



Noise Distribution(Report No.8) : Amusement Quarter Noises in Asahikawa

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Noise Distribution Report No. 8 Amusement Quarter Noises in Asahikawa

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地域別騒音の場所的分布 第8報 旭川市内歓楽街の騒音

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Abstract

We report the summarized results of measurements made of amusement quarter noises at three zones in Asahikawa. The measurements were carried out during early in Jun. 1986, at the Jinja-mae site, the 3-6 Gai site and the 17 chōme site. In each of the above mentioned zones the noises were measured at 10 different points, chosen by an arbitrary sampling method. The main results are as follows:

- a) Sound levels and conditions at each of the measuring points are shown in Table 1-3.
- b) Examples of the measurement of noise levels at the amusement quarter zones are summarized in Fig. 1-6

1. Introduction

Street noises in Tōkyō have already been measured by J. Morita (1953)¹⁾, while noise distribution in various zones has been measured by T. Mochizuki and N. Imaizumi (1967)²⁾. Noise-induced shifts in the pitch of pure and complex tones have also been studied by Adrianus J. M. Houtsma (1981)³⁾. The noises of busy streets and underground markets in Tōkyō and Sapporo have subsequently been measured by S. Takeuchi (1982)⁴⁾, (1984)⁶⁾, (1985)⁸⁾, (1986)⁹⁾ and (1986)¹⁰⁾, who has also measured commercial, industrial and residential zone noises in Asahikawa (1983)⁵⁾ and (1985)⁷⁾. The purpose of the present investigation was to measure amusement quarter noises in Asahikawa, as calculated by a sound level meter (type 1015A). Accordingly, Asahikawa amusement quarter site noises were measured at three locations: Jinja-mae site, 3

-6 Gai site and 17 chōme site. Noises were measured at 10 different points in the above mentioned areas, some of the points chosen arbitrarily. The meaning of arbitrary selection is as follows. In arbitrary selection the observation points were chosen so as to represent the general level of noise in the area. At each point, the sound level in dB (A) was measured 50 times at intervals of 5 seconds. The Mode, Median and 90% range were obtained statistically from these 50 pieces of data to represent the noise level distribution. These procedures are in accordance with the Japanese Industrial Standard JJSZ-8731 "Methods of Measurement of Sound Levels".

2. Result of investigation

a) Jinja-mae site

Table 1 Sound levels and conditions of the measuring points: Jinja-mae site, Asahikawa

Zone		Category		
Commercial		Amusement quarter		
Test No.	Time	Sound levels dB (A)		
		Mode	Median	90% range
①	20.03	70	73	70~84
②	20.17	70	71	69~76
③	20.23	70	70	66~76
④	20.44	68	70	68~80
⑤	20.53	68	69	67~75
⑥	21.00	60	60	57~74
⑦	21.07	58	58	57~65
⑧	21.14	47	47	46~58
⑨	21.23	50	50	47~63
⑩	21.33	60	65	59~75

Let us first examine the noise levels of the Jinja-mae site, part of Asahikawa's amusement quarter near the front of the Hokkaido Gokoku Shrine. It is bounded on the east by Ōmachi 2-2, on the west by Ōmachi 2-4. Tabel 1 and Fig. 1 illustrate the detailed data and the average sound level at 10 different points selected arbitrarily around the Jinja-mae site. We notice both vehicular traffic noises and the voices of barmaids. The measured results, which were obtained in the way described above, are shown in Table 1. As in the lower part of Fig. 1, the median sound levels are arranged in an order increasing in magnitude as the circular spots plot the measured values in the same figure, while the mode is represented by the black spots. Solid lines move up and down to show the difference within a 90% range. A central solid line shows the average value of the medians and indicates that the average sound level is 63.3 dB (A). The dotted lines show both its lowest and highest points as well as the average

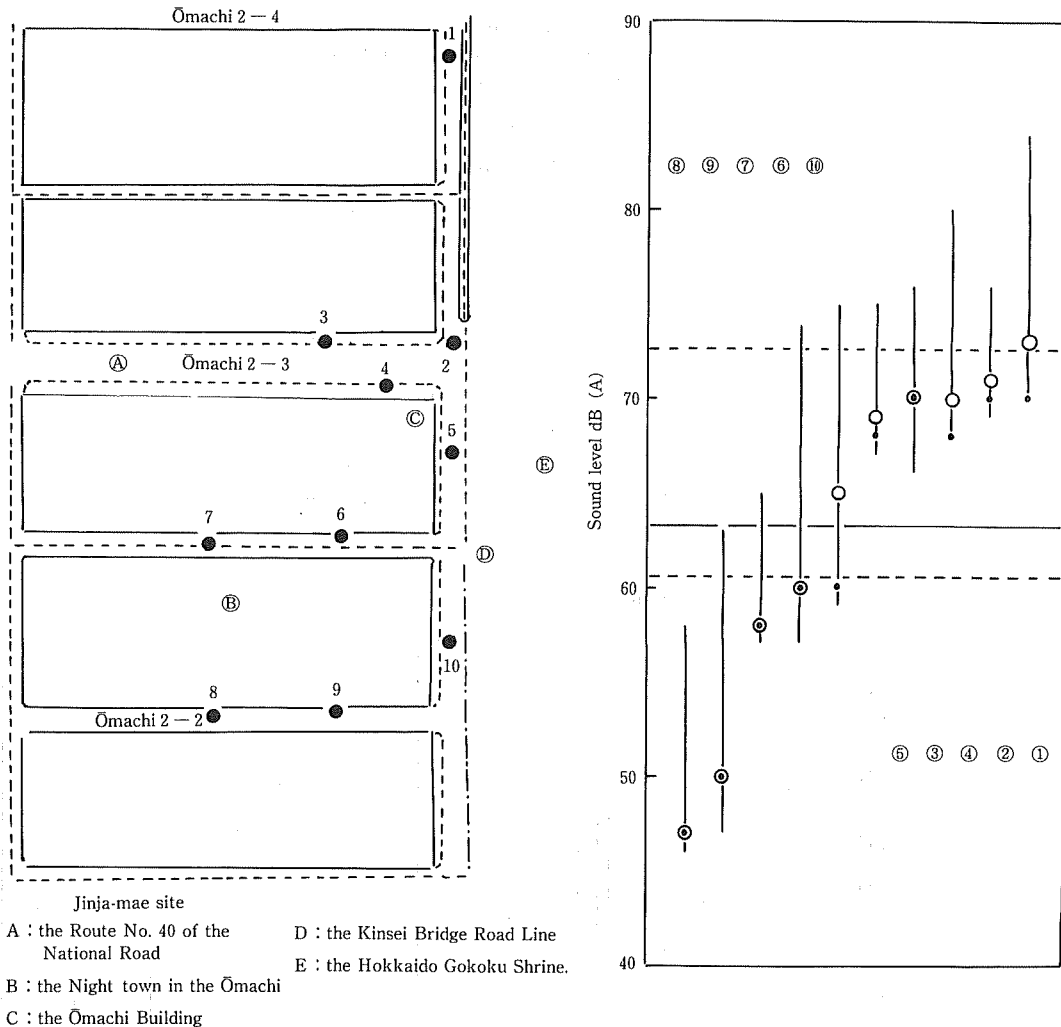


Fig. 1 Examples of measurement at amusement quarter: Jinja-mae site, Asahikawa 10 measuring points and sound levels obtained.

values with both lower limit values and upper limit values within a 90% range. Their average sound levels are shown as 60.6 and 72.6 dB (A) respectively. In the upper part of Fig. 1 values from ① to ⑩ show the position of the measured points, while letters from A to E are used to show the most conspicuously noisy places at the Jinja-mae site.

b) 3-6 Gai site

Let us now examine the noise levels at 3-6 Gai site, one of the largest amusement quarters in Hokkaido. It is in the 6-chōme, 3-*gyō* street aea. Table 2 and Fig. 2 illustrate the detailed data and the average sound level at 10 different points selected arbitrarily around 3-6 Gai site. We notice both vehicular traffic noises and the sound of many passersby. The measured results, which were obtained in the way described above, are shown in Table 2. As in the lower part of Fig. 2, the median sound levels are arranged in an order increasing in

Table 2 Sound levels and conditions of the measuring points: 3-6 Gai site, Asahikawa

Zome		Category		
Commercial		Amusement quarter		
Test No.	Time	Sound levels dB (A)		
		Mode	Median	90% range
①	22.05	65	65	61~71
②	22.12	62	62	60~73
③	22.18	75	75	73~77
④	22.24	60	60	59~67
⑤	22.31	60	60	58~64
⑥	22.40	62	62	60~68
⑦	22.46	62	64	61~70
⑧	22.52	58	59	57~64
⑨	22.58	60	60	58~65
⑩	23.04	60	60	60~67

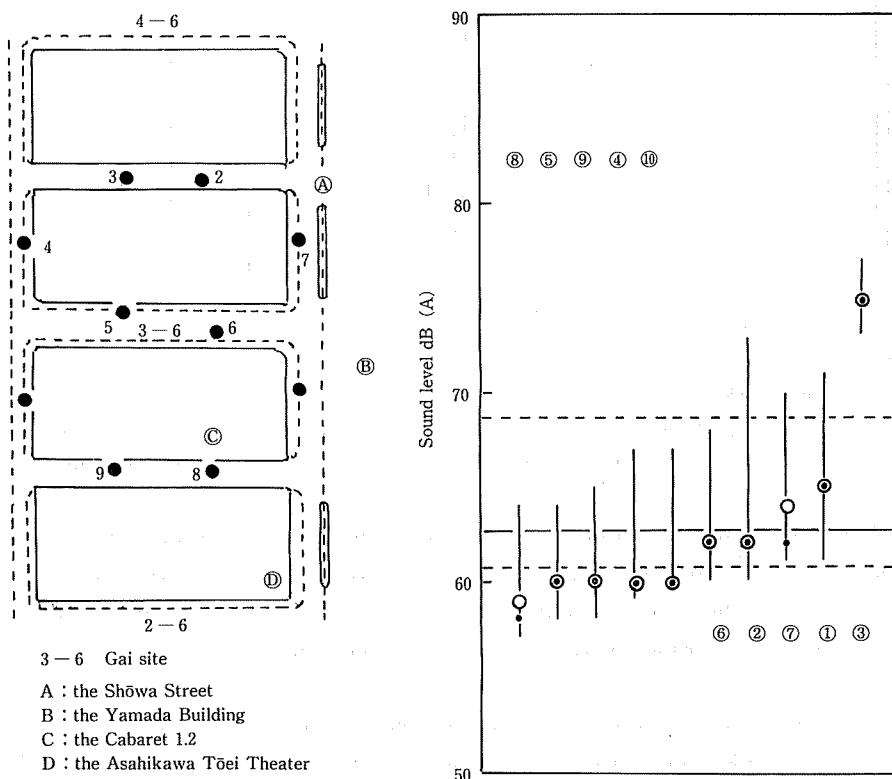


Fig. 2 Examples of measurement at amusement quarter: 3-6 Gai site, Asahikawa 10 measuring points and sound levels obtained.

magnitude as the circular spots plot the measured values in the seam figure, while the modes

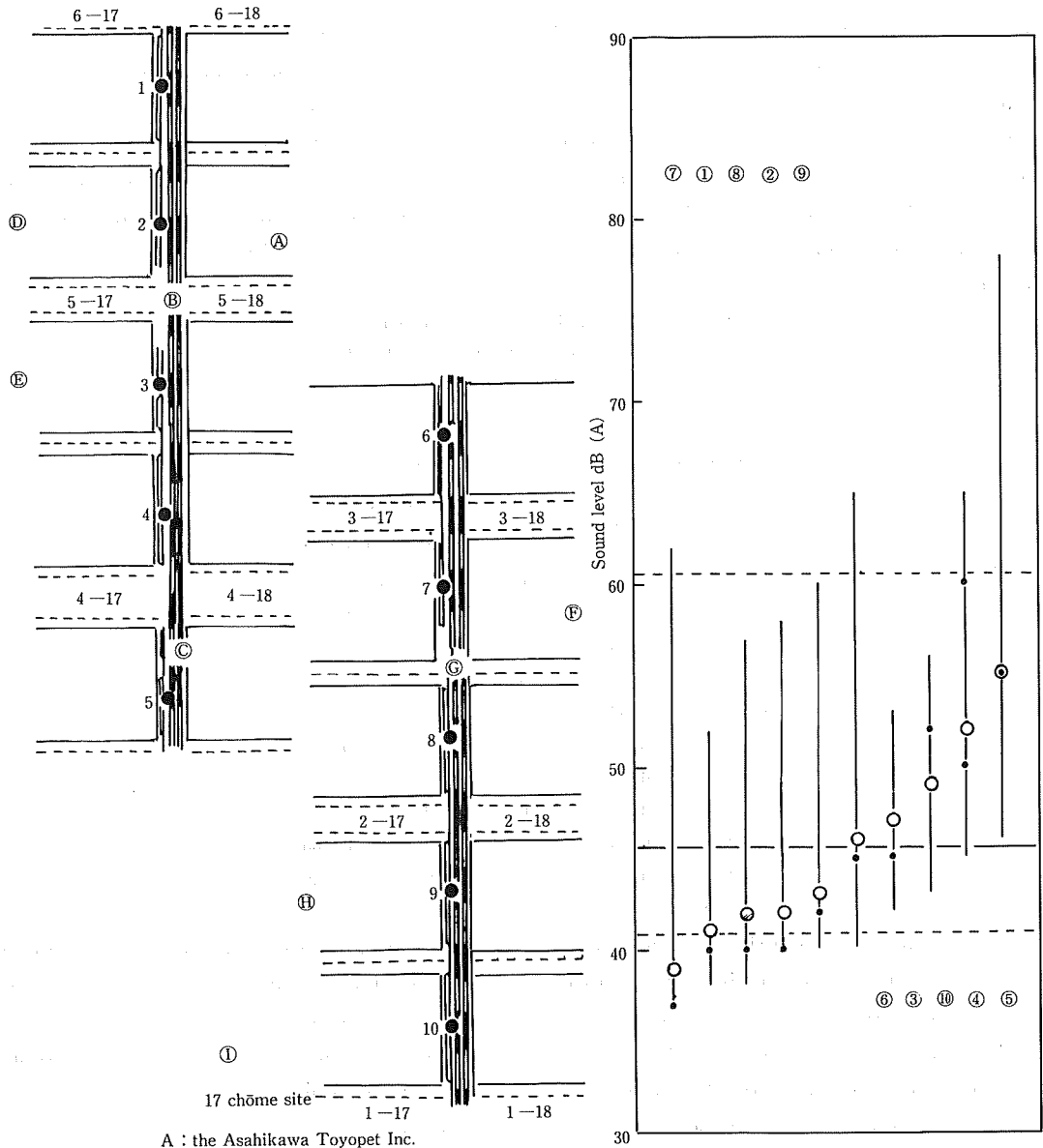
are represented by the black spots. Solid lines move up and down to show changes within a 90% range. A central solid line shows the average value of the median and indicates that the average sound level is 62.7 dB (A). Dotted lines show both its lowest and highest points as well as the average values with both lower limit values and upper limit values within a 90% range. Their average sound levels are shown as 60.7 and 68.6 dB (A) respectively. In the upper part of Fig. 2 values from ① to ⑩ show the position of the measured points, while letters from A to D are used to show the most conspicuously noisy places at the 3-6 Gai site.

c) 17 chōme site

Table 3 Sound levels and conditions of the measuring points: 17 chōme site, Asahikawa

Zome		Category		
Commercial		Amusement quarter		
Test No.	Time	Sound levels dB (A)		
		Mode	Median	90% range
①	23.26	40	41	38~52
②	23.33	40	42	40~58
③	23.40	45	47	42~53
④	23.46	50, 60	52	45~65
⑤	23.52	55	55	46~78
⑥	23.58	45	46	40~65
⑦	0.10	37	39	37~62
⑧	0.22	40	42	38~57
⑨	0.30	42	43	40~60
⑩	0.38	52	49	43~56

We also examined the noise levels at the 17 chōme site, one of Asahikawa's amusement areas under the elevated railroads for both the Sōya main line and the Sekihoku main line. It is bounded on the north by 17 chōme, 6-*gyō* street, on the south by 17 chōme, 1-*gyō* street. Table 3 and Fig.3 illustrate the detailed data and the average sound level at 10 different points selected arbitrarily along the 17-chōme site. We notice both vehicular traffic noises and the voices of barmaids. The measured results, which were obtained in the way described above, are shown in Table 3. As in the lower part of Fig. 3, the median sound levels are arranged in an order increasing in magnitude as the circular spots plot the measured values in the same figure, while the mode is represented by the black spots. Solid lines move up and down to show the difference within a 90% range. A central solid line shows the average value of the median and indicates that the average sound level is 45.6 dB (A). The dotted lines show both its lowest and highest points as well as the average values with both lower limit values and upper limit values within a 90% range. Their average levels are shown as 40.9 and 60.6 dB (A) respectively. In the upper part of Fig. 3 values from ① to ⑩ show the position of the measured points, while letter from A to I are used to show the most conspicuously noisy places at the 17-chōme site.



- A : the Asahikawa Toyopet Inc.
- B : the Sōya Main Line
- C : the Asahikawa 4-*kyō* Station
- D : the Konpō Temple
- E : the Asahikawa Branch of the Nippon Seishū Inc.
- F : the Noboritsuru Shuzō Inc.
- G : the Sekihoku Main Line
- H : the Taniuchi Inc.
- I : the Taimei Building Inc.

Fig. 3 Examples of measurement at amusement quarter: 17 *chōme* site, Asahikawa 10 measuring points and sound levels obtained.

3. Discussion

a) Jinja-mae site

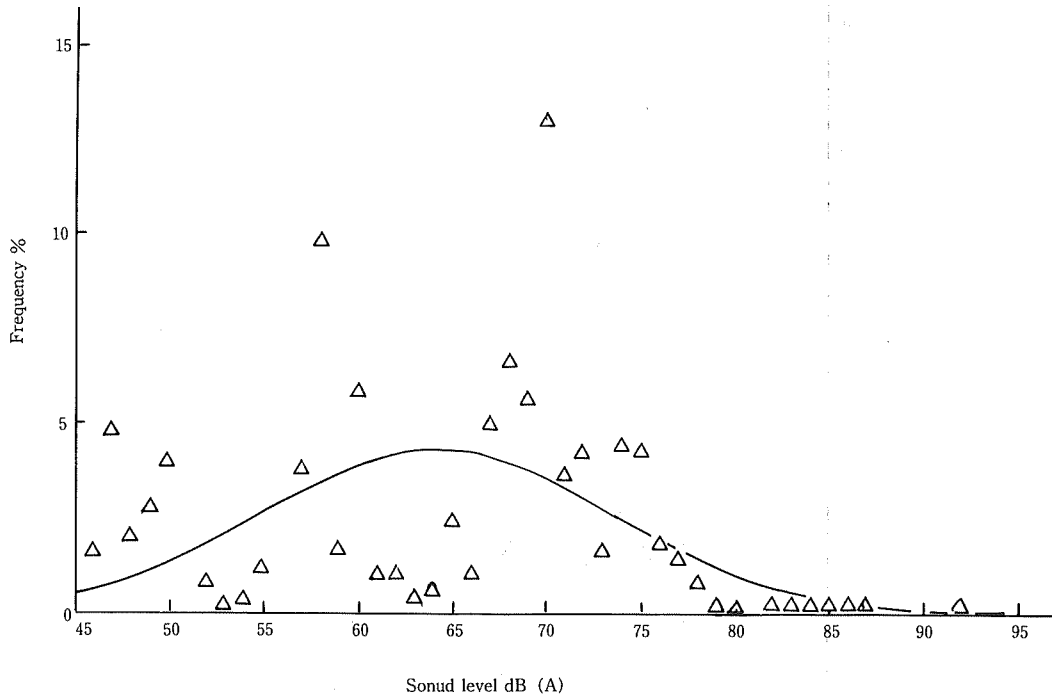


Fig. 4 Relation between the sound level and the frequency percentage in the Jinja-mae site. The solid line is calculated by the equation of Gaussian distribution curve and the measured values are represented by the triangular spots.

In this area the sound levels are highest (64.3 dB (A) on average), often reaching 80—94 dB (A). For example, the highest sound levels were recorded in the neighborhood of the Kinsei Bridge Road Line (①), where the average sound level was 74.0 dB (A); this was due to both the vehicular traffic noises and the sounds of many passersby. But in the neighborhood of the Night Town in the Ōmachi (⑧), the average sound level was only 48.8 dB (A), because there were neither high vehicular noises nor the sounds of many passersby. The distribution percentage y of sound levels is give by the equation of Gaussian distribution curve

$$y = \frac{1}{\sqrt{2\pi}\sigma} e^{-\frac{(x-m)^2}{2\sigma^2}}$$
 in which σ is the standard deviation, σ^2 the dispersion, x the sound level and

m the average sound level at the Jinja-mae site. Fig. 4 is the relation the sound level and the frequency percentage at the Jinja-mae site. The solid line is calculated by the equation of the Gaussian curve and the measured values are represented by the triangular spots. The measured values are very rccattered, but its tendency coincides approximately with the Ganssian

distribution curve.

b) 3-6 Gai site

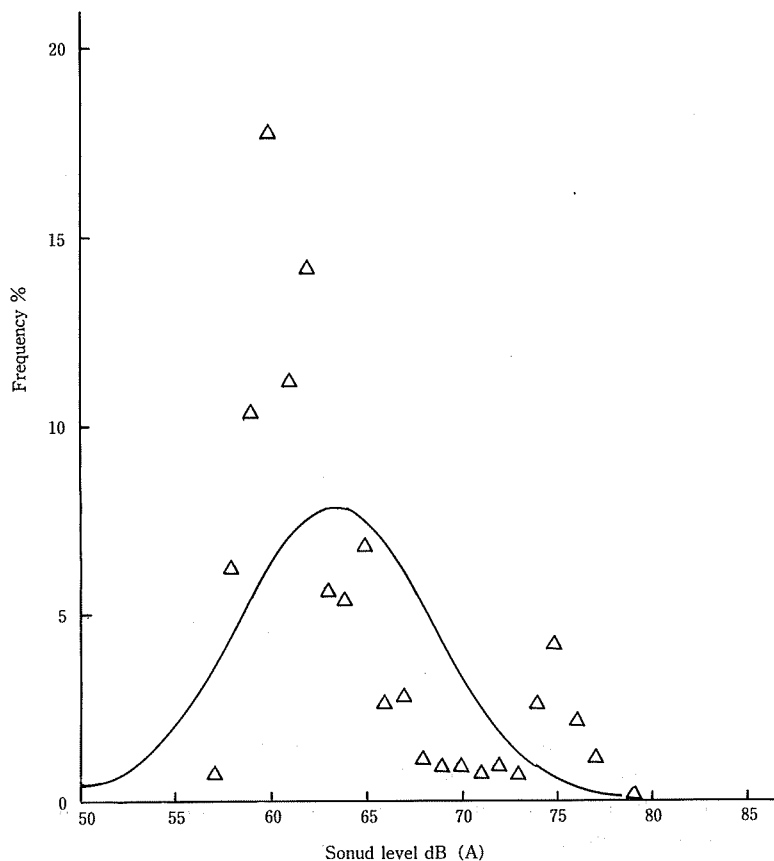


Fig. 5 Relation between the sound level and the frequency percentage in the 3-6 Gai site. The solid line is calculated by the equation of Gaussian distribution curve and the measured values are represented by the triangular spots.

In this area the sound levels were generally high (63.4 dB (A) on average), often reaching 70—79 dB (A). For example, the highest sound levels were recorded in the neighborhood of the Yoshitake Building (③), where the average sound level was 75.1 dB (A); this was due to both the vehicular traffic noises and the piercing steam whistle of a sweet potato vendor. But in the neighborhood of the Cabaret 1. 2 (⑧), the average sound level was 59.3 dB (A), because there were neither high vehicular noises nor the sounds of passersby. In the same manner as for the preceding data, Fig. 5 shows the relation between the sound level and the frequency percentage in the 3-6 Gai site. The solid line is calculated by the equation of the Gaussian distribution curve and the measured values are represented by the triangular spots. The measured values

are very scattered, but its tendency coincides approximately with the Gaussian distribution curve.

c) 17-chōme site

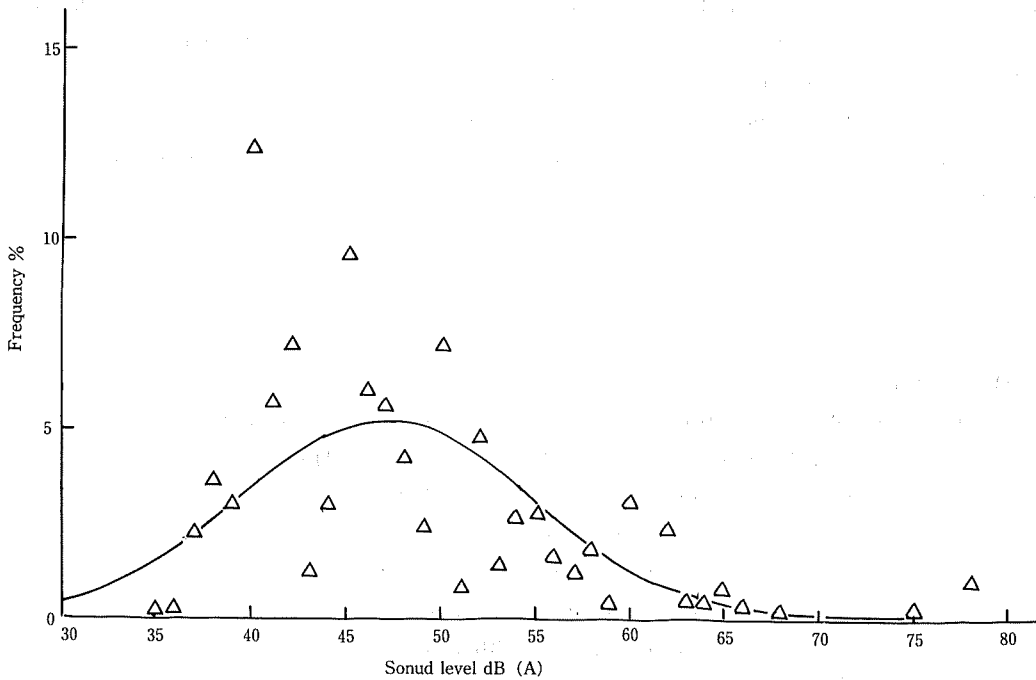


Fig. 6 Relation between the sound level and the frequency percentage in the 17 chōme site. The solid line is calculated by the equation of Gaussian distribution curve and the measured values are represented by the triangular spots.

In this area the sound levels were low, and the average sound level was 47.2 dB (A), often dropping to 35–40 dB (A). For example, the lowest sound levels were recorded in the neighborhood of the Noboritsuru Shuzō Inc. (㉞), where the average sound level was 41.7 dB (A), because there were neither high vehicular noises nor the sounds of passersby. But the highest sound level were recorded at the measured point (㉞) where the sound level was 78.0 dB (A); this was due to the sound of the trains operating on the elevated railroad. In the same manner as for the preceding data. Fig. 6 shows the relation between the sound level and the frequency percentage at the 17 chōme site. The solid line is calculated by the equation of the Gaussian distribution curve and the measured values are represented by the triangular spots. The measured values are very scattered, but its tendency coincides approximately with the Gaussian distribution curve.

4. Conclusion

The average median sound levels at the Jinja-mae site, 3-6 Gai site and 17-chōme site were 63.3, 62.7 and 45.6 dB (A) respectively, while the average of the highest sound levels are 72.6, 68.6 and 60.6 dB (A) respectively; the averages of the highest sound levels are 72.6, 68.6 and 60.6 dB (A); the averages of the lowest sound levels are 60.6, 60.7 and 40.9 dB (A). The average levels of sound within a 100% range for the Jinja-mae site, 3-6 Gai site and 17 chōme site were 64.3, 63.4 and 47.2 dB (A) respectively, while the standard deviation of sound level was 9.19, 5.06 and 7.62 dB (A).

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