been proven five times that when the Matsuda formula is used to determine the standard seismic motion, it will always be exceeded by future earthquakes.

6.4. The Matsuda Formula Is Contradicted by the Data in Matsuda's Graph

According to the Matsuda formula, a magnitude 7.0 earthquake will only occur when the active fault length: $L = 20$ km. However, magnitude 7.0 earthquakes have occurred on active faults with lengths of 12 km, 20 km, 40 km, and 60 km. A quick glance at the graph shows that the Matsuda formula is incorrect. When the powerful force that causes an earthquake creates a fault, a clay layer forms on the sliding surface. Over the years, this clay layer hardens and becomes a consolidated clay layer. Therefore, even if a fault is long, if it has only recently moved, it will move with a small amount of consolidated clay and a small amount of force. Conversely, if it has been moving for a long time, even a short fault will be almost entirely consolidated clay, and a large amount of force will be required to move it.

6.5. Matsuda's Statement That "Small Faults Cause Small Earthquakes" Is Clearly Wrong

[Fault displacement and earthquake occurrence are the sudden release of strain energy stored in the Earth's crust [10] p. 270. The magnitude of this strain energy depends on the size of the strain area. The size of the strain area is thought to be reflected in the size of the fault dimensions. For example, a small fault system has a small strain area, and it is thought that only small earthquakes can occur accord-

ingly.]

When it comes to small faults, we can say, "There was a small earthquake there in the past." However, we cannot say, "In the future, only small earthquakes will occur there." When a powerful force that causes an earthquake comes into play, a larger fault will form starting from that small fault, and a larger earthquake will occur. Large faults and large earthquakes are the result of the great forces that cause earthquakes, and are not a cause-and-effect relationship. Seismology makes the mistake of viewing results as having a cause-and-effect relationship. This is a spurious correlation that has long been used to make statistics lie. All seismological formulas are scientifically incorrect.

7. Japanese Tsunami Authorities Fail to Recognize the Destructive Power of Giant Tsunamis

Giant tsunamis are accompanied by debris flows that pick up sludge and sediment from the seabed, and have great destructive power. The fact that large tsunamis carry large amounts of sediment is clear from the 50cm of sediment found in the wake of past tsunamis. They are only using seawater for their calculations of the strength of seawalls and tank experiments.

The 2011 tsunami proved that seawalls, tsunami evacuation shelters, tsunami evacuation towers, and tsunami hazard maps were completely useless [11]. In fact, they made the damage caused by the tsunami worse.

The tsunami overran the seawalls and easily destroyed them. Of the 300km of seawalls along the Sanriku coast, 190km were completely destroyed. The sturdy doors, floodgates, and weirs blocking roads connecting the port to the city, as well as tsunami evacuation towers, were easily destroyed. Even sturdy buildings will be destroyed by a tsunami of 18m or more. Tsunami evacuation buildings are also dangerous. The tsunami evacuation shelters were not high enough and became death traps. The danger zone on the tsunami hazard map was narrow, and the tsunami struck people who had been reassured that the tsunami would not reach that far. Many people died in the safe zone on the hazard map.

In 2023, I was able to publish three of my papers, including [11] "Mistakes in Tsunami Countermeasures," [12] "The Need for Tsunami Shelters," and [13] "The Need for Urgent River Tsunami Countermeasures," in the American tsunami journal *Science Tsunami Hazard*.

However, Japanese tsunami experts are pouring huge amounts of money into ineffective countermeasures. If things continue as they are, 320,000 people could die in a massive tsunami caused by a Nankai Trough earthquake that could occur as soon as tomorrow. [14]

8. Why Mistakes in Seismology Have Been Left Unaddressed for so Many Years

I complained to the University of Tokyo Research Ethics Promotion Division [10] that "6.4 Matsuda's formula contradicts the data in Matsuda's graphs" and that "the research method is wrong."

"According to the Matsuda formula, a magnitude 7.0 earthquake will only occur when the active fault length: $L = 20$ km. However, magnitude 7.0 earthquakes have occurred on active faults with lengths of 12 km, 20 km, 40 km, and 60 km. One look at the graph shows that the Matsuda formula is incorrect."

However, the reply dated September 5, 2025, read as follows: "Regarding the content of the report you have just sent us (as in the March 2018 report), we have determined that the contentions asserted in this report should be discussed from an academic perspective at academic conferences and other such venues, and that they fall under the proviso to Article 2 of the University's Scientific Research Code of Conduct Committee's Rules, which states, "When differences of opinion arise and data and experimental records are handled in accordance with general practice in the relevant research field," and do not constitute "fabrication, falsification, or plagiarism of research results" as stated in the main text of the same rule. For these reasons, we have concluded that this will not be the subject of an investigation by the University's Scientific Research Code of Conduct Committee, and we hereby inform you of this."

In 2018, I complained to the University of Tokyo and Kyoto University's Research Misconduct Prevention Committees about the "mistakes in research methodology."

"Kyoto University Research Misconduct Prevention Committee, Vice President Katsumi Yamamoto, February 17, 2018

Kyoto University delivers research results to the world as products. The Kyoto University Research Misconduct Prevention Committee is like a company's quality assurance department. This quality assurance department has made a major blunder. In the Oi Nuclear Power Plant trial [15], Presiding Judge Higuchi pointed out that "The method for setting earthquake resistance standards for nuclear power plants is fundamentally flawed. It merely evaluates the average earthquake or seismic motion caused by a certain assumed fault. It is unacceptable to determine the earthquake resistance standards for something as dangerous as a nuclear power plant based on averages. In the 10 years since 2005, the earthquake resistance standards have been exceeded five times. The errors in the assumption of seismic motion will need to be resolved academically in the future. Nuclear power plants are dangerous in terms of earthquakes, so their operation will be prohibited." A judge representing a national public institution pointed out that the "Irikura Strong Vibration Recipe" put forward by Kyoto University was incorrect.

Nuclear power plants across the country have become defective based on Kyoto University's defective products. These are defective nuclear power plants that will collapse if a normal earthquake occurs nearby. In fact, in the 10 years since 2005, earthquake resistance standards have been exceeded five times.

The presiding judge of a national public institution pointed out that the "Irikura Strong Vibration Recipe" [16] proposed by Kyoto University was incorrect. Based on Kyoto University's defective product, nuclear power plants across the country have become defective. These are defective nuclear power plants that will collapse if a normal earthquake occurs nearby. In fact, in the 10 years since 2005, earthquake resistance standards have been exceeded five times.

The impact of Kyoto University's defective products will cause a total of 20 trillion yen in damages to nuclear power plants alone. 200,000 people will lose their jobs. Tsunami countermeasures were also based on average values. At Fukushima Daiichi Nuclear Power Plant, preparations for a 7m tsunami were made, but a 15m tsunami hit, causing the accident. The damage caused by the nuclear accident is 20 trillion yen. Tsunami countermeasures based on average values would be countermeasures for death. The seawalls were not high enough, and hazard maps made based on the average tsunami height became maps of death. Evacuation shelters were not high enough, and turned into death traps. The results of fraudulent research by Kyoto University's Disaster Prevention Research Institute killed 22,000 people. How do you intend to take responsibility for causing such great damage to society?

Kyoto University's Research Misconduct Prevention Committee overlooked the "Kojiro Irikura paper fabrication scandal." [15] Kyoto University Disaster Prevention Research Institute Annual Report No. 47 A, April 2004 Annuals of Disaster Prevention Research Institute, Kyoto University, No. 47 A, 2004 Strong Ground Motion Prediction Recipe -Prediction Methods for Strong Ground Motions Caused by Major Earthquakes- Kojiro Irikura Please read this.

Irikura calculated a regression equation from earthquake data and created the Irikura-Miyake equation. This equation predicts the largest earthquake to occur based on the area of an active fault. However, the answer from a regression equation is an estimated average value (an axiom of statistics). He argues that the average value is the maximum value. This strong vibration recipe has been used to set earthquake resistance standards for nuclear power plants since 2006.

During the Oi Nuclear Power Plant trial [15], Presiding Judge Higuchi pointed out that "the earthquake resistance standards for nuclear power plants are based on average values." In response, Irikura admitted in a newspaper report that "the answer to the Irikura-Miyake formula is the average value, not the maximum value" (Tokyo Shimbun).

The difference between the maximum value and the average value is worlds apart in terms of disaster prevention. If

earthquake resistance standards were based on average values, half of future earthquakes would exceed the standards. In fact, earthquake resistance standards have been exceeded five times in the 10 years since 2005. If we use the Irikura-Miyake formula, this would lead to a major disaster.

Kyoto University's Disaster Prevention Research Institute also uses a research method of "deriving a regression equation from earthquake data and combining this for calculations." However, the answer to the regression equation is an estimated average. The answer to the regression equation is not a fixed value A . The answer to the regression equation is an estimated average that shows a 95% probability of being $A \pm \alpha$. Since it does not take on a single value A , it cannot be calculated. Almost all of the research findings of Kyoto University's Disaster Prevention Research Institute are also incorrect.

This is a mistake made by mistakenly thinking that a regression equation created from data is a law for all earthquakes. A regression equation created from data is a sample regression equation, and it represents only the data in question. It is an equation that represents only a tiny portion of all earthquakes. Both Irikura and the researchers at Kyoto University's Disaster Prevention Research Institute are making a typical mistake made by people novices in statistics.

The issue of Irikura Kojiro's paper falsification should be taken up by Kyoto University's Committee for the Prevention of Research Misconduct. Anyone who looks at a graph of Irikura's Irikura-Miyake equation will be astonished. No one, not even an elementary school student, could look at this graph and tell it is an equation that represents a maximum. It is also clear what would happen if earthquake resistance standards were determined using this graph. Since the average value is the earthquake resistance standard, half of past earthquakes have exceeded the standards. What has happened in the past will happen in the future as well. Earthquake resistance standards for nuclear power plants are set so that they can be exceeded by future earthquakes.

What's even more frightening is that earthquakes of magnitude 6.5 or greater have occurred in the past even in areas below the active fault area SA where the seismic resistance standard is set at magnitude 6.5. If the seismic resistance standard is determined using a regression equation, the probability of exceeding the standard exceeds 50%. Setting seismic resistance standards using a regression equation becomes a "damage guarantee standard that will definitely break in an earthquake."

If you are asked to pay damages in court, the excuse that "we followed the academic theory of the time" will not be accepted. A glance at the graph makes this mistake obvious. The Kyoto University Committee for the Prevention of Research Misconduct will be pursued for breaching its duty of care.

The results of Kyoto University's Disaster Prevention Research Institute's many years of fraudulent research have been incorporated into societal safety measures. They need to be discovered and eliminated quickly. Large-scale complaint countermeasures, modeled on those in the automotive indus-

try, are necessary. Since the cause of fraudulent research is simply a careless mistake on the part of researchers, the responsibility cannot be shifted. Just like in the automobile industry, victims will pursue strict responsibility and demand huge compensation. This marks the beginning of a good era for lawyers, where they can easily make a lot of money. If a personal injury accident occurs while the problem is being put off, those involved will spend the rest of their lives behind bars. A quick response is needed. Please come see me.

In this way, the organization that is supposed to prevent research misconduct at universities has been promoting research misconduct for many years. The Research Misconduct Prevention Committee is responsible for ensuring the quality of university research results. Yet they are sending dangerous disaster prevention measures out into society, knowing that they are defective.

Since ancient times, science has developed by formulating hypotheses from data, publishing them, and having other researchers verify them. If they are correct, they are accepted as theories, and if they are wrong, the hypotheses are discarded. What is most necessary for the development of science is dissenting opinions. University anti-misconduct committees are silencing dissenting opinions, helping their colleagues and killing the public.

9. Summary

The error of the response spectrum theory in seismology is easily apparent when one considers the nature of the geological layers through which seismic waves propagate. It is surprising that such a simple error has not been noticed until now. What's even more puzzling is that the Matsuda formula is used to determine the standard earthquake motion (earthquake resistance standards) for nuclear power plants. A quick glance at Matsuda's graph reveals that the answer is the average value of the Matsuda formula. If the earthquake resistance standards were determined based on the average value, half of future earthquakes would exceed the earthquake resistance standards.

The Matsuda Formula was created by Matsuda by connecting two arbitrary points on a graph, and has no scientific basis. The Matsuda Formula also contains many other scientific errors. The Matsuda Formula cannot be used to create design-standard earthquake motions for nuclear power plants. The design-standard earthquake motions for nuclear power plants were exceeded five times in just the seven years from 2005 to 2011.

It has been proven five times that when the Matsuda formula is used to determine the design basis earthquake motion, it will always be exceeded by future earthquakes. Seismologists cannot even properly read graphs, nor can they understand the basics of regression analysis, which they learn in their first year of university. There are 10,000 such fools in Japan alone. They have been playing child's games under the guise of research for over 50 years, killing many people with

their flawed disaster prevention measures. And the university's anti-misconduct committee is helping them, silencing any opinions that point out their mistakes, and continuing to publish flawed disaster prevention measures.

It is scientifically impossible to establish a standard seismic motion for nuclear power plants. There is no way to guarantee that nuclear power plants are earthquake safe. If a nuclear accident occurs, Japan will become uninhabitable. Nuclear power plants must be shut down and decommissioned as soon as possible.

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I am deeply grateful to you for making this paper widely available. I realized there were errors in seismology and tsunami countermeasures during the 2011 disaster. However, my paper pointing out the errors in seismology was rejected by scientific journals both in Japan and abroad. It's like asking a scholar who believes in the geocentric theory to peer-review a paper on heliocentrism. If my argument is accepted, his achievements will be invalidated. As a result, my paper was rejected. However, science has traditionally developed by creating hypotheses from data, publishing them, and having other researchers test them. If they are correct, they are accepted as theories, and if they are wrong, they are discarded.

The most useful thing for the development of science is opposing opinions. The most important role of scientific journals is to provide a forum for such debate. Refusing to publish any theory other than the mainstream one of the time is a dereliction of this most important role of scientific journals. The Japanese scientific community ignored opposing opinions, which led to the nuclear accident and tsunami that killed 22,000 people.

Author Contributions

Yuuji Tauchi is the sole author. The author read and approved the final manuscript.

Conflicts of Interest

I declare that I have no conflict of interest.

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