CHAPTER III

OBSERVATIONS

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Cotton is the 'White Gold'. It is used in India since four thousand years B.C.. The artisans possessed extraordinary skill, who spun the yarn, wove the fabrics, create intricate designs and patterns. So destrous was the yarn turned out by them for the famous 'Dacca Muslin' that it was called 'Web of the Woven Wind' (Dr. Piramal 1990).

In 1830 in West Bengal, India set up her first successful mechanised textile mill, only engaged in the spinning. In 1854 the first mill producing both yarn and cloth was set up in Bombay. Later on textile mills were set up at other cities like Ahmedabad and Nagpur. By the end of eighteenth century, there were 90 mills throughout India with 2.15 million spindles and over 1,65,000 looms. By the end of nineteenth century, many new mills were established in Southern India. Before the Second World War and even during the war years, the Indian textile industry was one of the most modern in the world.

The growth of the Indian textile industry since Independence was fast. In the year 1951 there were total 378 mills, out of which 103 were spinning mills and 275 were composite. In 1961 total 479 mills were present, 192 were spinning and 287 were composite. In 1971, out of the total 664 mills, 373 were spinning and 291 were composite mills present in India (Dr. Piramal 1990). At present in India total 1,051 textile mills are existing, 769 are spinning and

282 are composite mills, with the number of spindles 26.5 millions and number of looms 184 thousand (Betrabet and Garde 1991).

More than 97 per cent of the total number of looms are located in the following ten states of India: 1) Maharashtra, 2) Gujarat, 3) U.P., 4) M.P., 5) West Bengal, 6) Tamilnadu, 7) Karnataka, 8) Delhi, 9) Rajasthan and 10) Pondicherry. Out of these, more than 80 per cent of the looms are installed in the 1) Gujarat, 2) M.P., 3) U.P. and 4) Maharashtra.

In Kolhapur district there are about 35,000 powerlooms and 4,000 handlooms. Out of these, about 80 per cent powerlooms and handlooms are working in the Ichalkaranji area. Ichalkaranji city is popularly known as the 'Manchester of Maharashtra', where the business of weaving cotton textile yarn was started in 1904. In 1938 there were 1,200-1,500 handlooms, in 1960-61 there were 5,000 powerlooms, in 1973-74, 18,000 powerlooms and 1,000 handlooms. In 1976-77, 22,000 powerlooms were existing. In 1977-78, 27,000 powerlooms were present. In 1978-79 30,000 powerlooms and 300 handlooms were present. In 1978 nearly 46,000 workers were busy in cotton textile mill at Ichalkaranji (Hupare 1979).

(2) Description of the Job:

The textile industry is one of the oldest and the largest industries. It constitutes various sections according to the stepwise processing of cotton. The sequence of different processes and their related sections are as follows:

1) Blow Room:

The main object of blowroom is opening and cleaning of cotton. Before opening and cleaning, mixing of cotton is done by means of automixer, multimixer, etc.. Opening is done by beaters or different types of openers such as porcupine opener, Kringhton opener etc.. Cleaning is done by cleaners to remove seed coats, dried leaf particles and other impurities. Thus, cotton is cleaned up to 70 per cent extent. End product of blowroom is a cotton sheet called as, 'Lap Sheet', which is fed to the carding department.

2) Carding:

The main objects of carding are individualisation of cotton fibre and to remove trash in the cotton to some extent. The lap sheet is fed to the carding is converted into a bulky strand, which is like yarn called as 'sliver'. It has larger diameter than that of yarn. The sliver is stored into big cans.

3) Drawframe:

Parallelisation of the sliver is done in the drawframe. The fibres become parallel to the sliver axis.

4) Combing:

In combing, the fibres which are shorter than the staple length are removed. Other remaining impurities are also removed in this process.

(5) Speedframe:

Here the sliver is converted into a thinner yarn-like structure,

which is bigger in diameter than yarn and smaller in diameter than silver called as 'Roving'. In this process the silver is reduced to roving which is wound on the bobbins.

(6) Ringframe:

In this section roving is covered into yarn. In this process twisting is done with the help of revolving spindle and ring.

(7) Doubling:

Here yarn is doubled, due to which the strength of the yarn can be increased. Twisting of yarn is also carried out.

(8) Winding:

In this section yarn faults like slubs, knots, etc. are removed by the cleaner. Bobbins are wound on the cone to form the package of 1 Kg or 1½ Kg of yarn.

(9) Packing:

Cones are packed in hessian bags for a local packing. Weight of one bag is 50 Kg. For export purpose packing is done in cartons. Weight of one bag is 60 Kg.

Temperature and humidity are adjusted properly in different sections depending on the variety of cotton. Warm and humid conditions are maintained in the textile mill, which are desirable for the process.

(3) Occupational Environment of the Textile Mill:

Though the largest number of cotton textile mills are located

in Ichalkaranji area, no investigation has yet been carried out in relation to health and safety of the textile workers. The occupational environment in the textile mill was quite adverse. High temperature, poor ventilation and high noise level are important stress factors in the textile mill affecting the workers' body, efficiency and productivity.

From the general survey of the textile mill it was revealed that, there are three different units, viz. units A, B and C provided with well equipped machinery. Each unit has different sections such as blowroom, carding, speedframe, ringframe, doubling, winding and packing.

The present investigation is carried out in'B' unit. Area of the blowroom is 9,625.25 sq.ft. and number of buckets is 8. Area of the carding is 7,420 sq.ft, where 8 buckets are present. Here recorded dry temperature is 31°c and wet temperature is 24°. Area of speedframe is 2,448.50 sq.ft., where 25 buckets are present. Here recorded dry temperature is 31.5°c and wet temperature is 24.5°c. Area of the ringframe is 29,387 sq.ft. with 30 buckets present. The recorded dry temperature is 37°c and wet temperature is 26°c. Area of the doubling and winding units is 19,513.04 sq.ft., where 19 buckets are present. Here recorded dry temperature is 32°c and wet temperature is 22°c.

Thus, occupational environment in the textile mill is warm and humid.

(4) Measurement of Sound Pressure Level:

Evaluation of noise is made with a Sound Level Meter. Noise

level is measured in different sections and the results are expressed in dB(A). Noise level is recorded at 8 a.m., 12 noon and 4 p.m. during the first shift in the blowroom, carding, speedframe, ringframe, doubling and winding. The noise levels are recorded at the entrance at the middle, at the end of the shed and near the machine (two feet away from the machine). In the office noise level is measured at 11 a.m., 1 p.m. and 3 p.m.. It is measured at the entrance, at the middle and at the end of the office. The results are listed in Table-1.

Noise level in the blowroom is 85-87 dB(A), carding 85-89 dB(A), speedframe 89-91 dB(A), ringframe 91-95 dB(A), doubling 87-92 dB(A), winding 83-89 dB(A) and office 50-52 dB(A).

NEI:

Most of the work in the textile mill is repetitively carried out in three different shifts. Machinery in the different sections of the mill is in continuous working condition. Therefore, workers are exposed to continuous noise for 8 hours. According to the recommended formula of NEI (Dr Dhar 1990), NEI value of the different sections is calculated and results are listed in Table-3.

NEI value of the blowroom and carding is '1', that is, within the range of normal limit. In speedframe, ringframe, doubling and winding, NEI value is greater than 1; therefore, workers from sections are over-exposed to the excess noise level. NEI value of the ringframe section is 8, while that of the office is 0.

TABLE 1

Mean sound pressure levels in dB(A) in 'B' unit of Textile Mill

Sr. No.	Section →→ Location ↓	Below Room	Carding	Speed-frame	Ring-frame	Doubling	Winding	Office
1	At the entrance	84.66	84.66	88.66	90.66	86.66	83.33	52
2	At the middle	87.33	85.33	90.66	92.66	91.33	88.66	50
3	At the end	84.66	85.33	87.33	90.66	85.66	84.66	50
4	Near the machine	87.33	88.66	91.33	94.66	92.00	89.33	-
	Mean value	85.99	85.99	89.49	92.16	88.91	86.49	51

TABLE 2

Recommended ambient noise levels

Area	Day-Time* Leg dB(A)	Night-Time** Leg dB(A)
Industrial	75	65
Commercial	65	55
Residential	55	45
Silence Zones	50	45

* Day-Time: 06.00 a.m. to 09.00 p.m. (15 hrs)

** Night-Time: 09.00 p.m. to 06.00 a.m. (9 hrs)

Source: Central Pollution Control Board, New Delhi - 1989-90

Ref: Bhatnagar et al. 1991.

TABLE 3

NIE of different sections in Textile Mill

Sr. No.	Department	NEI	Remark
1	Blow Room	1	-
2	Carding	1	-
3	Speed frame	3.5	Workers are over-exposed
4	Ring frame	8	,,
5	Doubling	4	,,
6	Winding	2	,,

(5) General Survey And Anthropometry:

In the 'B' unit total 294 male workers are present, out of which 171 workers are selected for the present investigation. From the office, 18 office members are selected for the present investigation.

A majority of the workers are young. They are found in the age group of 25 to 45 years. But in blowroom and carding section a few workers are found in this age group. Therefore in both these sections age group of 25 to 55 is considered.

In the blowroom 6 workers are found in the age-group of 25 to 55 years. Their service experience ranges from 4 to 33 years. The highest height of the worker is 170 cm and the lowest height is 152.5 cm. The highest weight of the worker is 71 Kg and the lowest is 45 kg.

In the carding unit 7 workers are found in the age-group of 25 to 55 years. Their service experience ranges from 6 to 35 years. The highest height of the worker is 165 cm and the lowest is 155 cm. The highest weight of the worker is 61 Kg and lowest is 41 Kg.

In the speedframe 13 workers are found in the age-group-A (25 to 35 years). The youngest worker is 25 years old and the oldest is 35 years old. Their service experience ranges from 5 to 16 years. The highest height of the worker is 175 cm and lowest

is 150 cm. The highest weight of the worker is 80 Kg and the lowest is 46 Kg. In the same section, 10 workers are found in the age-group B (36-45 years). The youngest worker is aged 36 years and the oldest 45 years. Their service experience ranges from 13 to 26 years. The highest height of the worker is 170 cm and the lowest 157.5 cm. The highest weight of the worker is 70 Kg and the lowest is 47 Kg.

In the ringframe unit, 26 workers are found in the age-group 'A'. The youngest worker is 25 years old and the oldest 35 years. Their service experience ranges from 4 to 23 years. The highest height of the worker is 172.5 cm and the lowest 152.5 cm. The highest weight is 72 Kg and the lowest is 40 Kg. In the same section 31 workers are found in the age-group 'B'. The youngest worker is of 36 years age and the oldest 45 years. Their service experience ranges from 8 to 30 years. The highest recorded height of the worker is 177.5 cm and the lowest is 152.5 cm. The highest recorded weight of the worker is 75 Kg and the lowest 44 Kg.

In the doubling unit 19 workers are found in the age group 'A'. The youngest worker is of 25 years age and the oldest 35 years. Their service experience ranges from 5 to 12 years. The highest height of the worker is 167.5 cm and the lowest is 155 cm. The highest weight of the worker is 70 Kg and the lowest 40 Kg. In the same section, 4 workers are found in the age group 'B'. The youngest worker is of 38 years and the oldest 45 years. Their service experience ranges from 12 to 24 years. The highest height

of the worker is 165 cm and the lowest is 155 cm. The highest weight of the worker is 63 Kg and the lowest is 43 Kg.

In the winding unit 36 workers are found in the age group 'A'. The youngest worker is 25 years old and the oldest 35 years. Their service experience ranges from 4 to 18 years. The highest height of the worker is 172.5 cm and the lowest 152.5 cm. The highest weight of the worker is 67 Kg and the lowest 39 Kg. In the same section 14 workers are found in the age group 'B'. The youngest worker is of 36 years age and the oldest 45 years. Their service experience ranges from 12 to 27 years. The highest height of the worker is 175 cm and the lowest is 155 cm. The highest weight of the worker is 70 Kg and the lowest is 43 Kg.

In Packing unit 5 workers are found in the age-group of 25 to 45 years. The youngest worker is 25 years old and the oldest 43 years. Their service experience ranges between 4 and 23 years. The highest height of the worker is 172.5 cm and the lowest is 157.5 cm. The highest weight of the worker is 84 Kg and the lowest is 48 Kg.

In the office, 9 members are found in the age-group 'A'. The youngest member is of 29 years and oldest 35 years. Their service experience ranges from 7 to 15 years. The highest height of the member is 167.5 cm and the lowest is 155 cm. The highest weight of the member is 64 Kg and the lowest is 53 Kg. In the same section 9 members are found in the age-group 'B'. The youngest

member is 37 years old and the oldest is 45 years. Their service experience ranges from 11 to 29 years. The highest height of the member is 165 cm and the lowest 155 cm. The highest weight of the member is 67 Kg and the lowest 45 Kg.

(6) Measurement of Cardiovascular Responses:

Workers are randomly selected for the measurement of cardio-vascular responses. Pulse is expressed in Pulse rate per min. Heart rate is expressed in heart beats/min, systolic blood pressure - SBP, diastolic blood pressure - DBP and pulse pressure is expressed in mm Hg.

As per the observation, in the blowroom about 4 workers are having high pulse rate as also hart rate. The highest pulse and heart rate is 92 beats/min. The lowest pulse and heart rate is 65 beats/min. About 33.33 per cent workers are having high SBP, low SBP and Normal SBP. About 50 per cent of workers are having high DBP, 16.66 per cent workers are having low DBP and 33.33 per cent workers are having normal DBP. The pulse pressure is in the range of 31 to 68 mm Hg.

In the carding unit about 4 workers are having high pulse and heart-rate. The highest pulse and heart rate is 96 beats/min and the lowest 68 beats/min. About 57.14 per cent workers are having high SBP. About 28.56 per cent workers are having high DBP and normal DBP. About 42.84 per cent workers are having low DBP. The pulse pressure ranges from 40 to 62 mm Hg.

In the speedframe 61.53 per cent workers of the age group 'A' are having high pulse and heart rate. The highest recorded pulse and heart rate is 106 beats/min and the lowest is 62 beats/min. About 61.53 per cent workers are having high SBP, 30.76 per cent workers are having low SBP, and 8.69 per cent workers are having normal SBP. About 30.76 per cent workers are having high DBP, 61.53 per cent workers are having low DBP and 7.69 per cent workers are having normal DBP. The pulse pressure ranges from 30-58 mm Hg. In the same section 50 per cent workers of the age-group 'B' are having high pulse and heart rate. The highest recorded pulse and heart rate is 90 beats/min and the lowest is 60 beats/min. About 60 per cent workers are having high SBP, 30 per cent workers are having low SBP and 20 per cent workers are having normal SBP. About 30 per cent workers are having high DBP, 50 per cent workers are having low DBP and 20 per cent workers are having normal DBP. The pulse pressure ranges from 37 to 58 mm Hg.

In the ringframe 65.28 per cent workers of the age-group 'A' are having high pulse and heart rate. The highest recorded pulse and heart rate is 88 beats/min and the lowest 54 beats/min. About 61.53 workers are having high SBP, 19.2 per cent workers are having low SBP and normal SBP. About 30.72 per cent workers are having high DBP, 42.24 per cent workers are having low DBP and 26.88 per cent workers are having normal DBP. The pulse pressure is in the range of 34-64 mm Hg. In the same section, 66.66 per cent workers of the age-group 'B' are having high pulse and heart

rate. The highest recorded pulse and heart rate is 88 beats/min and the lowest is 52 beats/min. About 70.84 per cent workers are having high SBP, 16.1 per cent workers are having low SBP and 12.88 per cent workers are having normal SBP. About 57.96 per cent workers are having high DBP, 32.2 per cent workers are having low DBP and 9.66 per cent workers are having normal DBP. The pulse pressure is in the range of 32-64 mm Hg.

In the doubling unit, 56 per cent workers of the age group 'A' are having high pulse and heart rate. The highest recorded pulse and heart rate is 84 beats/min and the lowest 46 beats/min. About 36.84 per cent workers are having high SBP, 31.56 per cent workers are having low SBP and normal SBP. About 5.26 per cent workers are having high DBP, 63.12 per cent workers are having low DBP and 31.56 per cent workers are having normal DBP. The pulse pressure is in the range of 34 to 58 mm Hg. In the same section 25 per cent workers of the age group 'B' are having high pulse and heart rate. The highest pulse and heart rate is 74 beats/min and the lowest is 60 beats/min. About 50 per cent workers are having high and low SBP. About 25 per cent workers are having high and low DBP; while 50 per cent workers are having normal DBP. The pulse pressure is in the range of 40 to 58 mm Hg.

In the winding unit 69.25 per cent workers of the age group 'A' are having high pulse and heart rate. The highest recorded plulse and heart rate is 96 beats/min and the lowest is 66 beats/min.

About 63.71 per cent workers are having high SBP, 2.77 per cent workers are having low SBP and 33.24 per cent workers are having normal SBP. About 19.39 per cent workers are having high DBP, 38.78 per cent workers are having low DBP and 41.55 per cent workers are having normal DBP. The pulse pressure is in the range of 32 to 74 mm Hg. In the same section 78.54 per cent workers of the age-group 'B' are having high pulse and heart rate. The highest pulse and heart rate is 92 beats/min and the lowest is 62 beats/min. About 64.26 per cent workers are having high SBP and 21.42 per cent workers are having low SBP and 14.28 per cent workers are having normal SBP. About 42.84 per cent workers are having high DBP, 14.28 per cent workers are having low DBP and 42.84 per cent workers are having normal DBP. The pulse pressure is in the range of 17 to 66 mm Hg.

In the packing unit, 80 per cent workers are having high pulse and heart rates. The highest pulse and heart rate is 88 beats/min and the lowest is 66 beats/min. About 60 per cent workers are having high SBP, 40 per cent workers are having normal SBP. About 20 per cent workers are having high DBP and 80 per cent normal DBP. The pulse pressure is in the range of 40 to 48 mm Hg.

Thus in general 59.6 per cent workers are having high pulse and heart rate. The highest pulse and heart rate is 106 beats/min and the lowest is 46 beats/min. About 59.06 per cent workers are having high SBP, 17.98 per cent workers are having low SPB and 22.62 per cent workers with normal SBP. About 31.32 per cent workers

are having high DBP, 38.86 per cent workers are having low DBP and 29 per cent workers are having normal DBP. The pulse pressure is in the range of 17-74 mm Hg.

In the office, 88.88 per cent members of the age group 'A' are having high pulse and heart rate. The highest pulse and heart rate is 85 beats/min and the lowest is 70 beats/min. About 66.66 per cent members are having high SBP, 22.22 per cent members are having low SBP and 11.11 per cent members are having normal SBP. About 11.11 per cent members are having high DBP, 77.77 per cent members are having low DBP and 11.11 per cent members are having normal DBP. The pulse pressure is in the range of 34-58 mm Hg. From the same area, 55.55 per cent members are having high pulse and heart rate. The highest pulse and heart rate is 88 beats/min and the lowest is 64 beats/min. About 66.66 per cent members are having high SBP and 33.33 per cent members are having low SBP. About 55.55 per cent members are having high DBP, 33.33 per cent members are having low DBP and 11.11 per cent members are having normal DBP. The pulse pressure is in the range of 34 to 52 mm Hg.

Higher noise level [92 dB(A)], NEI value (8) and cardiovascular responses are found in the ringframe section. In this section considerable number of workers are present. Higher number of workers are exposed to the excess noise for continuous 8 hours. Therefore, ringframe section is selected for the present investigation; while lower noise level [51 dB(A)] and NEI value (0) of the office. Cardiovascular

responses of the members are more or less normal. Therefore, office is considered as a control group.

Table-4 shows physical characteristics of the ringframe workers of the age group-A (25 to 35 years).

Table-5 shows physical characteristics of the ringframe workers of the age group-B (36 to 45 years).

Table-6 shows plhysical characteristics of the office members of the age group-A (25 to 35 years).

Table-7 shows physical characteristics of the office members of the age group-B (36 to 45 years). These tables are already discussed in the previous part of this chapter. Height and weight of the workers and office members are not related with each other.

Table-8 shows cardiovascular responses of the ringframe workers of the age group-A (25 to 35 years). Table-9 shows cardiovascular responses of the ringframe workers of the age group-B (36 to 45 years).

Table-10 shows cardiovascular responses of the office members of the age group-A (25 to 35 years). Table-11 shows cardiovascular responses of the office members of the age group-B (36 to 45 years). These tables are already discussed in the previous part of this chapter. The incidence of hypertension is higher in the ringframe section.

TABLE 4

Physical characteristics of the workers
in the Ringframe Section
(1) Age Group-A: 25-35 years

S.No.	OBJECT	AGE Yrs.	SERVICE EXPERIENCE Yrs.	BODY HEIGHT Cm.	BODY WEIGHT Kg.
1	MGJ	25	4	160.0	49
2	APH	26	4	167.5	57
3	MSK	27	8	157.5	42
4	BSB	27	8	162.5	47
5	ABJ	28	13	157.5	46
6	JSK	28	13	157.5	56
7	RGD	28	12	162.5	59
8	VPS	28	7	167.5	54
9	SBJ	28	6	170.0	51
10	SRR	30	12	157.5	53
11	SKT	30	11	170.0	72
12	KGU	31	23	165.0	60
13	BSP	31	10	167.5	47
14	MGP	32	14	167.5	62
15	MAP	32	12	152.5	48
16	SLP	32	12	155.0	47
17	NGG	32	11	160.0	47
18	SDP	32	10	160.0	54
19	DBB	32	8	155.0	61
20	MMB	32	8	167.5	65
21	JKG	33	10	165.0	65
22	PAS	35	17	172.5	54
23	KRR	35	16	160.0	57
24	MAG	35	12	155.0	47
25	DIK	35	12	160.0	40
26	MSM	35	7	167.5	59

TABLE 5

Physical characteristics of the workers
in the Ringframe Section
(2) Age Group-B: 36-45 years

S.No.	OBJECT	AGE Yrs.	SERVICE EXPERIENCE Yrs.	BODY HEIGHT Cm.	BODY WEIGHT Kg.
1	RGK	36	15	152.5	49
2	BAK	37	15	160.0	53
3	TBP	37	12	162.5	54
4	BIA	38	22	155.0	57
5	SRM	38	22	162.5	73
6	DGP	38	16	157.5	61
7	MML	38	13	162.5	45
8	BVD	39	24	170.0	70
9	NKP	39	20	170.0	44
10	SAJ	40	23	157.5	61
11	SDB	40	21	162.5	60
12	ABK	40	20	157.5	57
13	JKC	40	20	160.0	57
14	HGB	40	18	167.5	59
15	MUI	40	18	165.0	50
16	MBK	41	17	170.0	51
17	TKH	42	20	167.5	51
18	TMC	42	18	177.5	64
19	PGK	42	8	162.5	52
20	VJJ	43	25	160.0	54
21	AAM	43	20	157.5	61
22	PSP	43	16	167.5	47
23	VSK	44	22	162.5	66
24	RAB	44	11	167.5	68
25	BJP	45	30	157.5	65
26	BSG	45	29	162.5	57
27	DGK	45	24	155.0	48
28	PDF	45	23	167.5	49
29	PNB	45	19	165.0	47
30	SMP	45	16	160.0	56
31	ADP	45	11	152.5	42

TABLE 6

Physical characters of the office members

Age Group-A: 25-35 years

Sr.No.	OBJECT	AGE Yrs	SERVICE EXPERIENCE Yrs.	BODY HEIGHT Cm.	BODY WEIGHT Kg.
1	PLJ	29	9	160.0	61
2	VVB	30	8	155.0	62
3	DND	30	7	157.5	60
4	KJG	32	13	160.0	52
5	YBB	32	07	167.5	61
6	SBK	33	14	160.0	53
7	MKB	33	12	167.5	60
8	VAG	34	8	157.5	64
9	DGR	35	15	155.0	55

TABLE 7

Physical characteristics of the office members

(2) Age Group-B: 36-45 years

Sr.No.	OBJECT	AGE Yrs.	SERVICE EXPERIENCE Yrs.	BODY HEIGHT Cm.	BODY WEIGHT Kg.
1	MKB	37	16	157.5	63
2	SRS	38	13	165.0	67
3	RBY	39	13	160.0	54
4	SNK	40	16	155.0	45
5	PRG	41	13	155.0	55
6	ARG	42	11	165.0	67
7	BMS	43	21	162.5	67
8	BMB	43	17	165.0	51
9	ASB	45	28	165.0	55

TABLE 8

Cardiovascular responses of the workers in the Ringframe Section

(1) Age Group-A: 25-35 years

Sr. No.	OBJECT	AGE Yrs	SERVICE EXP. Yrs	PULSE Per min.	HR per min.	SYSTOLIC B.P. mm Hg	DIASTOLIC B.P. mm Hg	PULSE PRESSURE mm Hg
1	MGI	25	4	69	69	120	56	64
2	APH	26	4	77	77	120	68	52
3	MSK	27	8	84	84	124	74	50
4	BSB	27	8	80	80	118	80	48
5	ABJ	28	13	72	72	122	80	42
6	JSK	28	13	71	71	124	80	44
7	RGD	28	12	62	62	138	82	56
8	VPS	28	7	75	75	124	60	64
9	SBJ	28	6	74	74	110	66	44
10	SRR	30	12	76	76	136	96	40
11	SKT	30	11	88	88	138	78	60
12	KGU	31	23	82	82	138	90	48
13	BSP	31	10	68	68	122	84	38
14	MGP	32	14	87	87	134	64	60
15	MAP	32	12	88	88	122	88	34
16	SLP	32	12	80	80	110	64	46
17	NGG	32	11	77	77	102	68	34
18	SDP	32	10	76	76	124	82	42
19	OBB	32	8	80	80	130	88	42
20	MMB	32	8	53	53	120	80	40
21	JKG	33	10	72	72	138	88	50
22	PAS	35	17	76	76	120	80	42
23	KRR	35	16	80	80	130	80	50
24	MAG	35	12	72	72	122	58	64
25	DIK	35	12	54	54	108	60	48
26	MSM	35	7	80	80	120	80	40

TABLE 9

Cardiovascular responses of the Workers in the Ringframe Section

(2) Age Group-B: 36-45 years

Sr. No.	OBJECT	AGE Yrs	SERVICE EXP. Yrs	PULSE Per min	HR Per min.	SYSTOLIC B.P. mm Hg	DIASTOLIC B.P. mm Hg	PULSE PRESSURE mm Hg
1	RGK	36	15	88	88	128	76	52
2	BAK	37	15	70	70	126	88	38
3	TBP	37	12	70	70	112	72	40
4	BIA	38	22	75	75	120	80	40
5	SRM	38	22	70	70	130	90	40
6	DGP	38	16	72	72	122	84	38
7	MML	38	13	84	84	120	84	46
8	BVD	39	24	82	82	144	94	50
9	NKP	39	20	64	64	122	88	34
10	SAJ	40	23	64	64	126	92	34
11	SDB	40	21	68	68	122	88	34
12	ABK	40	20	75	75	110	68	42
13	JKC	40	20	79	79	124	70	54
14	HGB	40	18	72	72	128	88	40
15	MUI	40	18	80	80	132	68	64
16	MBK	41	17	72	72	120	80	40
17	TKH	42	20	64	64	180	138	42
18	TMC	42	18	76	76	124	64	40
19	PGK	42	8	60	60	118	84	34
20	VJJ	43	25	64	64	136	90	46
21	AAM	43	20	80	80	140	80	60
22	PSP	43	16	72	72	126	74	52
23	VSK	44	22	52	52	144	86	58
24	RAB	44	11	68	68	132	78	54
25	BJP	45	30	68	68	150	110	40
26	BSG	45	29	80	80	180	128	52
27	DGK	45	24	75	75	126	70	56
28	PDF	45	23	60	60	110	70	40
29	PNB	45	29	72	72	120	88	32
30	SMP	45	16	78	72	142	92	50
31	ADP	45	11	67	67	108	66	42

TABLE 10

Cardiovascular responses of the office members

(1) Age Group-A: 25-35 years

Sr.	OBJECT	AGE Yrs	SERVICE EXP. Yrs.	PULSE Per min.	HR Per min.	SYSTOLIC B.P. mm Hg	DIASTOLIC B.P. mm Hg	PULSE PRESSURE mm Hg
1	PLJ	29	9	80	80	120	70	50
2	VVB	30	8	85	85	148	92	56
3	DND	30	7	76	76	126	76	50
4	KJG	32	13	74	74	114	80	34
5	YBB	32	07	78	78	124	76	48
6	SBK	33	14	60	60	122	78	44
7	MKB	33	12	82	82	124	78	46
8	VAG	34	8	80	80	134	76	58
9	DGR	35	15	76	76	118	76	42

TABLE 11

Cardiovascular responses of the office members

(2) Age Group-B: 36-45 years

Sr No	OBJECT	AGE Yrs	SERVICE EXP. Yrs.	PULSE Per min.	HR Per min.	SYSTOLIC B.P. mm Hg	DIASTOLIC B.P. mm Hg	PULSE PRESSURE mm Hg
1	MKB	37	16	80	80	122	70	52
2	SRS	38	13	80	80	130	80	50
3	RBY	39	13	70	70	112	76	36
4	SNK	40	16	64	64	122	86	36
5	PRG	41	13	64	64	114	76	38
6	ARG	42	11	70	70	126	86	40
7	BMS	43	21	88	88	152	106	46
8	BMB	43	17	80	80	138	88	50
9	ASB	45	28	86	86	110	76	34

(7) Audiometry:

Audiometry of the selected hypertensive cases of the ringframe section and selected office members was carried out. From the audiometric results audiograms were prepared. Pure Tone Audiogram numbers 1 to 5 are of the ringframe workers of the age group-A (25 to 35 years). Pure Tone Audiogram numbers 6 to 15 are of the ringframe workers of the age group-B (36 to 45 years). Pure Tone Audiogram numbers 16 to 20 are of the office members.

From the results of the audiometry per cent hearing loss was calculated and type of hearing impairment was decided. Table-12 shows hearing impairment of the ringframe workers of the age group-A (25 to 35 years). From the Table it is observed that 40 per cent workers are having mild hearing loss and 20 per cent are having moderate hearing loss in the right ear; while hearing level of right ear is normal in 40 per cent ringframe workers. Whereas 100 per cent workers are having normal hearing level of the left ear. Table-13 shows hearing impairment of the ringframe workers of the age group-B (36 to 45 years). Here 20 per cent workers are having mild and 20 per cent workers are having moderate hearing loss in the right ear. About 60 per cent workers are having normal hearing level of the right ear; while 30 per cent workers are having mild hearing loss in the left ear and 70 per cent workers are having normal hearing level of the left ear. Table-14 shows hearing impairment of the of the office members. Here 40 per cent members are having mild hearing loss in the right ear and 60 per cent members are

Fig - 1

Right Ear

Pure Tone Audiogram 1

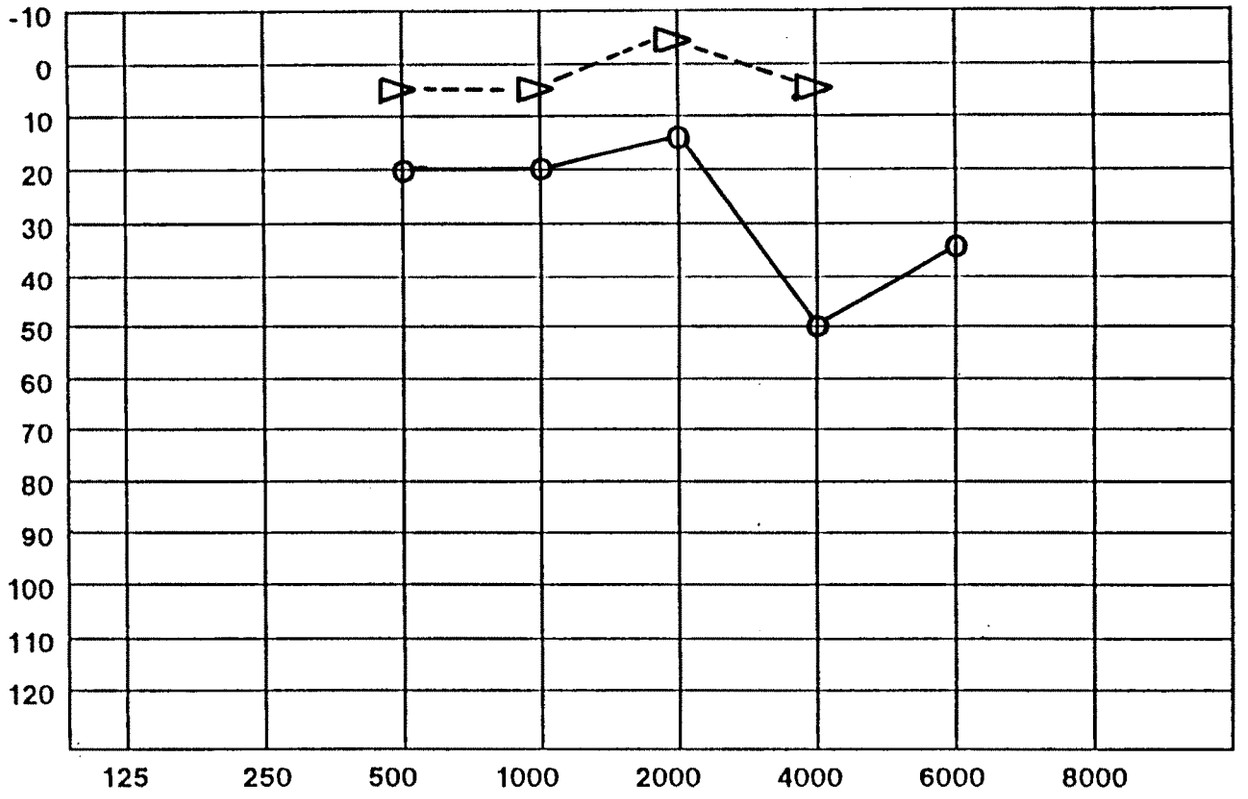
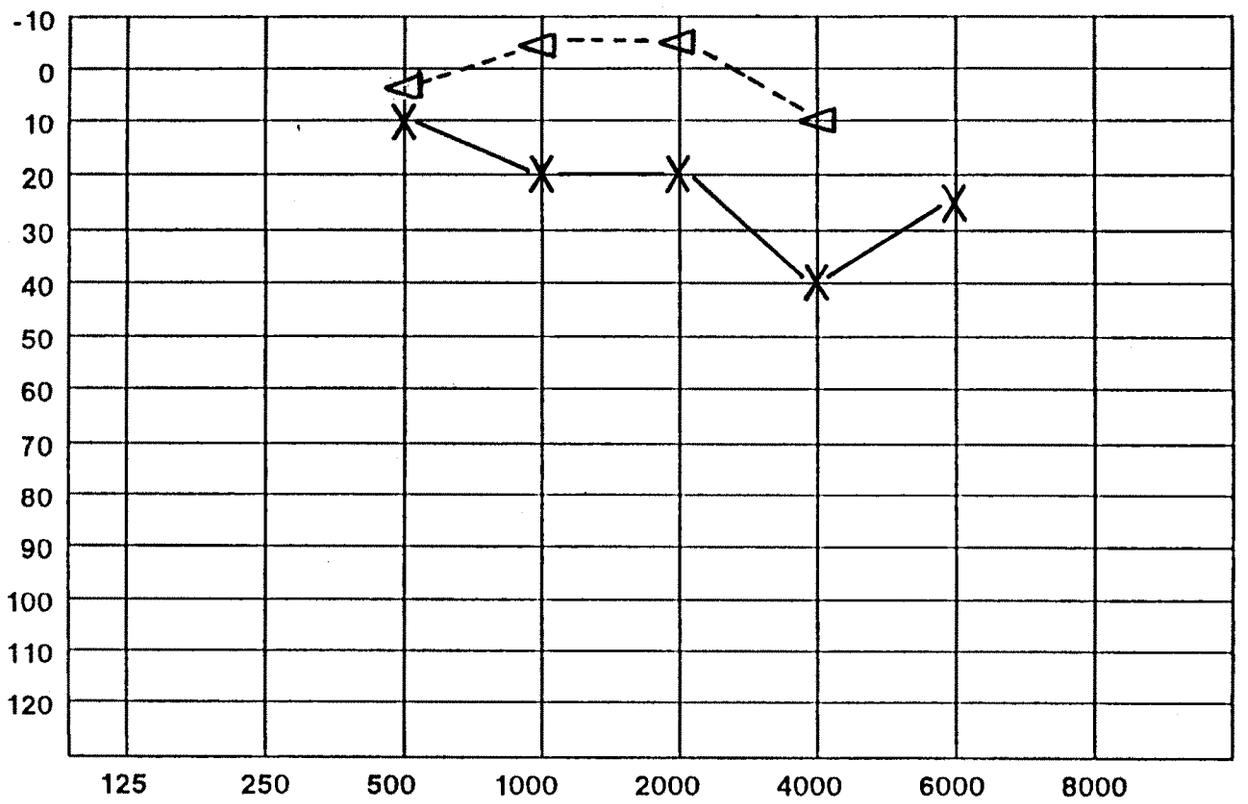


Fig - 2

Left Ear



Name RGD Age 28 years

Percent Hearing Loss Right Ear 18.33 Left Ear 16.66

Fig - 1

Right Ear

Pure Tone Audiogram 2

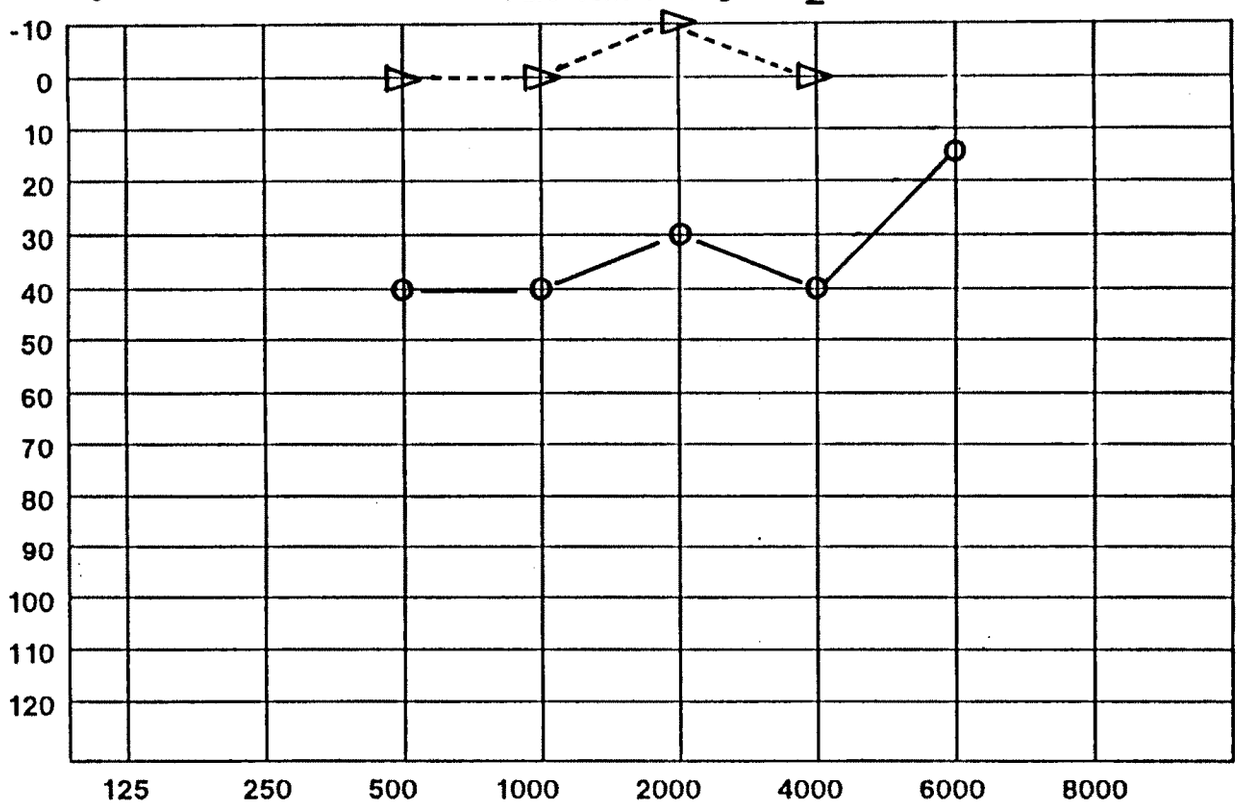
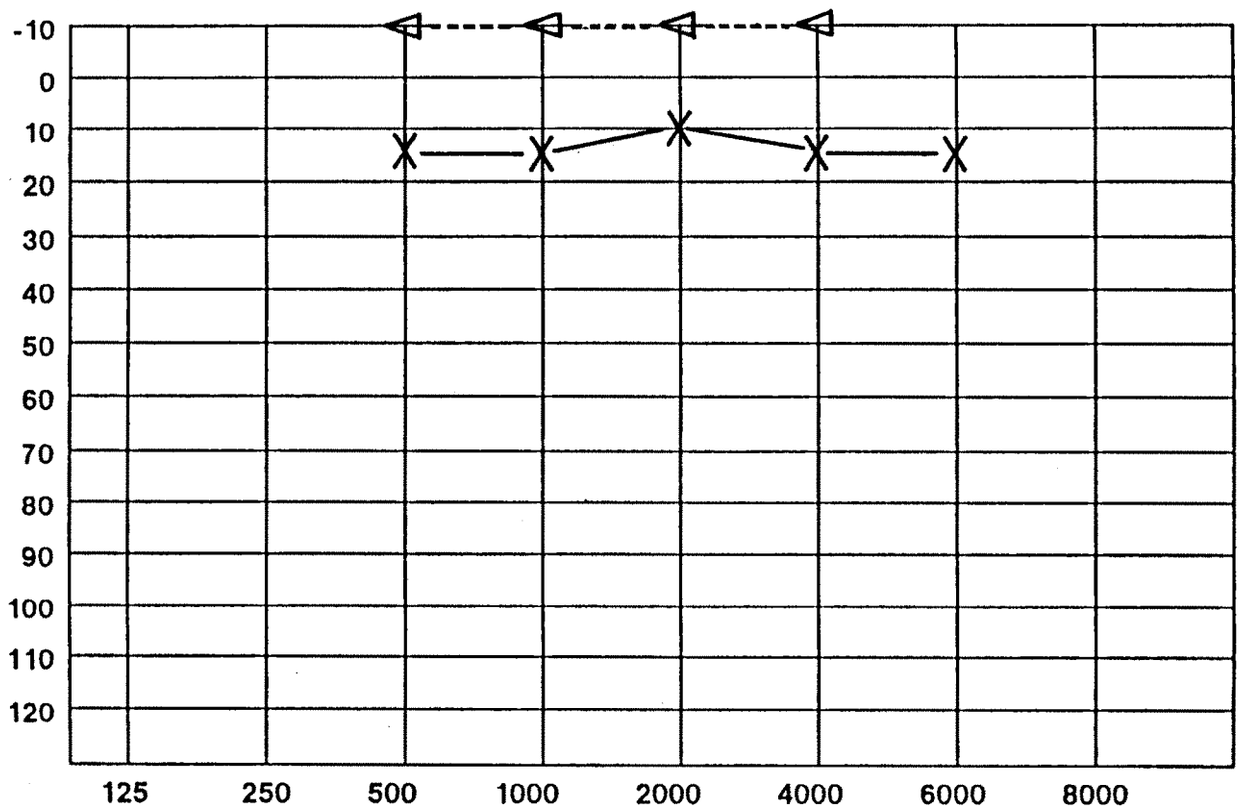


Fig - 2

Left Ear



Name SRR Age 30 years

Percent Hearing Loss..... Right Ear 36.66 Left Ear 13.33

Fig - 1

Right Ear

Pure Tone Audiogram 3

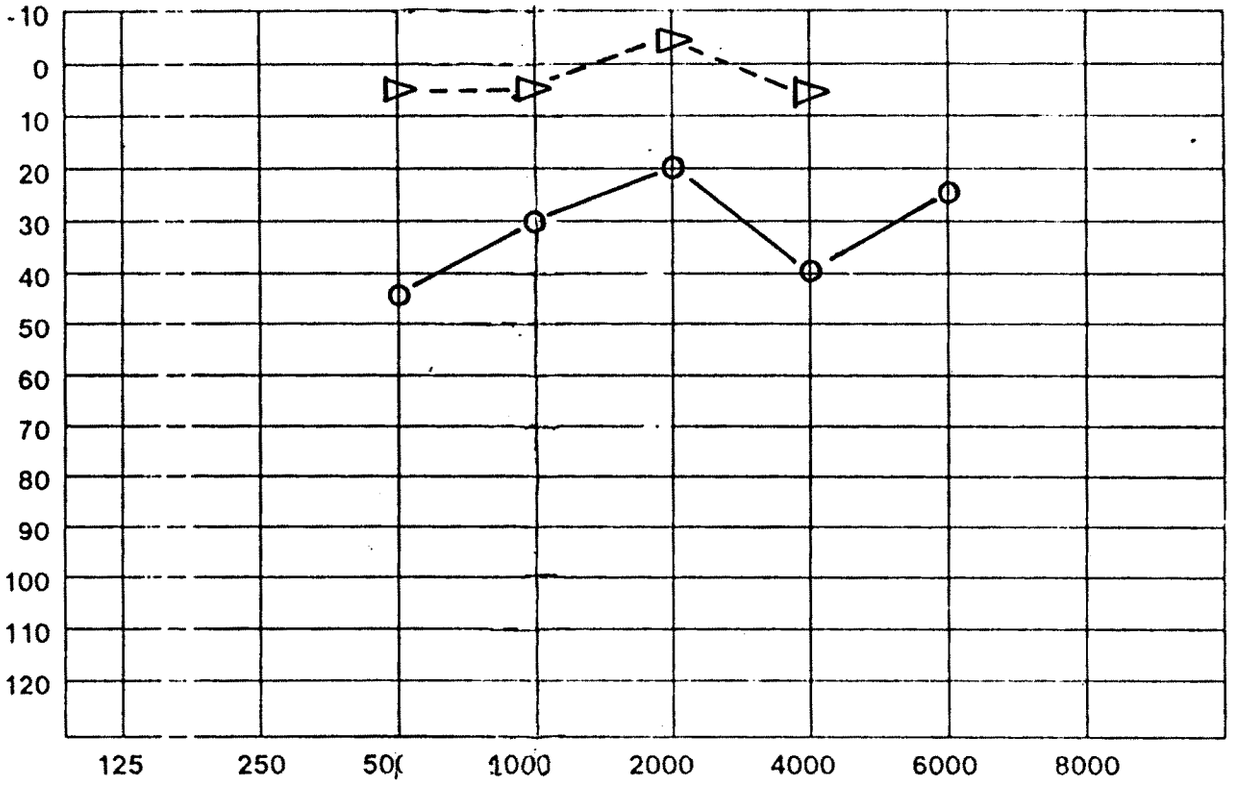
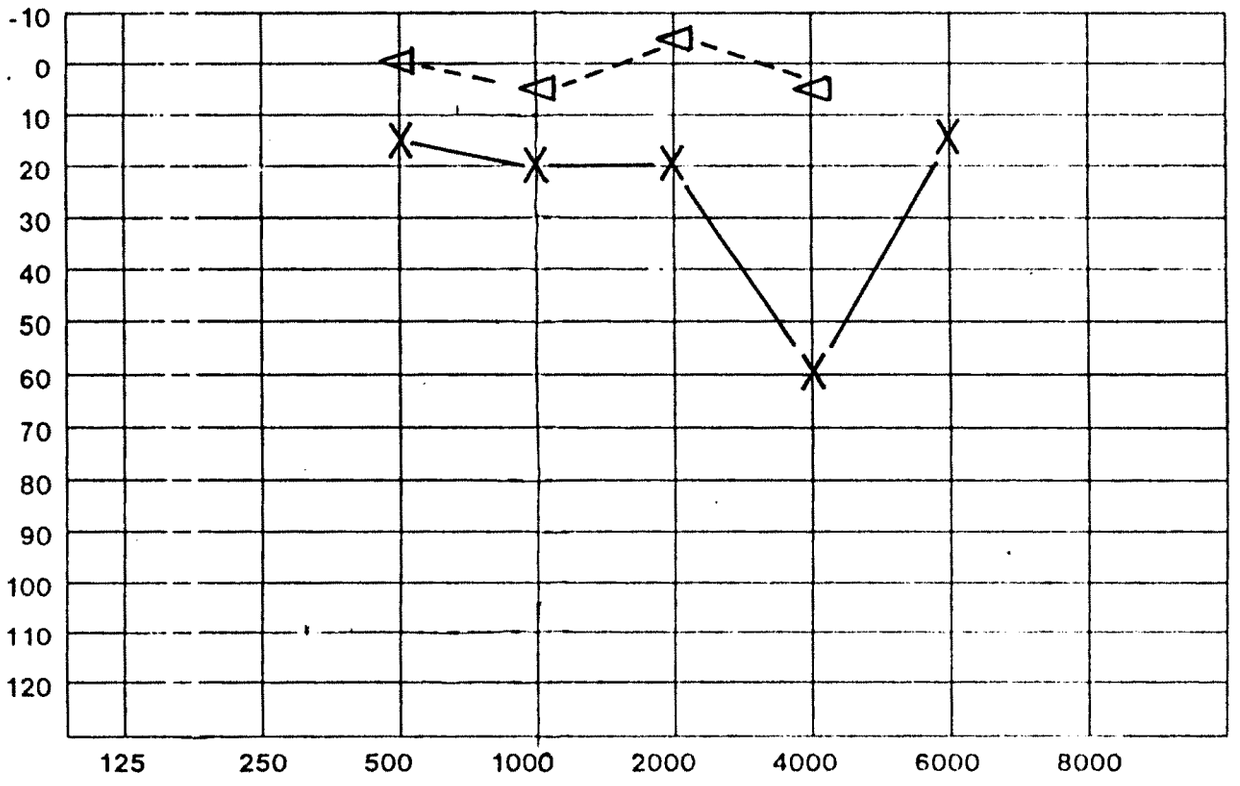


Fig - 2

Left Ear



Name SKT Age 30 years

Percent Hearing Loss Right Ear 31.66 Left Ear 18.33

Fig - 1

Right Ear

Pure Tone Audiogram 4

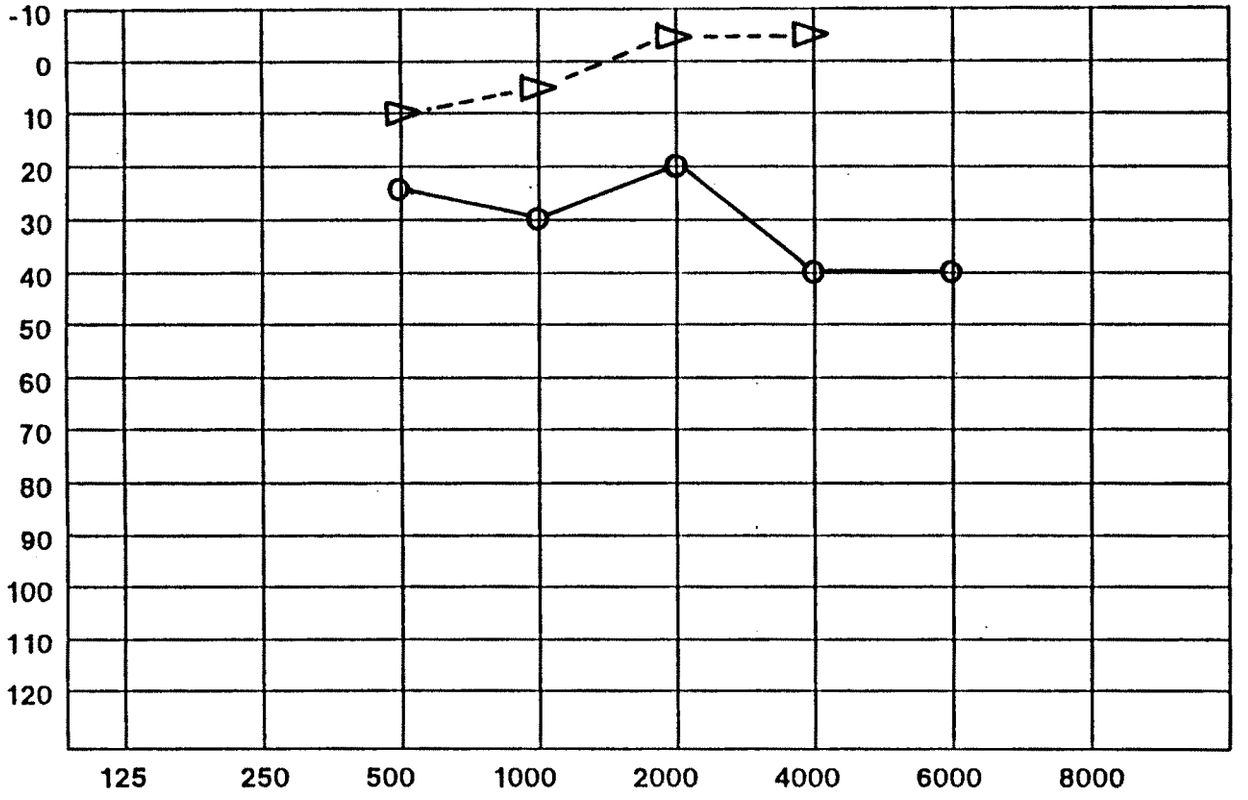
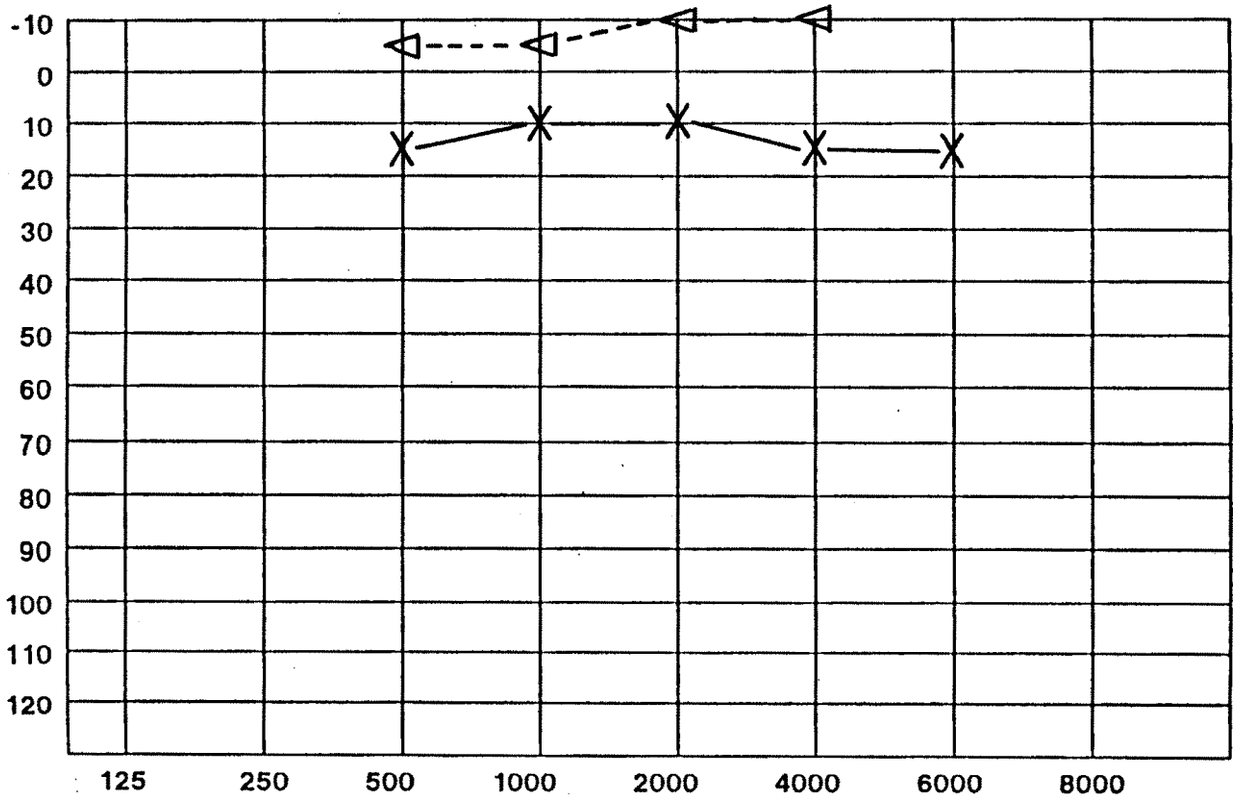


Fig - 2

Left Ear



Name BSP Age 31 years

Percent Hearing Loss Right Ear 25.00 Left Ear 11.66

Fig - 1
Right Ear

Pure Tone Audiogram 5

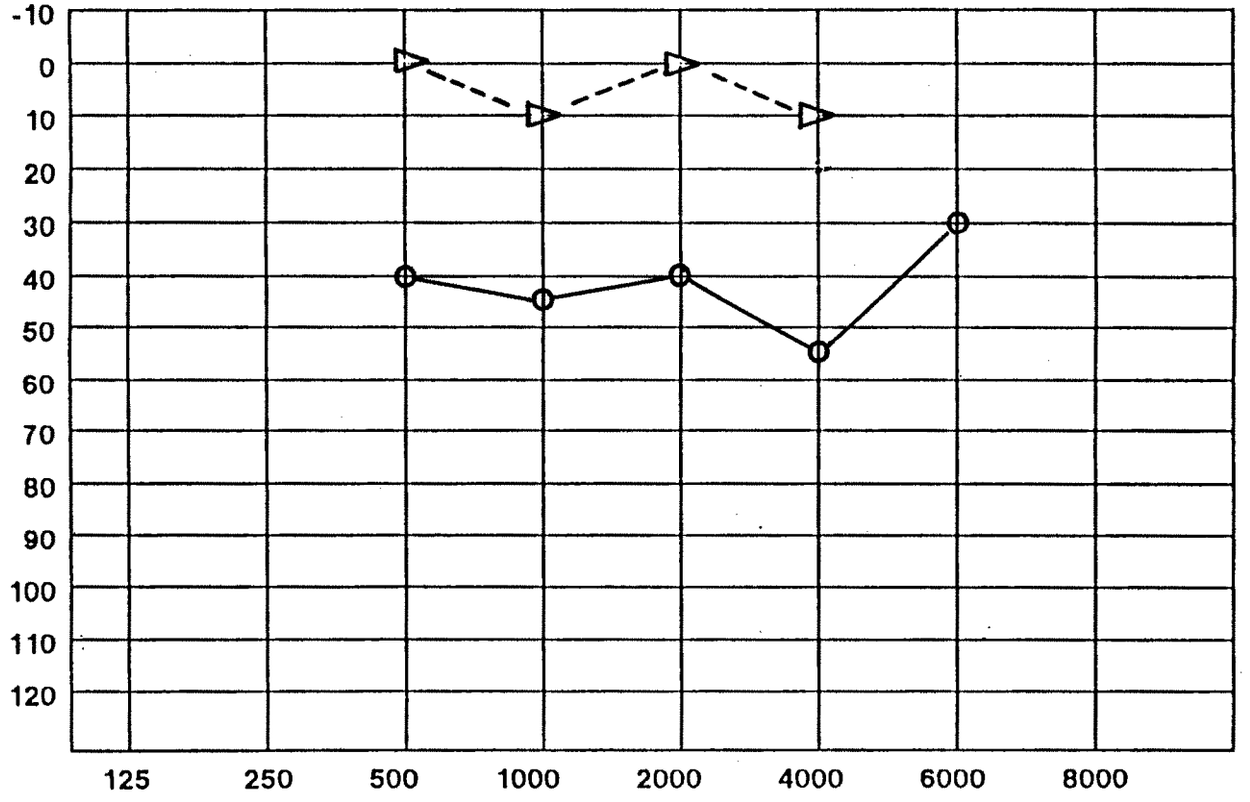
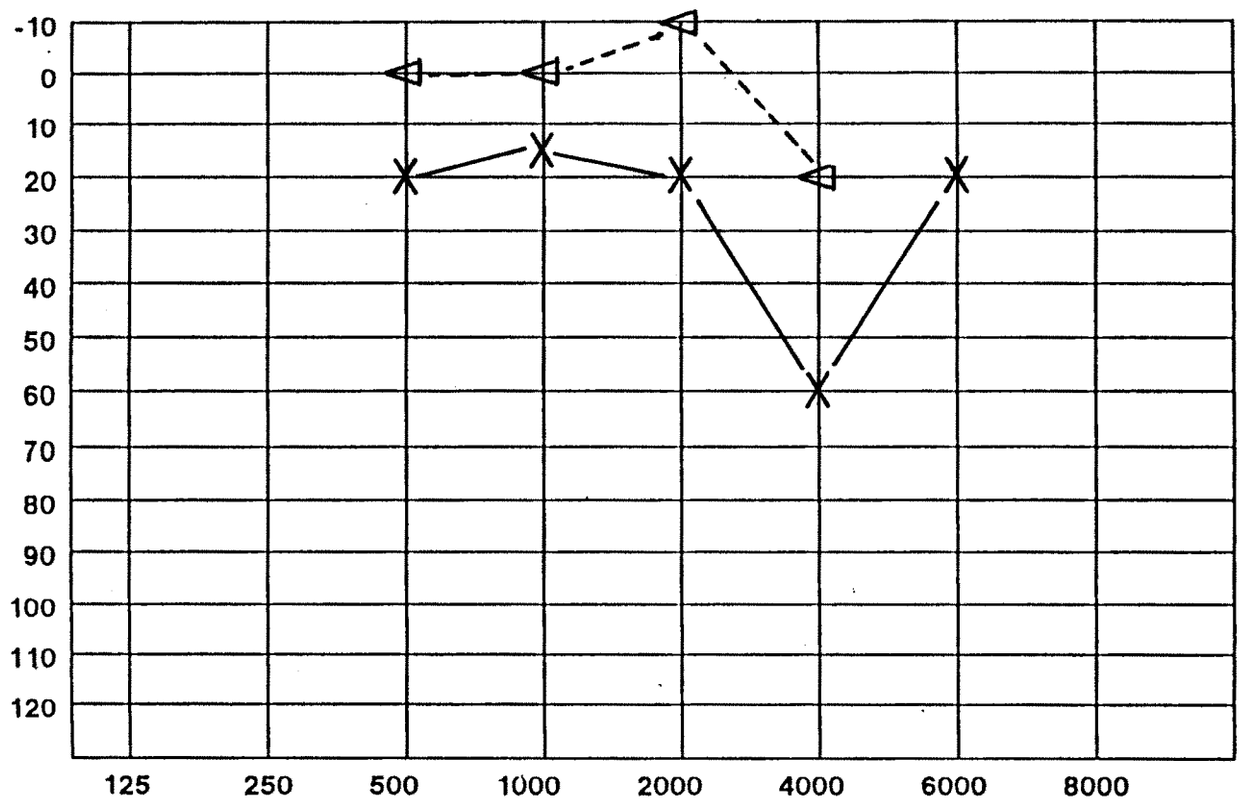


Fig - 2
Left Ear



Name JKG Age 33 years

Percent Hearing Loss Right Ear 41.6 Left Ear 18.33

Fig - 1

Right Ear

99

Pure Tone Audiogram 6

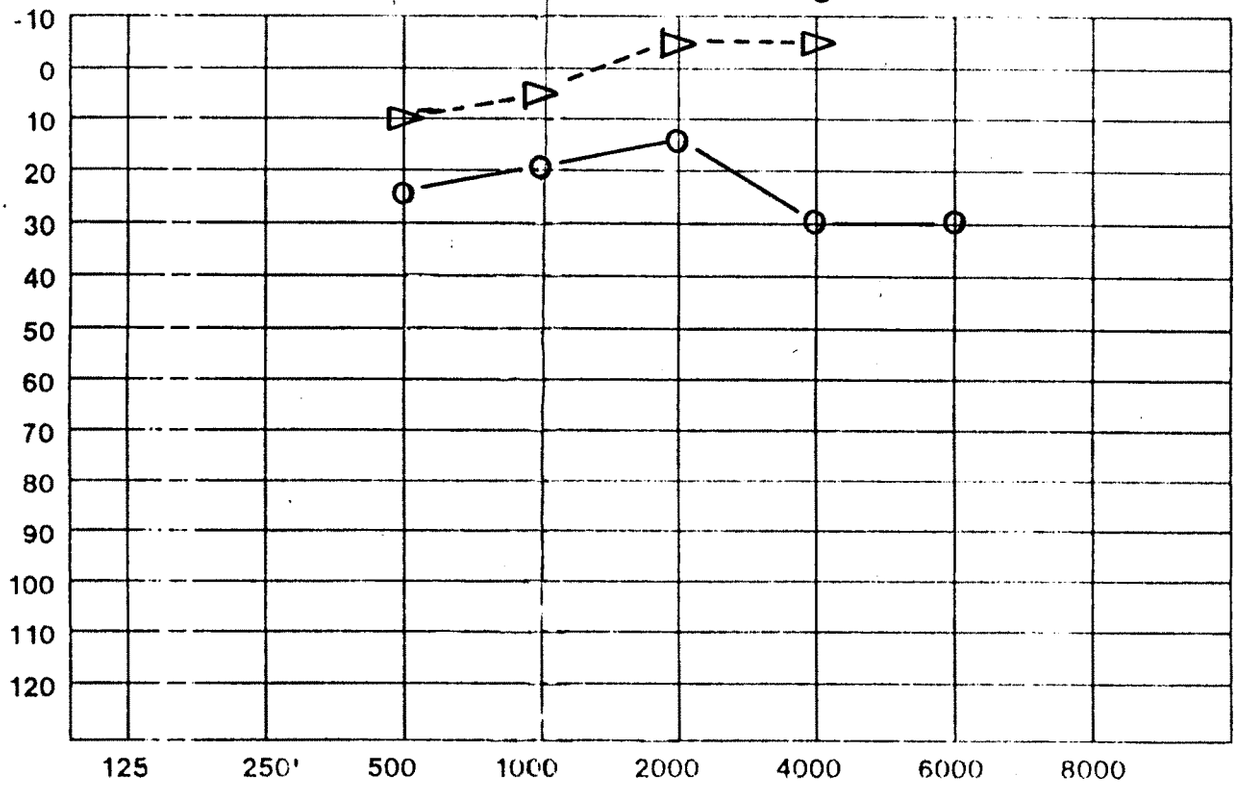
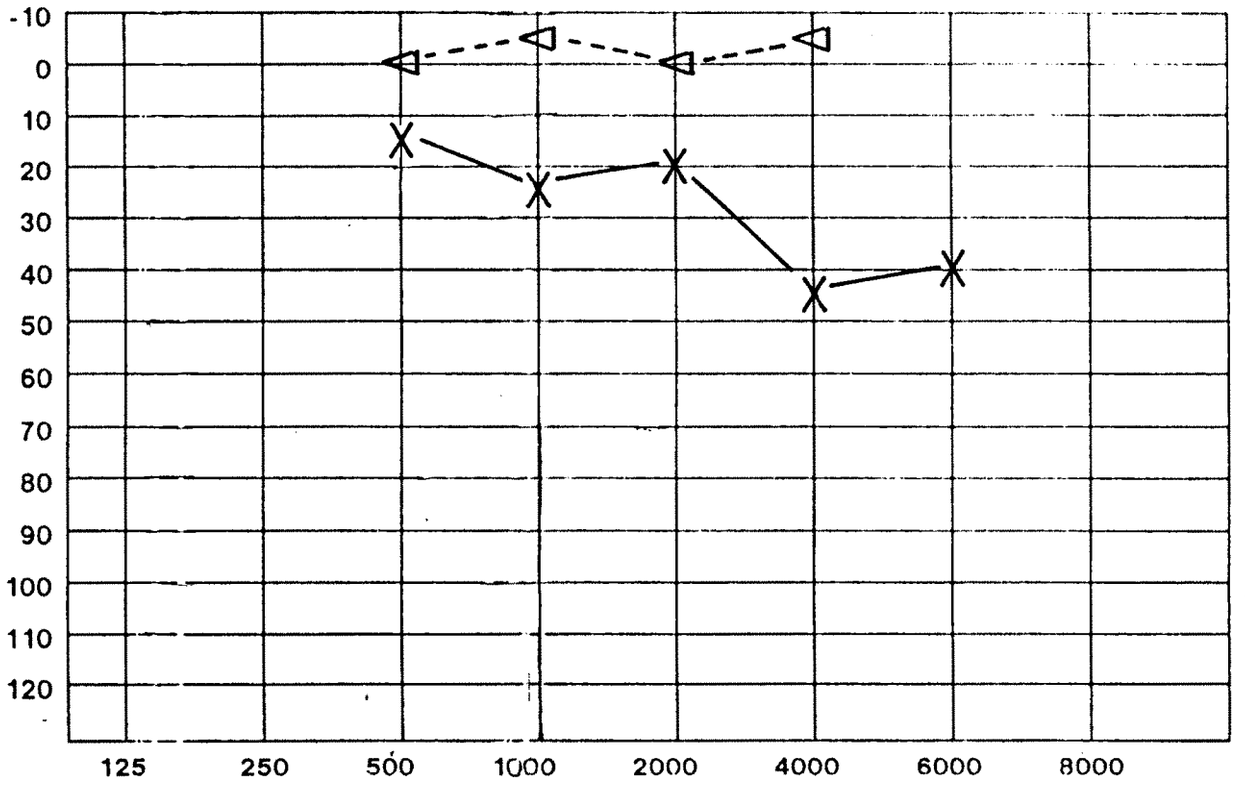


Fig - 2

Left Ear



Name SRM Age 38 year

Percent Hearing Loss Right Ear 20 Left Ear 20

Fig - 1

Right Ear

Pure Tone Audiogram 7

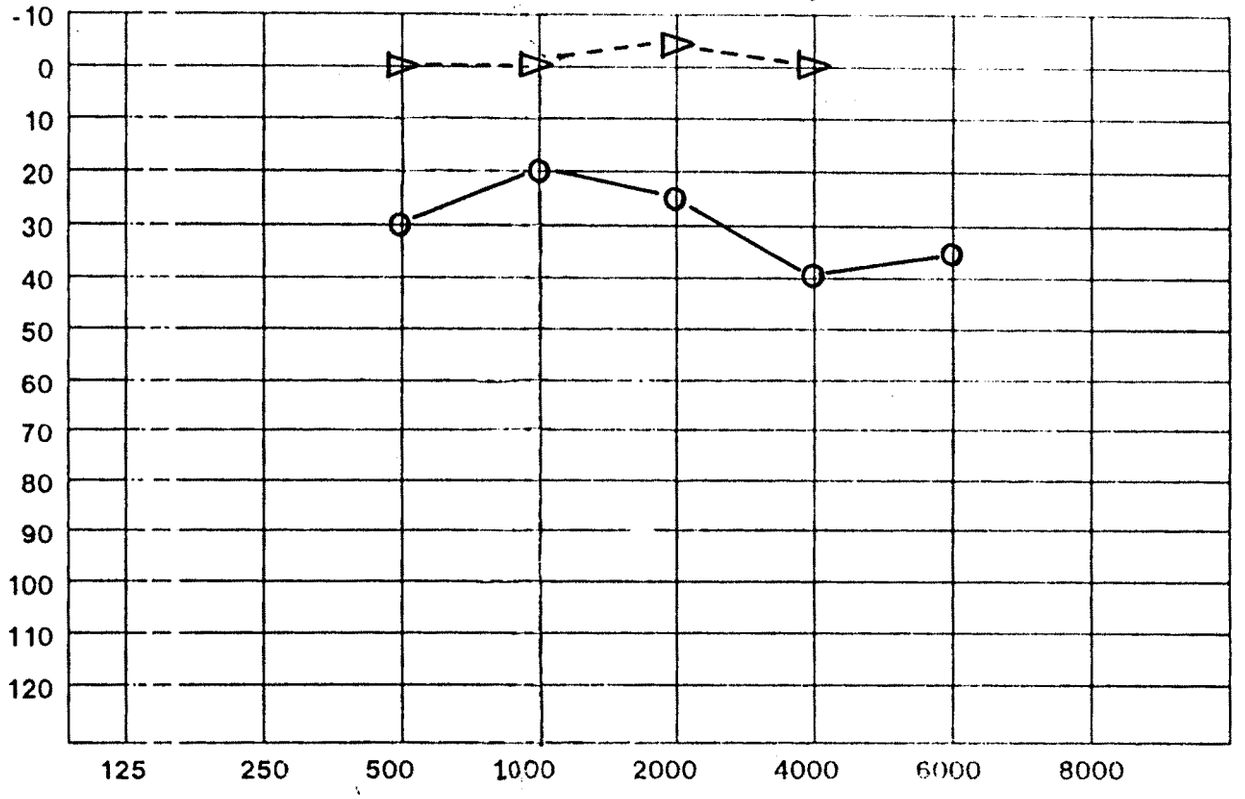
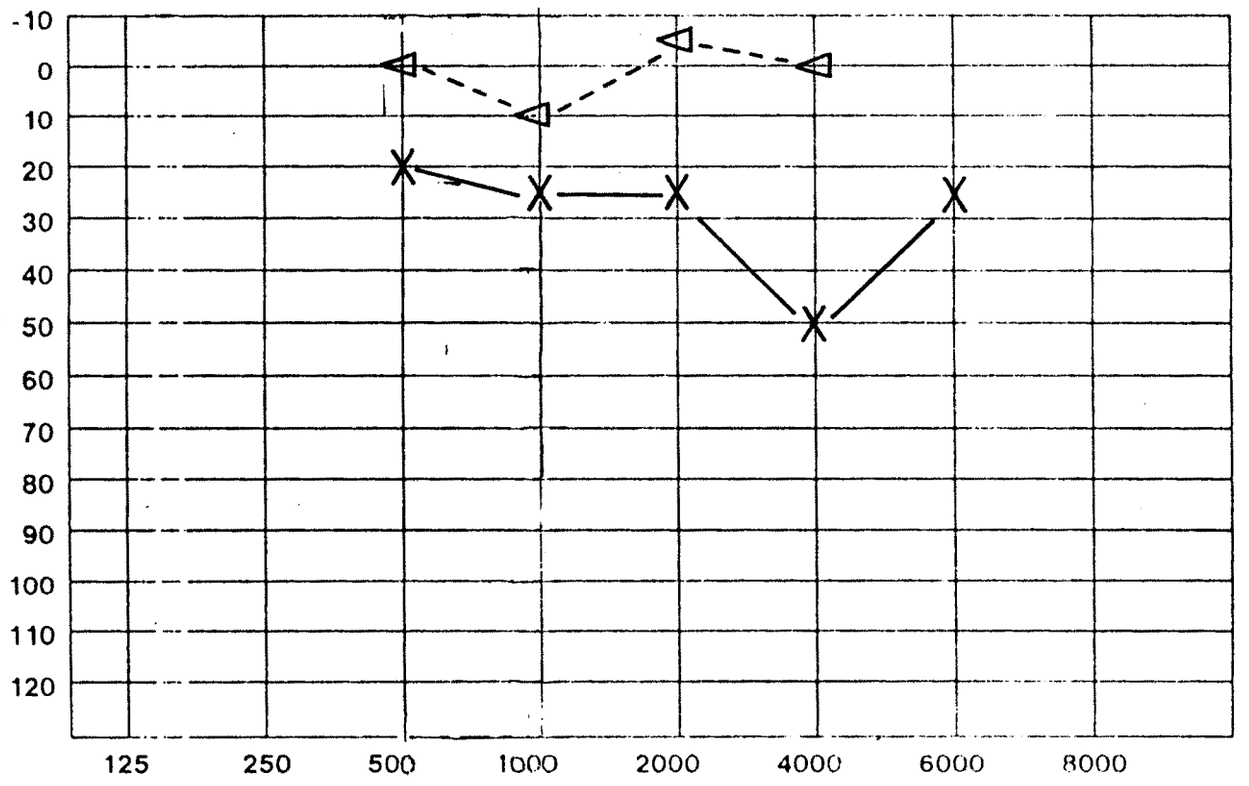


Fig - 2

Left Ear



Name BVD Age 39 Years

Percent Hearing Loss Right Ear 25 Left Ear 23.33

Fig - 1

Right Ear

Pure Tone Audiogram 8

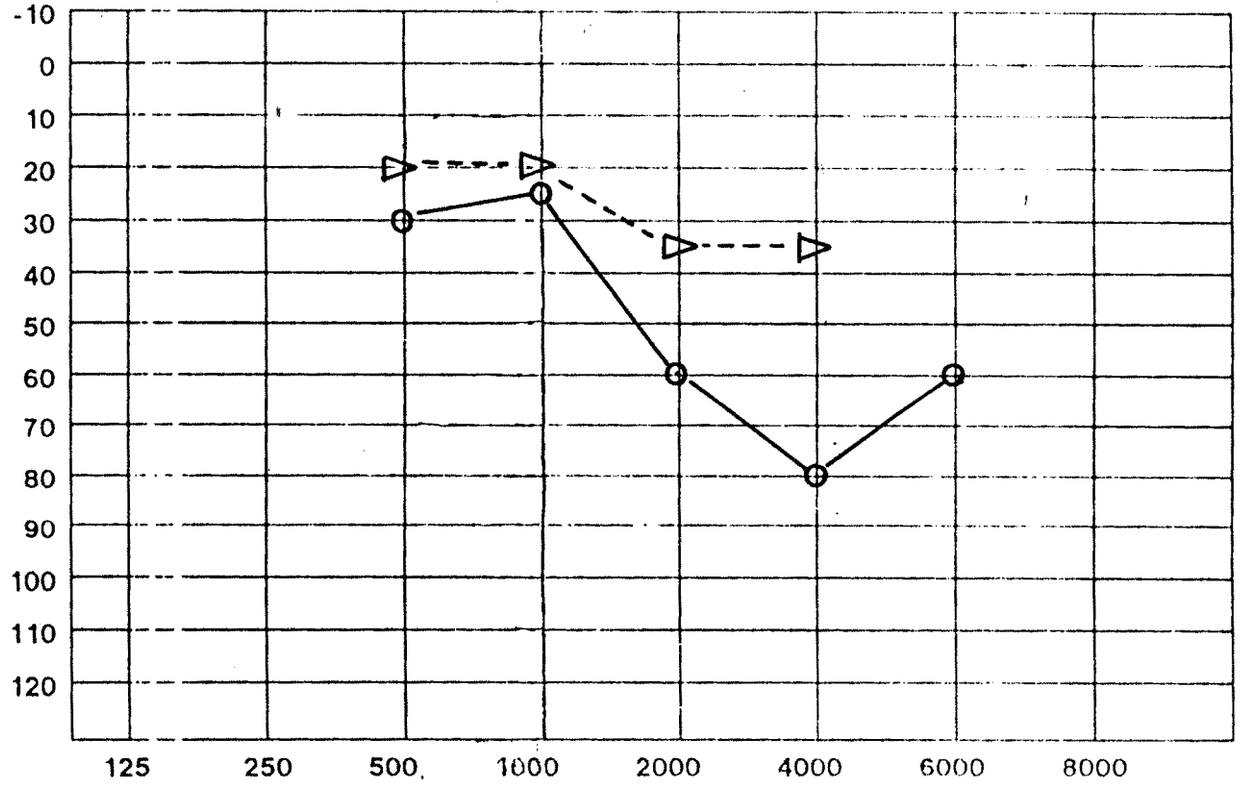
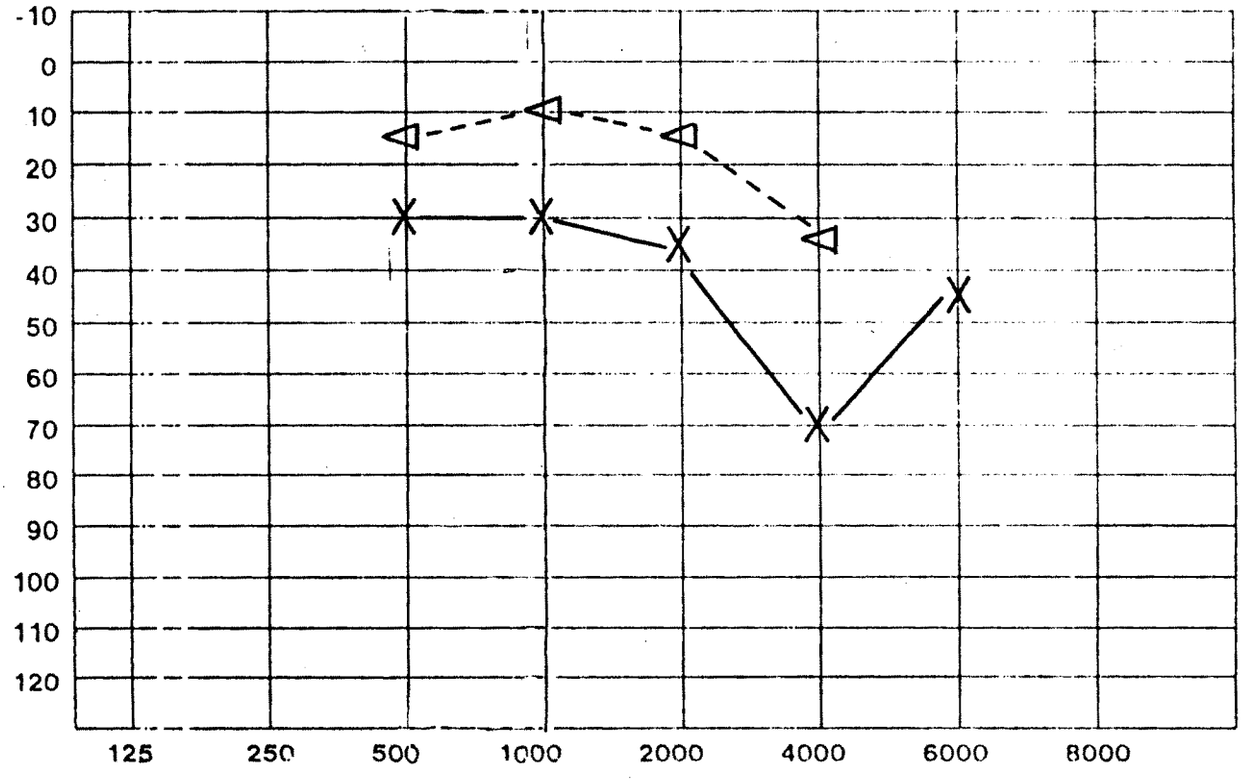


Fig - 2

Left Ear



Name SAJ Age 40 years

Percent Hearing Loss Right Ear 38.3 Left Ear 31.66

Fig - 1
Right Ear

Pure Tone Audiogram 9

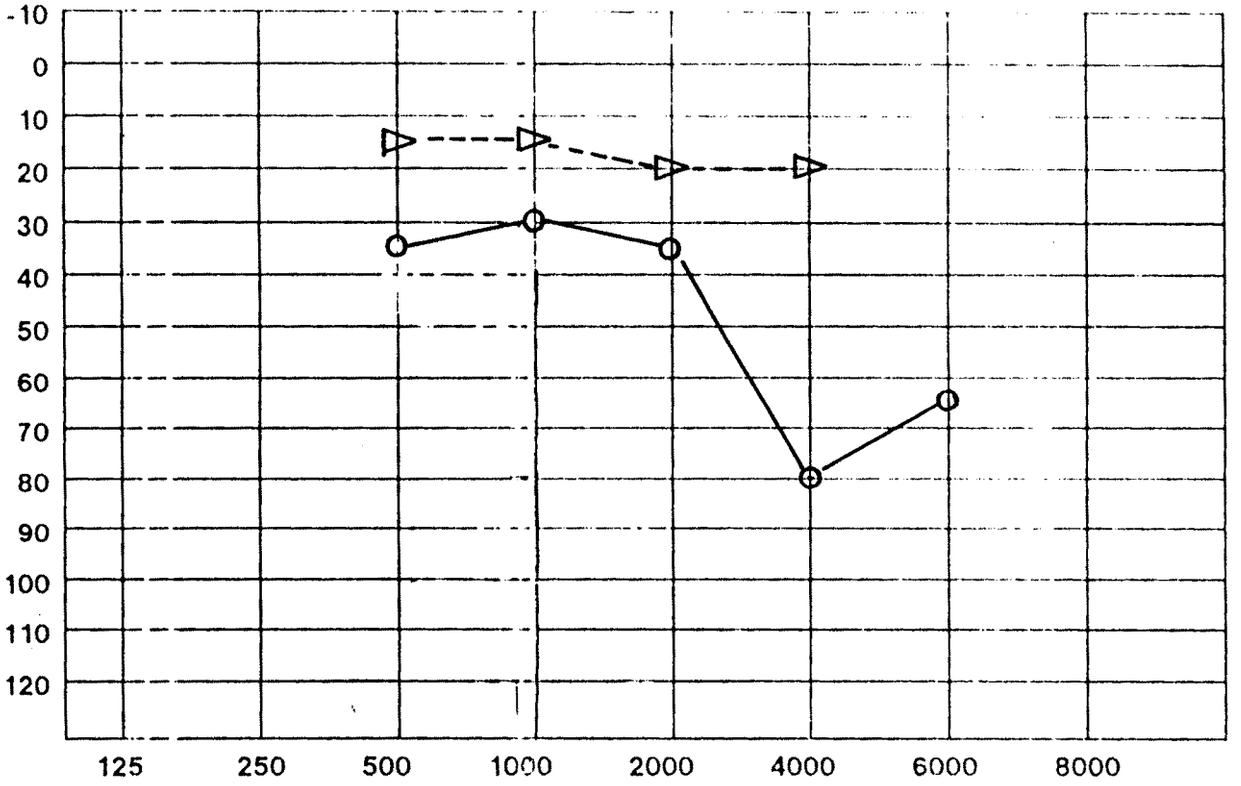
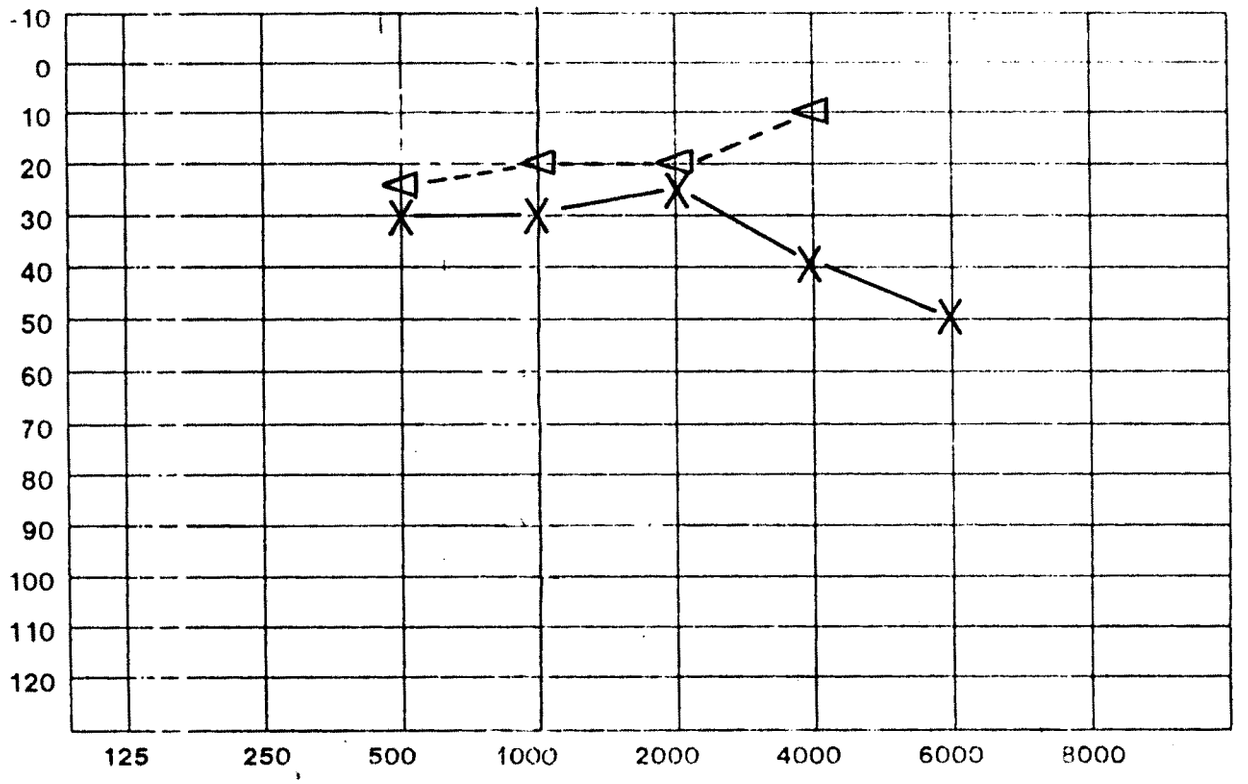


Fig - 2
Left Ear



Name TKH Age 42 years

Percent Hearing Loss Right Ear. 33.33 Left Ear 28.33

Fig - 1

Right Ear

Pure Tone Audiogram 10

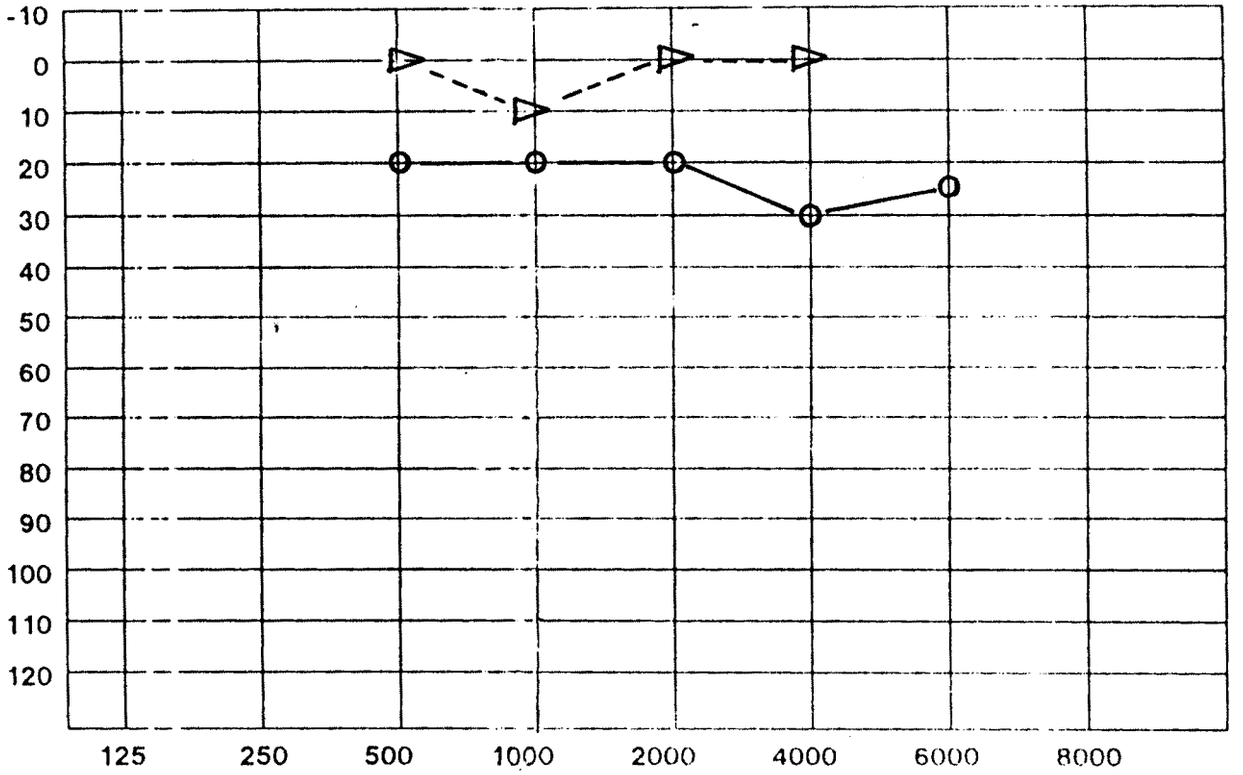
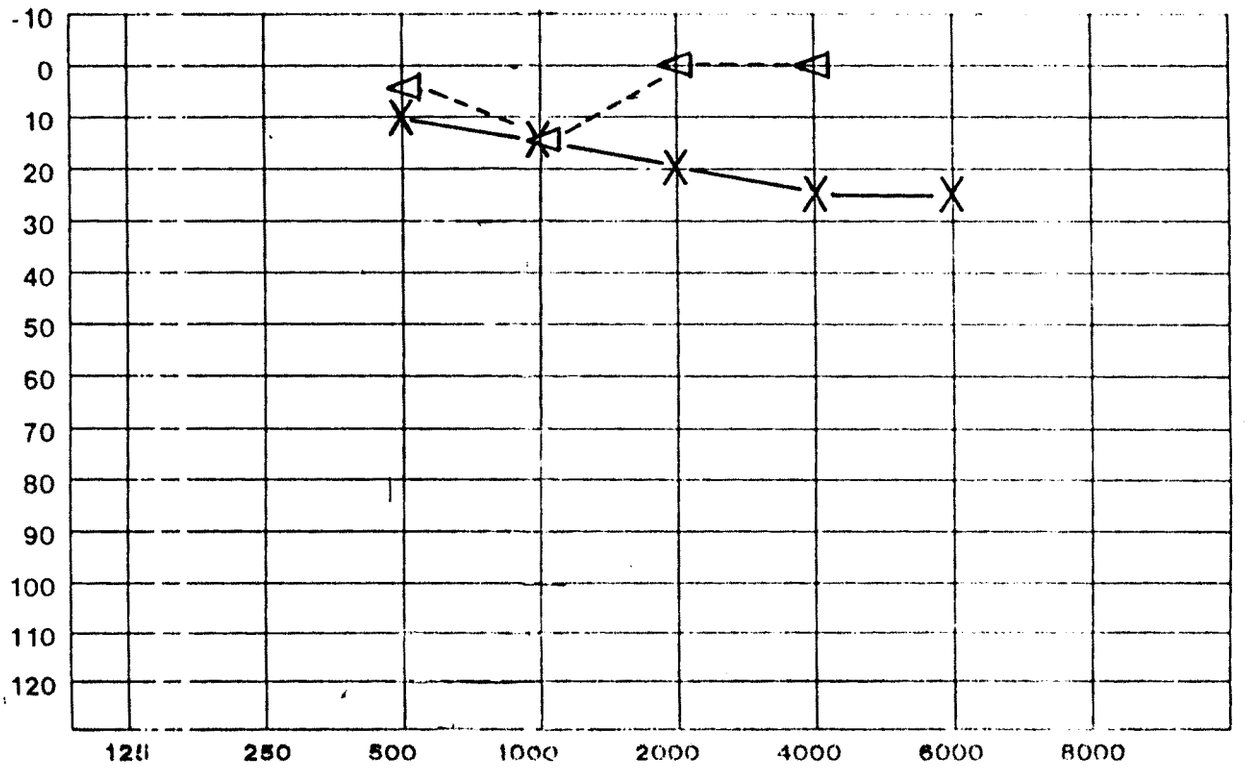


Fig - 2

Left Ear



Name VJJ Age 43 years

Percent Hearing Loss Right Ear 20 Left Ear 15

Fig - 1
Right Ear

Pure Tone Audiogram 11

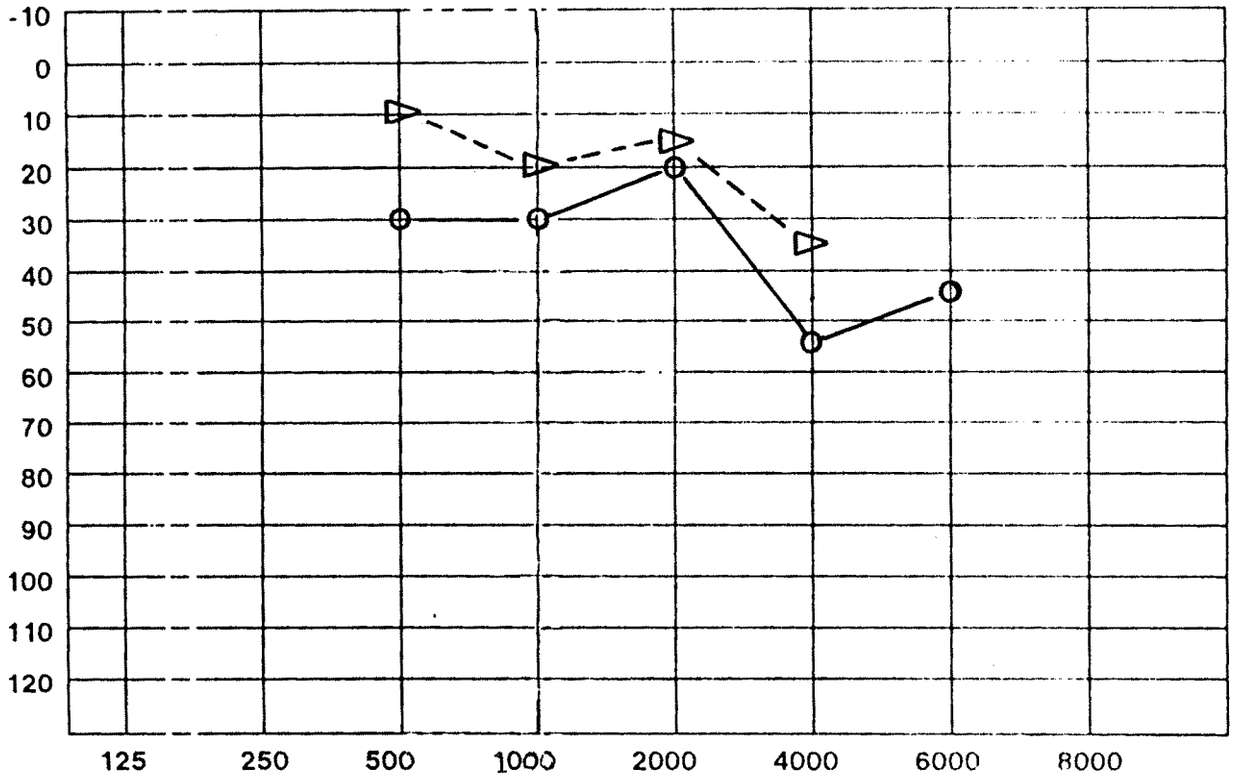
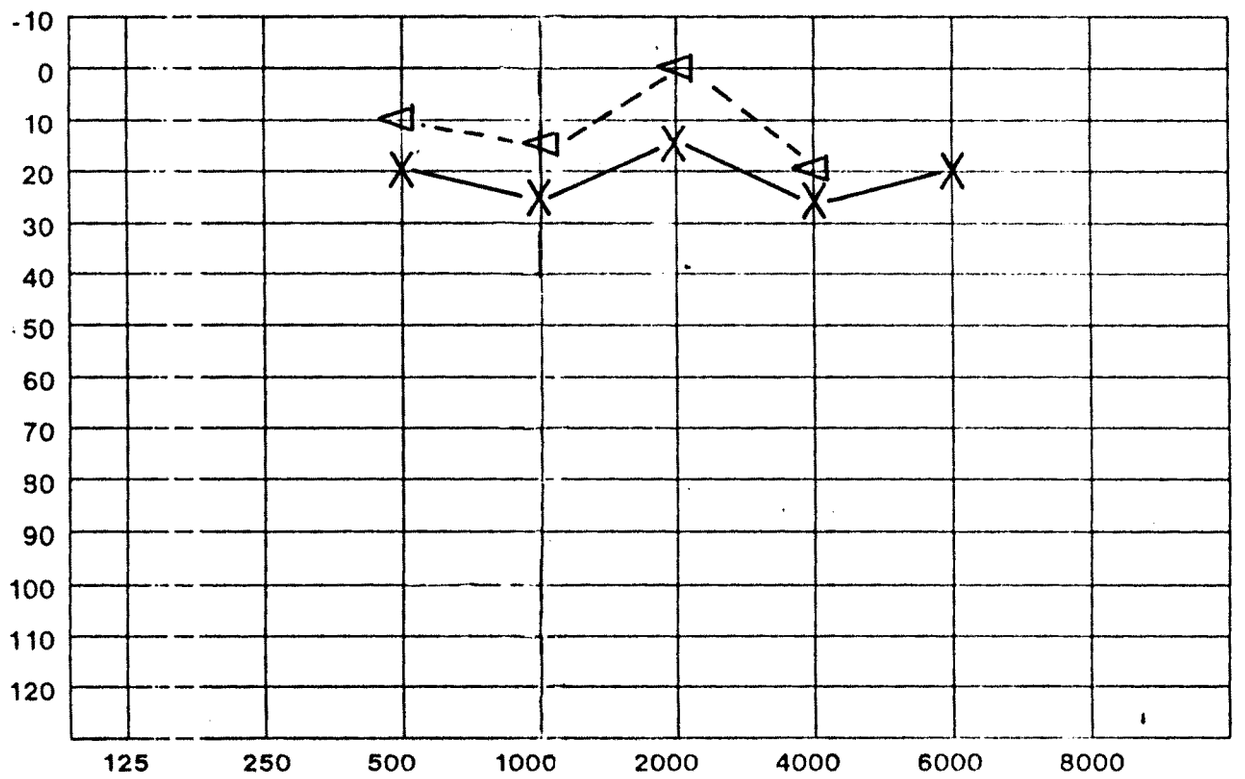


Fig - 2
Left Ear



Name VSK Age 44 years

Percent Hearing Loss Right Ear 26.66 Left Ear 20

Fig - 1

Right Ear

Pure Tone Audiogram 12

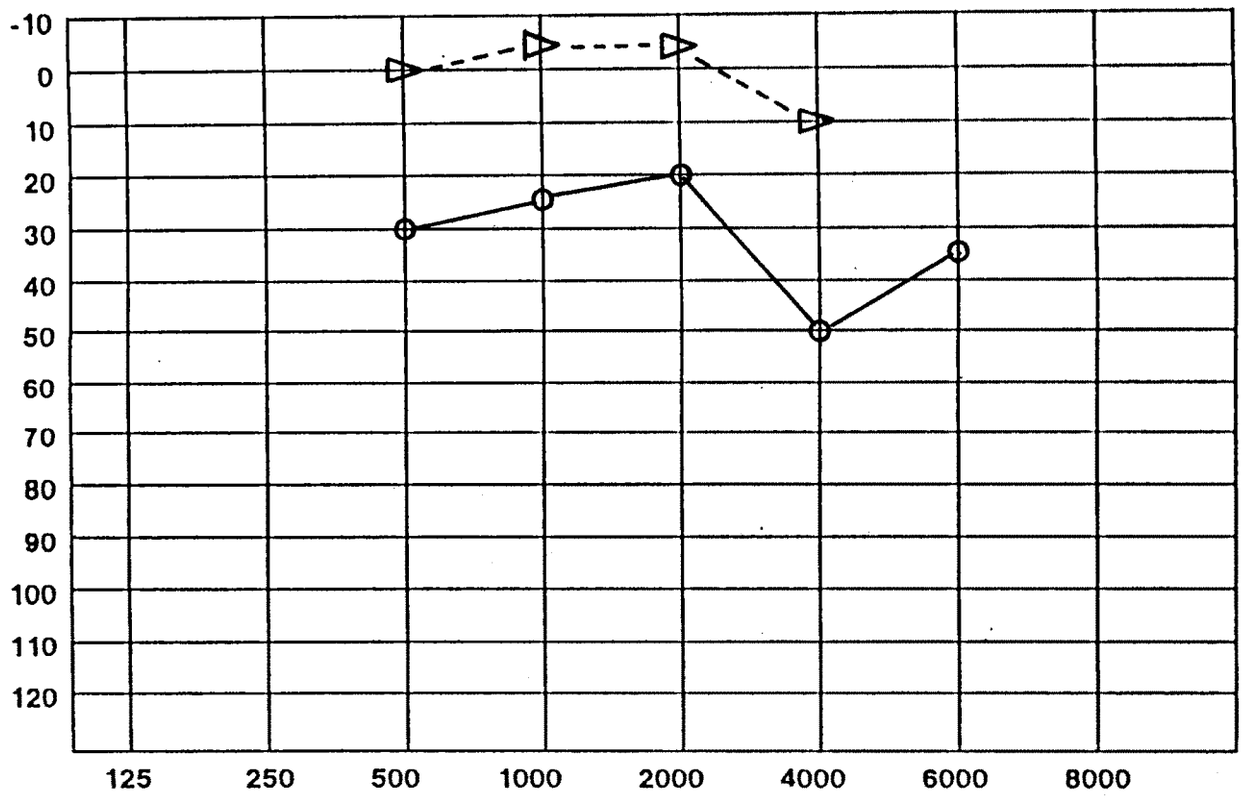
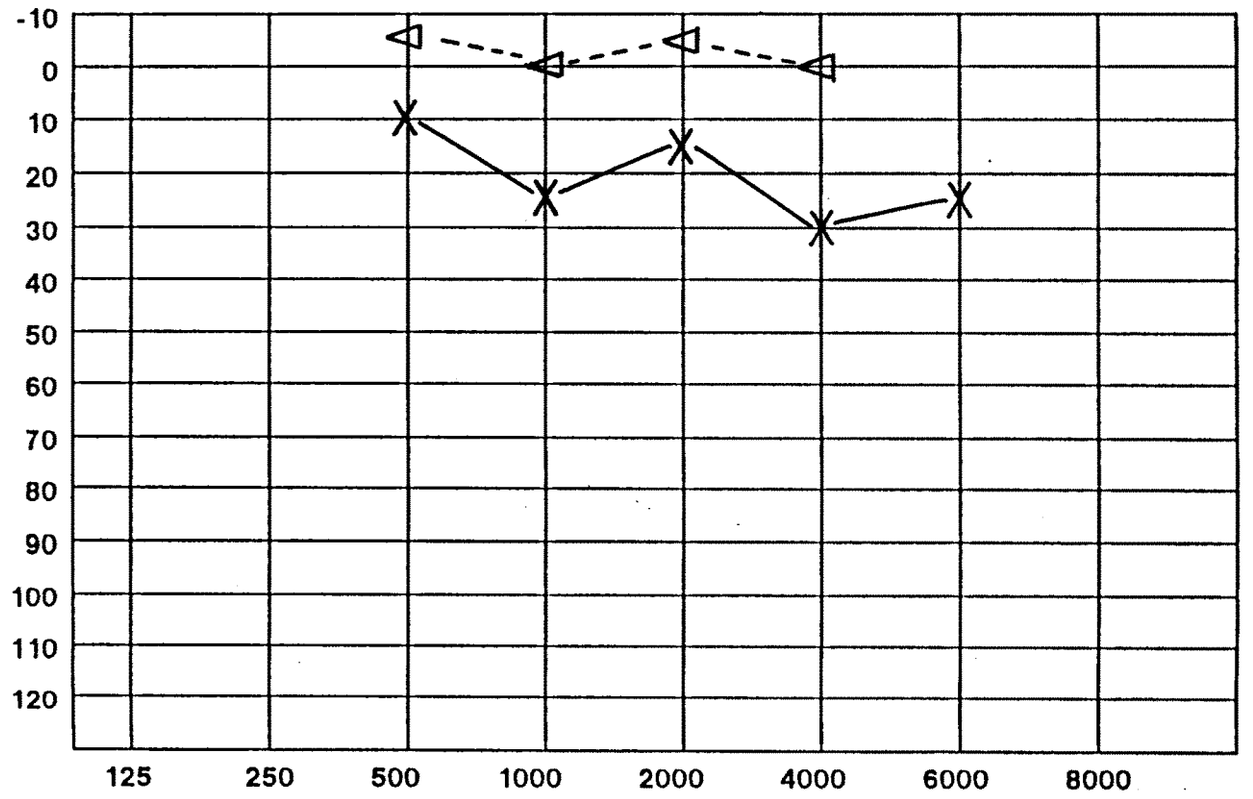


Fig - 2

Left Ear



Name RAB Age 44 years

Percent Hearing Loss ____ Right Ear 25 Left Ear 13.33

Fig - 1

Right Ear

Pure Tone Audiogram 13

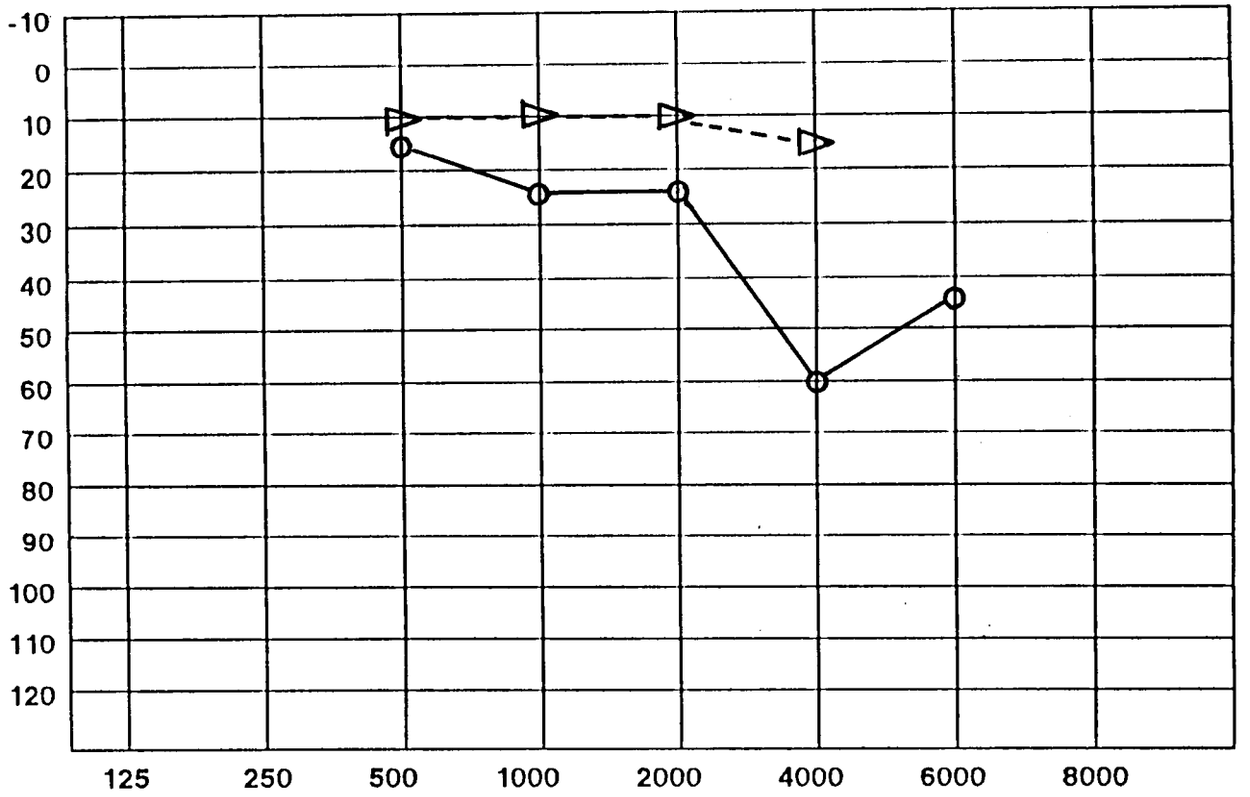
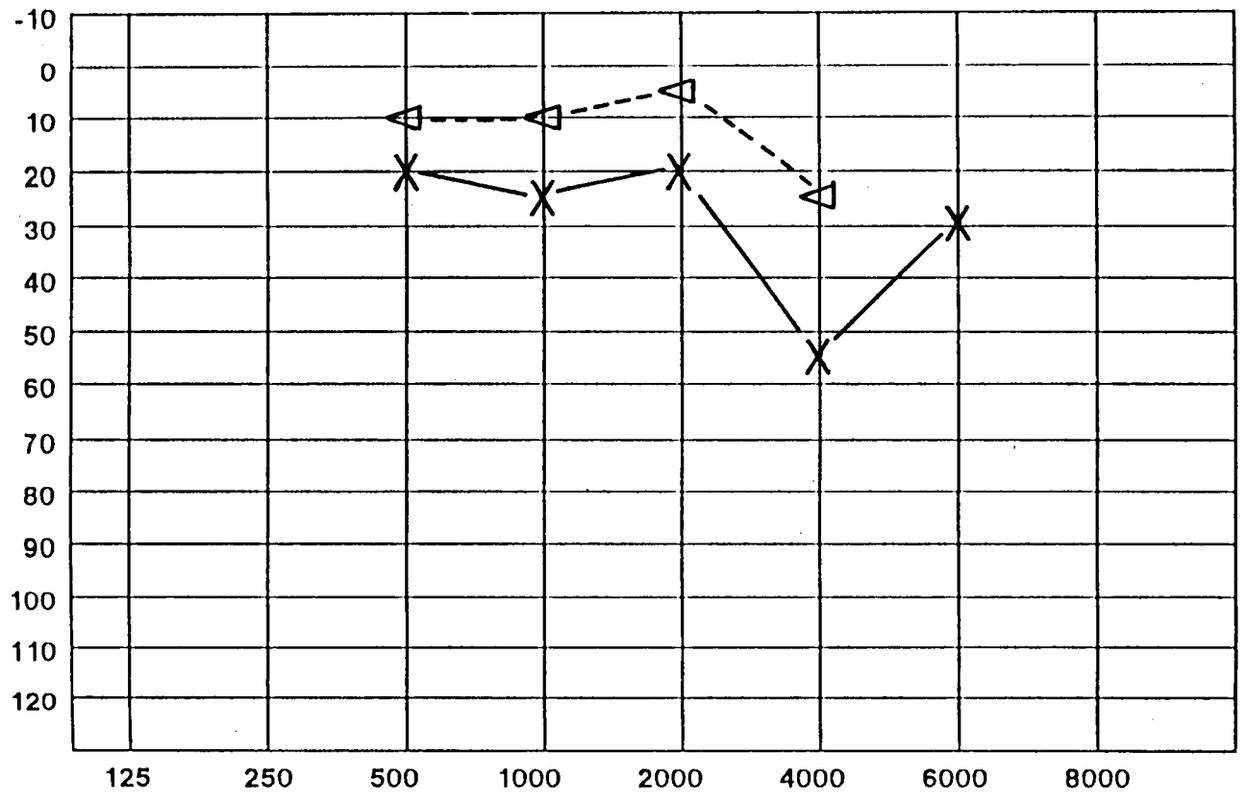


Fig - 2

Left Ear



Name BJP Age 45 years

Percent Hearing Loss . . . . . Right Ear 21.66 Left Ear 21.66

Fig - 1

Right Ear

Pure Tone Audiogram 14

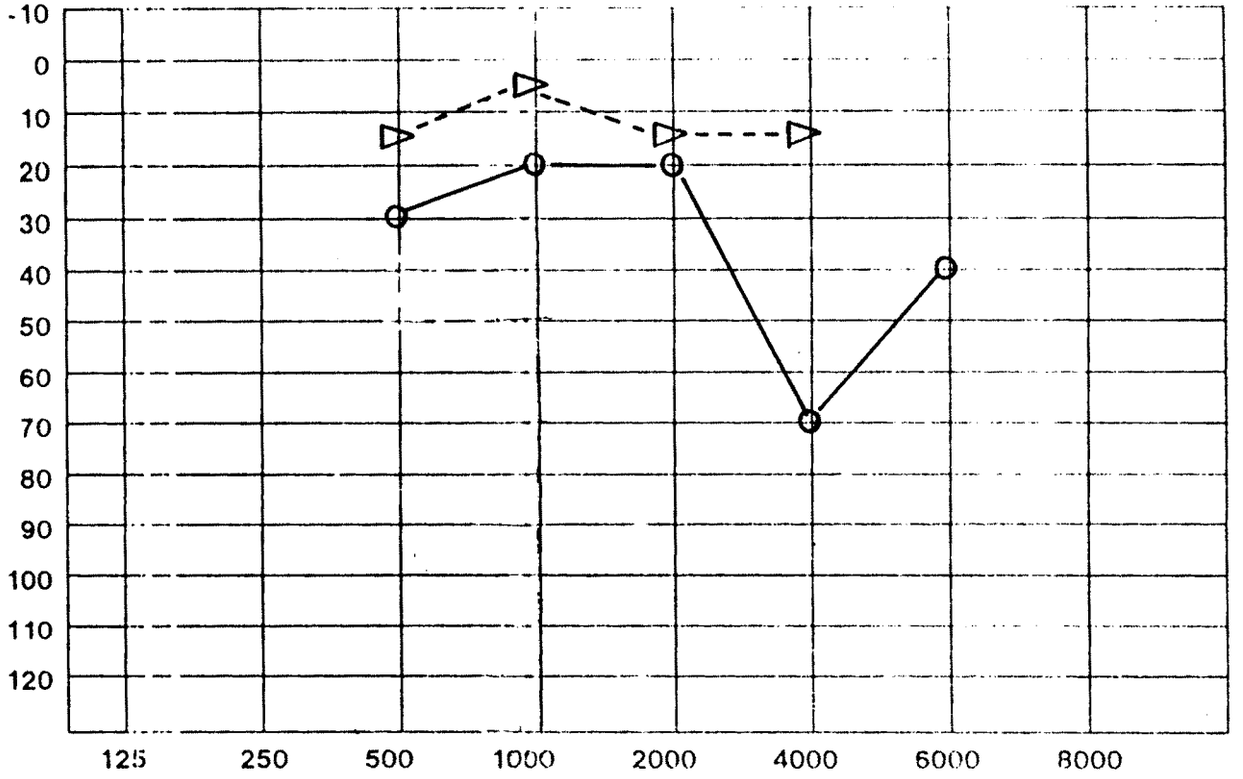
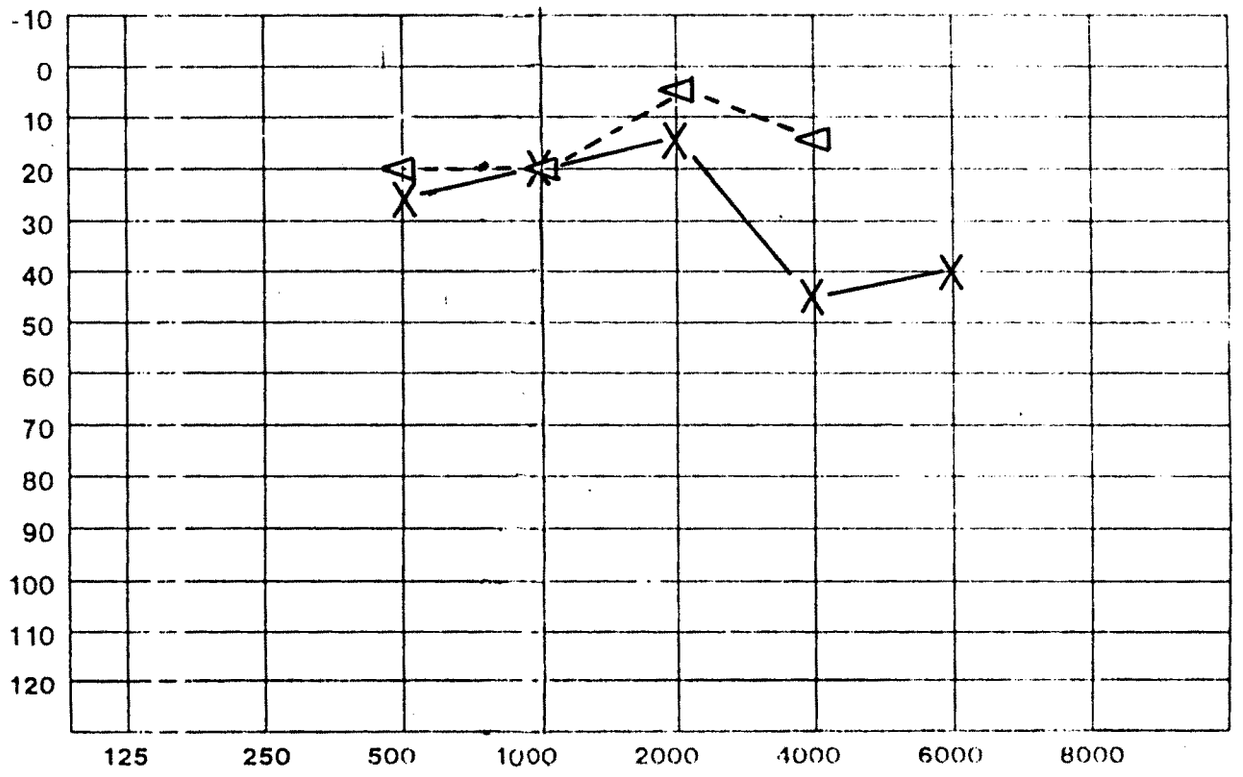


Fig - 2

Left Ear



Name BSG Age 45 years

Percent Hearing Loss Right Ear 23.33 Left Ear 20

Fig - 1
Right Ear

Pure Tone Audiogram 15

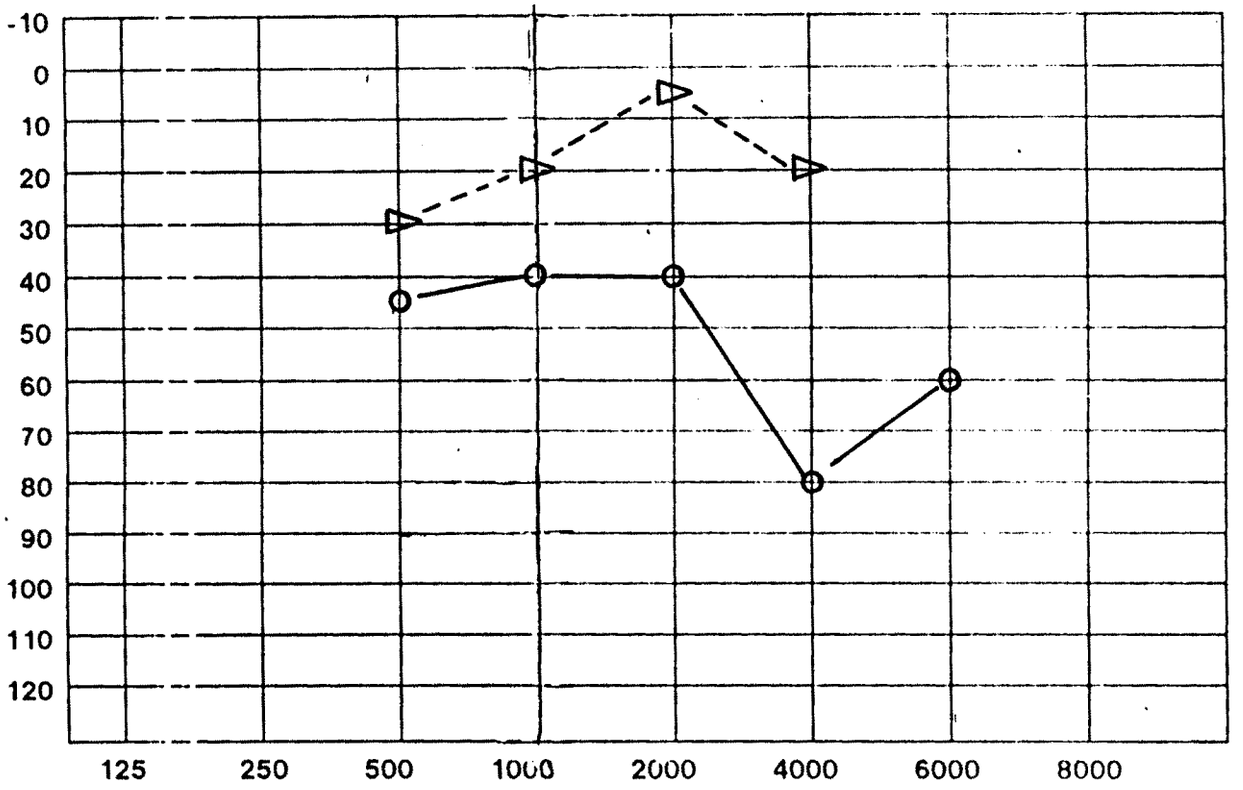
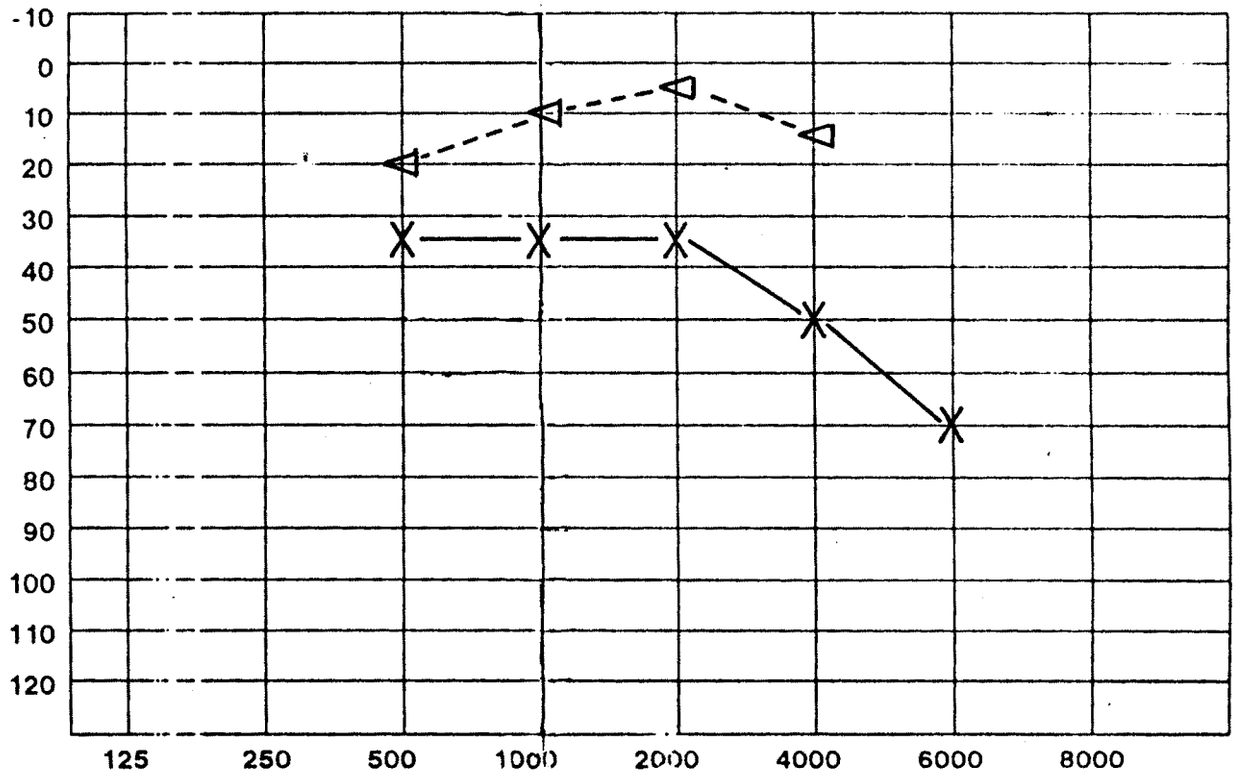


Fig - 2
Left Ear



Name SMP Age 45 years

Percent Hearing Loss Right Ear 41.66 Left Ear 35

Fig - 1

Right Ear

Pure Tone Audiogram 16

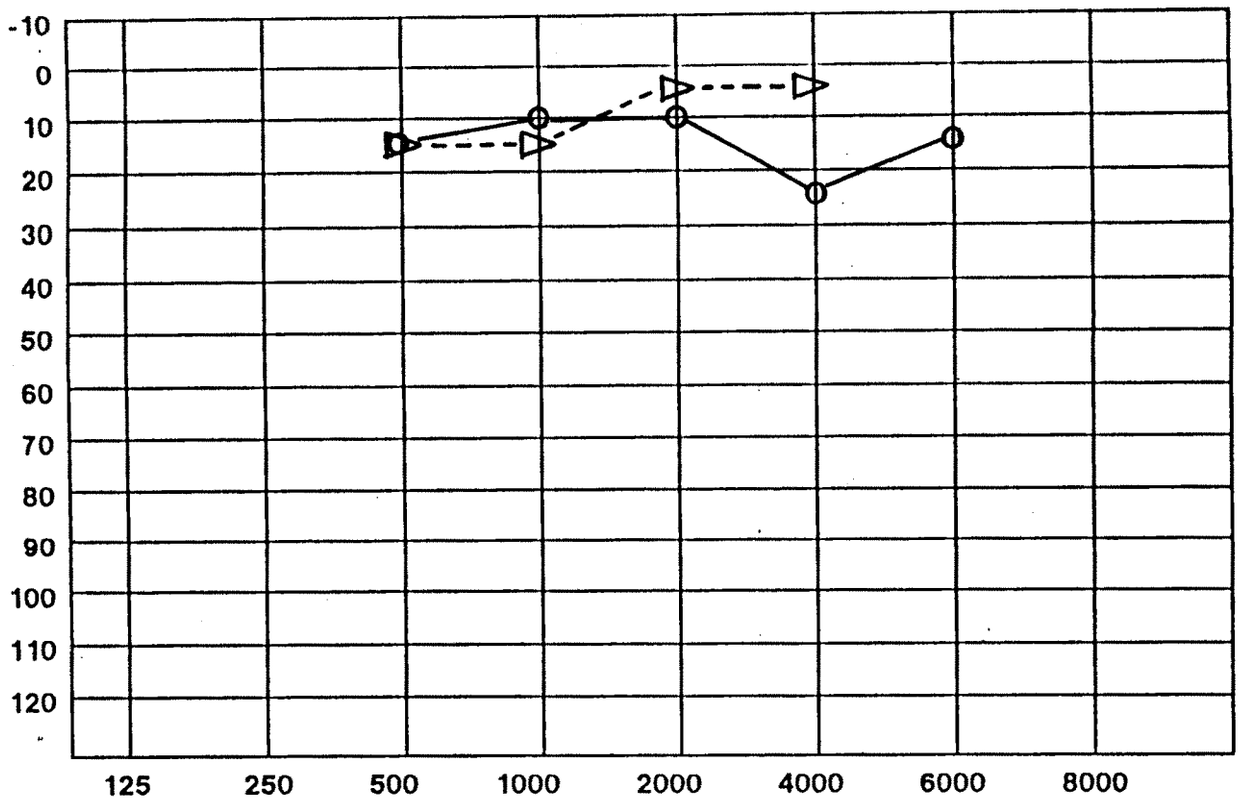
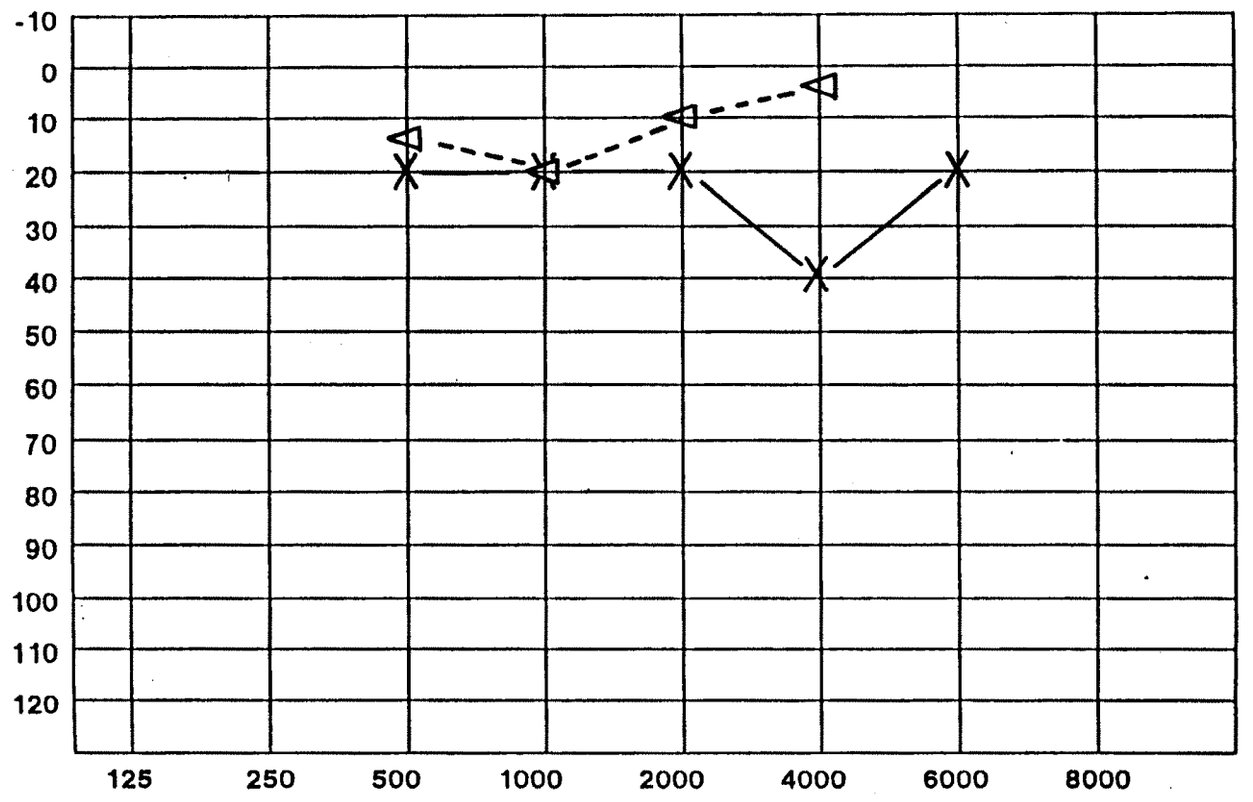


Fig - 2

Left Ear



Name DND Age 30 year

Percent Hearing Loss Right Ear 11.33 Left Ear 20

Fig - 1
Right Ear

Pure Tone Audiogram 17

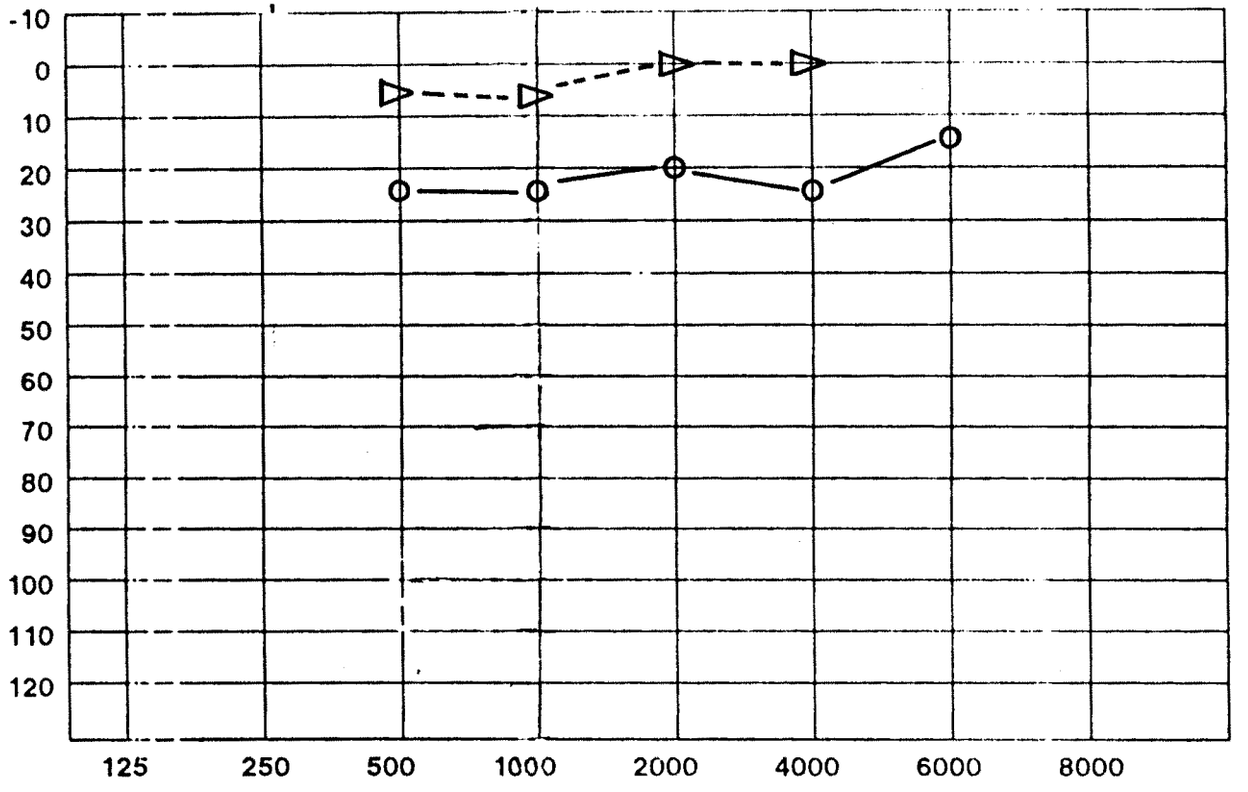
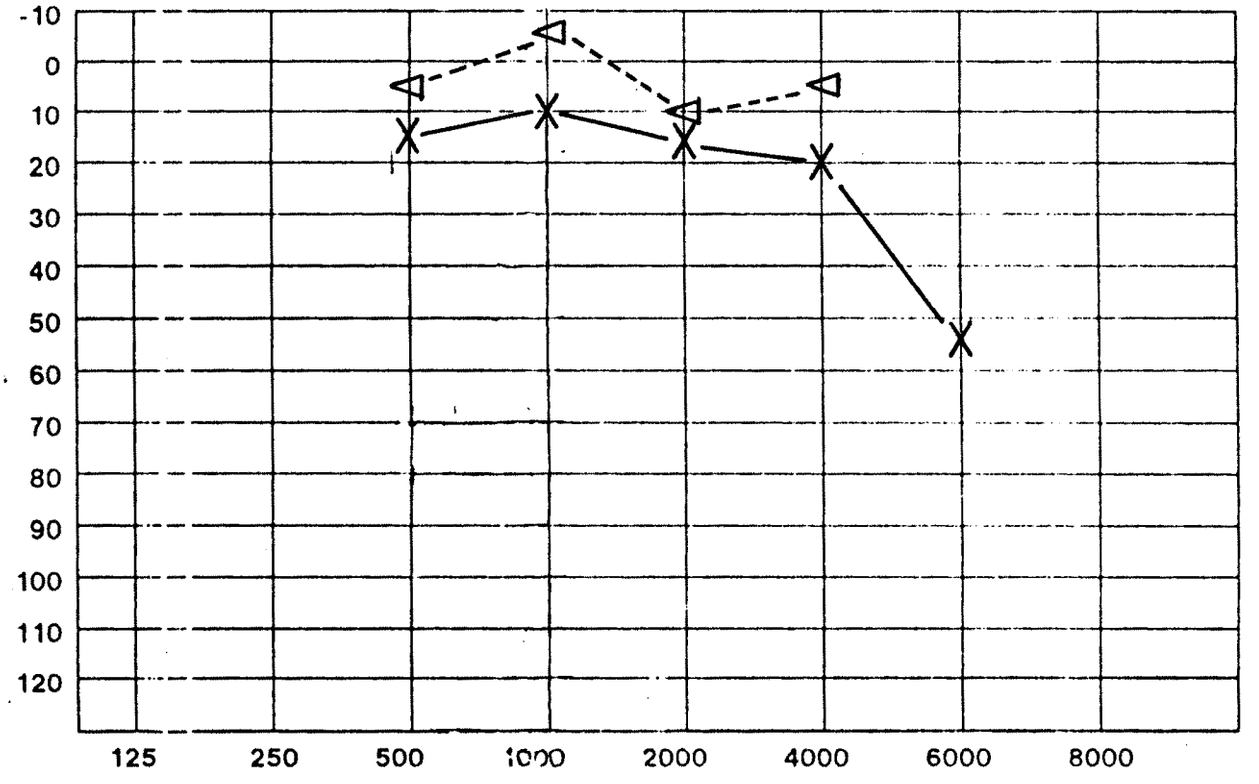


Fig - 2
Left Ear



Name YBB Age 32 years

Percent Hearing Loss Right Ear 23.33 Left Ear 13.33

Fig - 1

Right Ear

Pure Tone Audiogram 18

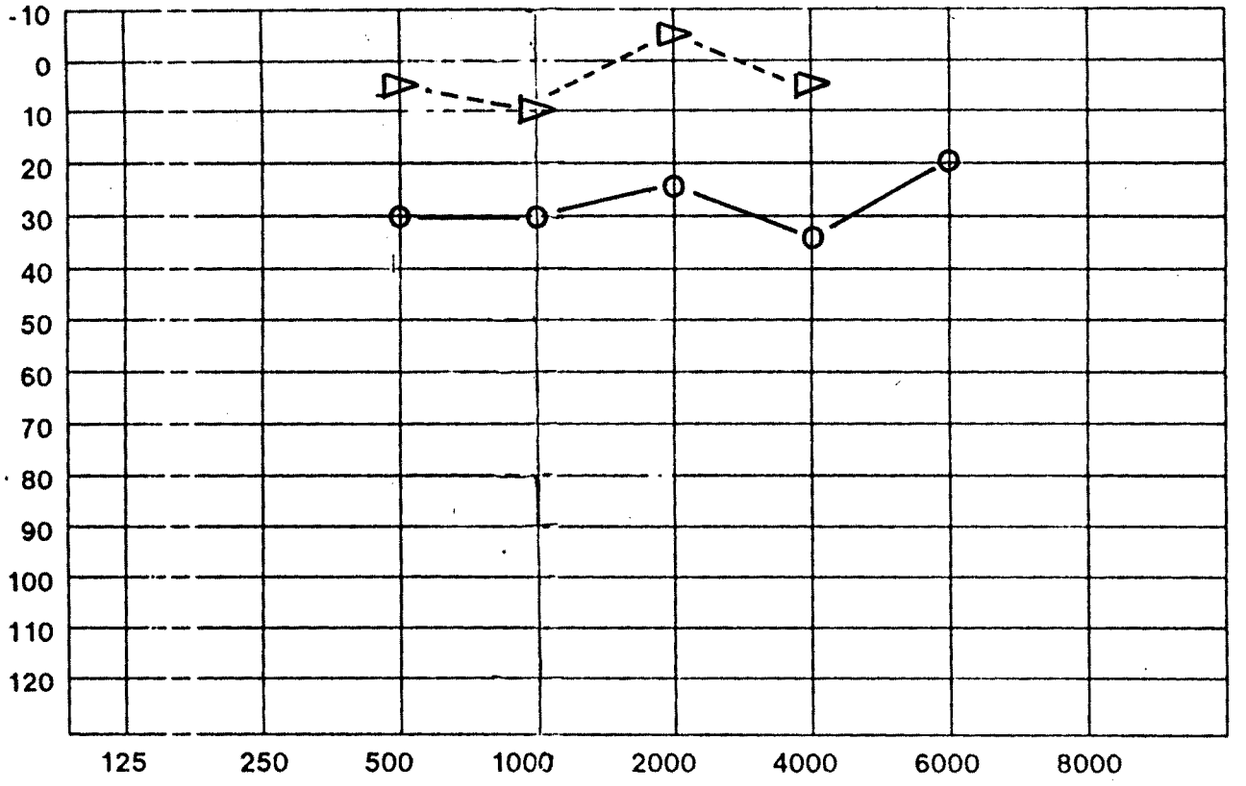
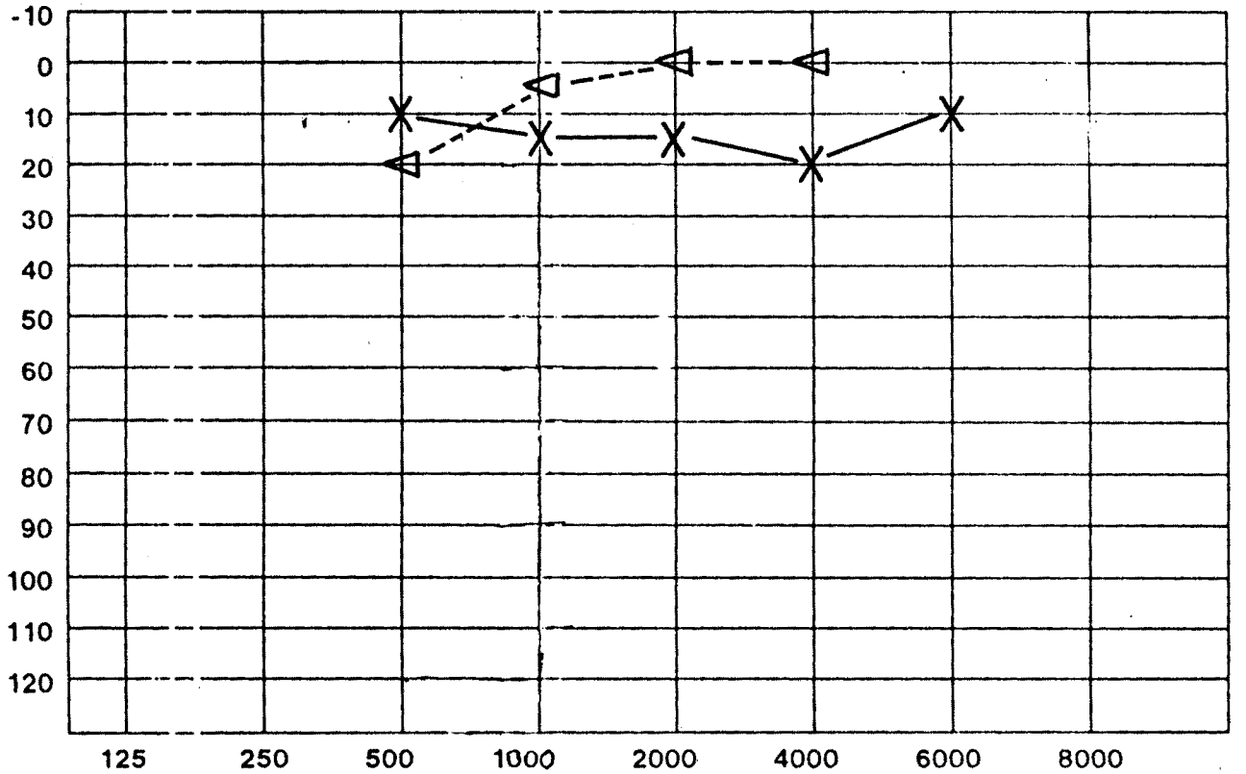


Fig - 2

Left Ear



Name MKB Age 37 years

Percent Hearing Loss Right Ear 28.33 Left Ear 13.33

Fig - 1

Right Ear

Pure Tone Audiogram 19

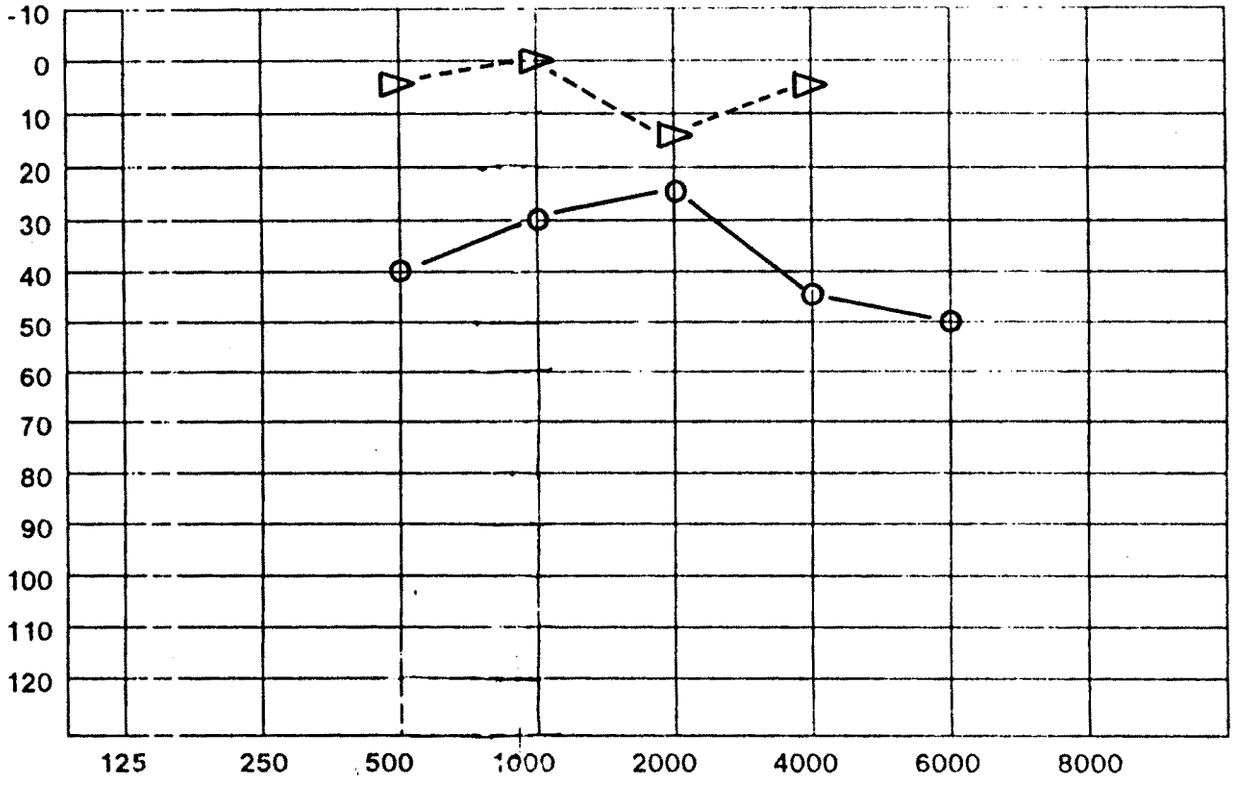
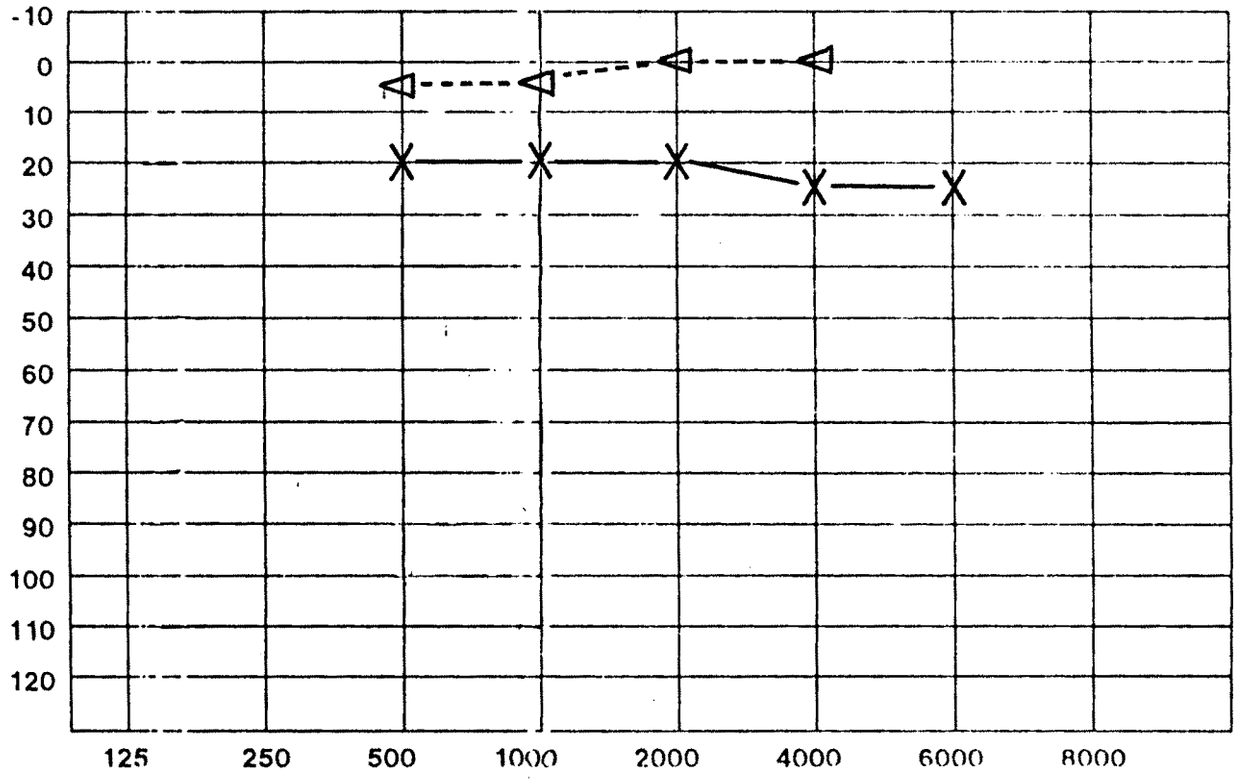


Fig - 2

Left Ear



Name PRG Age 41 years

Percent Hearing Loss Right Ear 31.66 Left Ear 20

Fig - 1

Right Ear

Pure Tone Audiogram 20

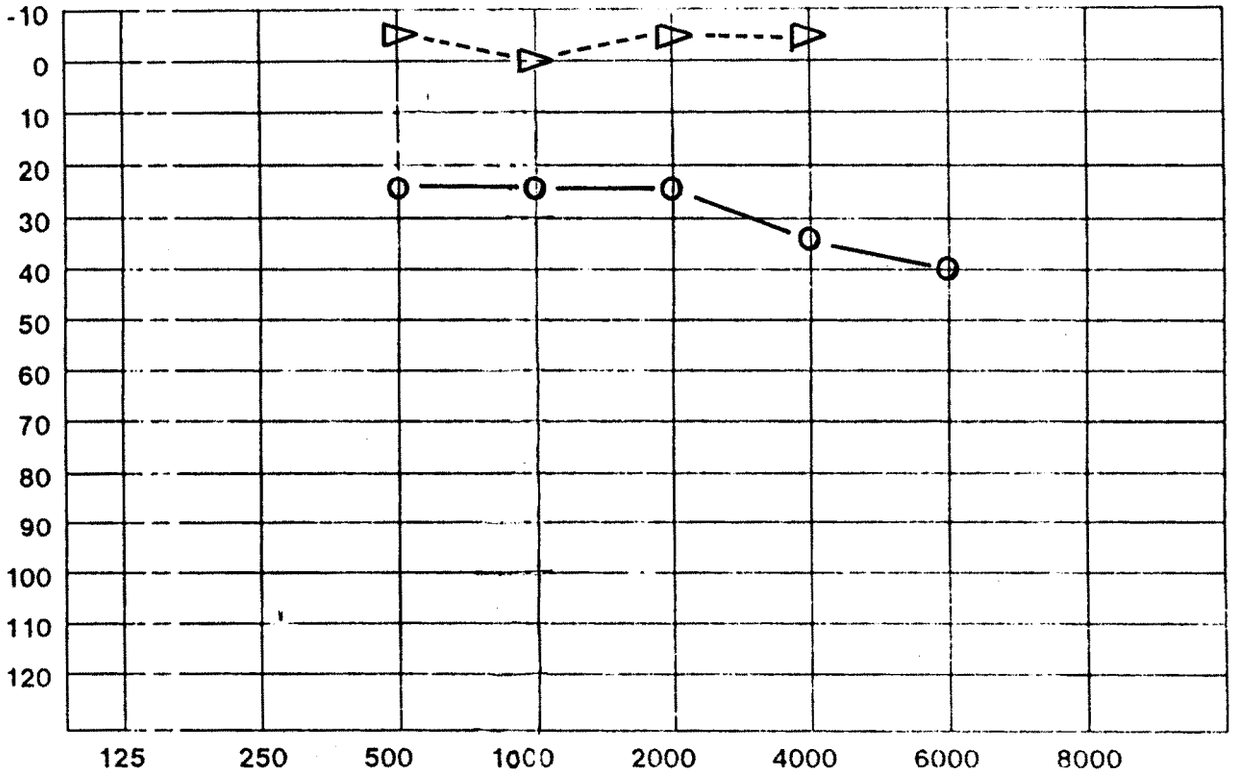
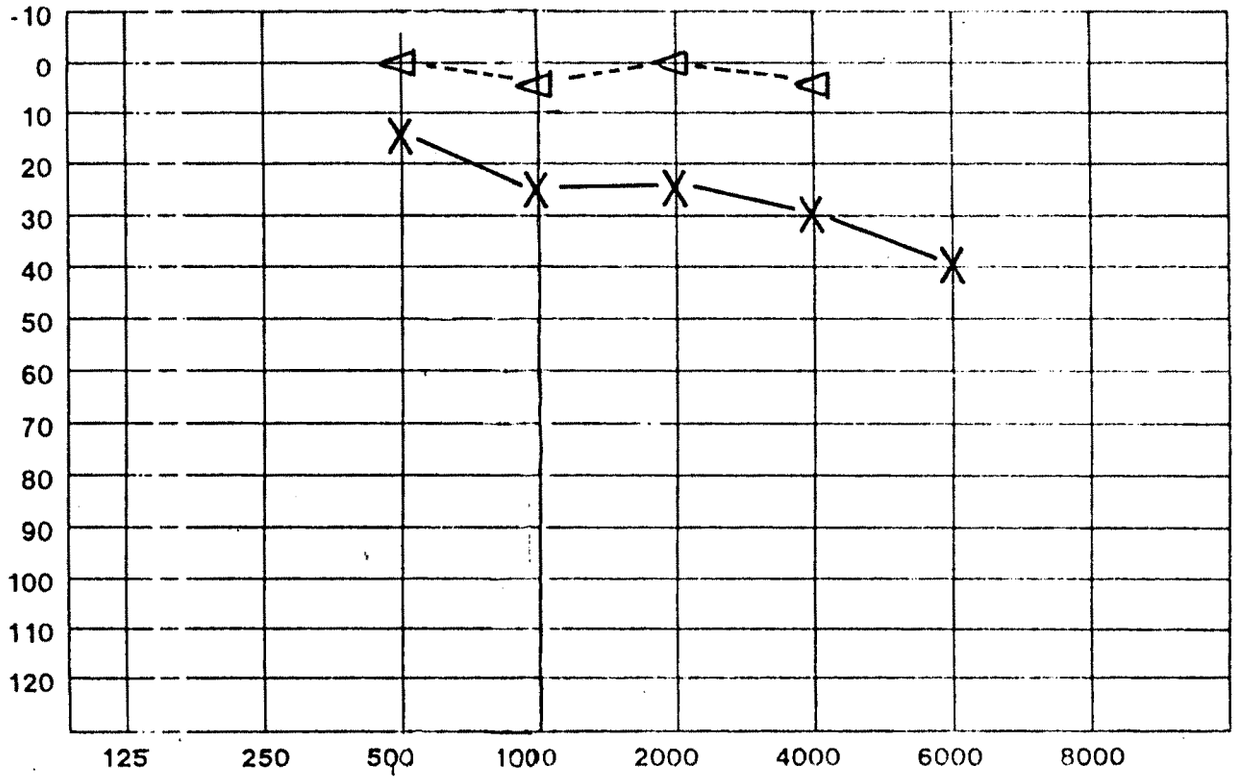


Fig - 2

Left Ear



Name BMS Age 43 years

Percent Hearing Loss Right Ear 25 Left Ear 21.26

TABLE 12

Hearing impairment of the workers in the Ringframe Section

(1) Age Group-A: 25-35 years

AUDIO-GRAM No.	OBJECT	AGE Yrs	SERVICE EXP Yrs	PER CENT HEARING LOSS		HEARING LOSS	
				RIGHT EAR	LEFT EAR	RIGHT EAR	LEFT EAR
1	RGD	28	12	18.33	16.66	No	No
2	SRR	30	12	36.66	13.33	Mild	No
3	SKT	30	11	31.66	18.33	Mild	No
4	BSP	31	10	25.00	11.66	No	No
5	JKG	33	10	41.6	18.33	Moderate	No

TABLE 13

Hearing impairment of the workers in the Ringframe Section

(2) Age Group-B: 36-45 years

AUDIO-GRAM No.	OBJECT	AGE Yrs	SERVICE EXP. Yrs	PER CENT HEARING LOSS		HEARING LOSS	
				RIGHT EAR	LEFT EAR	RIGHT EAR	LEFT EAR
6	SRM	38	22	20	20	No	No
7	BVD	39	24	25	23.33	No	No
8	SAJ	40	23	38.3	31.66	Moderate	Mild
9	TKH	42	21	33.33	28.33	Mild	Mild
10	VJJ	43	25	20	15	No	No
11	VSK	44	22	26.66	20	Mild	No
12	RAB	44	11	25	13.33	No	No
13	BJP	45	30	21.66	21.66	No	No
14	BSG	45	29	23.33	20	No	No
15	SMP	45	16	41.66	35	Moderate	Mild

TABLE 14

Hearing impairment of the office members

(1) Age Group 25-45 years

AUDIO GRAM No.	OBJECT	AGE Yrs	SERVICE EXP. Yrs	PER CENT HEARING LOSS		HEARING LOSS	
				RIGHT EAR	LEFT EAR	RIGHT EAR	LEFT EAR
16	DND	30	07	11.33	20.00	No	No
17	YBB	32	07	23.33	13.33	No	No
18	MKB	37	16	28.33	13.33	Mild	No
19	PRG	41	13	31.66	20.00	Mild	No
20	BMS	43	21	25.00	21.66	No	No

having normal hearing level of the right ear; while hearing level of the left ear is quite normal in all members.

Per cent hearing loss and type of hearing impairment are found higher in the ringframe workers than the office members. Problem of hearing impairment is higher in the right ear than the left ear.

Absenteeism:

From the available mandays report it is clear that CL, PL, SL, paid days leave and unauthorised absenteeism are found higher in the ringframe section.