JPRS 69684

26 August 1977

WORLD

WIDE

TRANSLATIONS ON TELECOMMUNICATIONS POLICY, RESEARCH AND DEVELOPMENT

No. 11

U. S. JOINT PUBLICATIONS RESEARCH SERVICE

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BIBLIOGRAPHIC DATA SHEET	1. Report No. JPRS 69684	2.	3. Recipient's Accession No.
4. Title and Subtitle TRANSLATIONS ON TELECOMMUNICATIONS POLICY, RESEARCH AND DEVELOPMENT, No. 11			5. Report Date 26 August 1977
			6.
7. Author(s)			8. Performing Organization Rept. No.
9. Performing Organization Name and Address Joint Publications Research Service 1000 North Glebe Road Arlington, Virginia 22201			10. Project/Task/Work Unit No.
			11. Contract/Grant No.
12. Sponsoring Organization Name and Address As above			13. Type of Report & Period Covered
			14.
15. Supplementary Notes			

16. Abstracts

This serial report contains translations from the world press and radio relating to worldwide political, economic and technical developments in telecommunications, computers, and satellite communications. Coverage will be worldwide with focus on France, Federal Republic of Germany, United Kingdom, Italy, Japan, the USSR, People's Republic of China, Sweden, and the Netherlands.

17. Key Words and Document Analysis. 17a. Descriptors

Worldwide
Computers
Satellite Communications
Electronics and Electrical Engineering
Telecommunications
Telemetry

17b. Identifiers/Open-Ended Terms

17c. COSATI Field/Group 09B, C, F, 17B, 22B

18. Availability Statement Unlimited Availability Sold by NTIS Springfield, Virginia 22151	19. Security Class (This Report) UNCLASSIFIED	21. No. of Pages 53
	20. Security Class (This Page UNCLASSIFIED	22. Price

FORM NTIS-35 (REV. 3-72)

THIS FORM MAY BE REPRODUCED

USCOMM-DC 14952-P72

JPRS 69684

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TRANSLATIONS ON TELECOMMUNICATIONS POLICY, RESEARCH AND DEVELOPMENT

No. 11

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BRIEFS

DIRECT COMMUNICATIONS WITH CUBA--According to an official announcement from the Secretariat of State for Communications, direct telephone communications will be established between Angola and Cuba starting today. The inauguration of direct communications between the two countries will take place in conjunction with the 26 of July commemorative ceremonies, and it is probable that the speech to be given in Havana by Commander Fidel Castro will be retransmitted directly by the Angolan National Radio at 2200 hours. Measures are already being taken to insure technical coordination between the CTT [Posts, Telegraph and Telephone] and EPTEL [Public Telecommunications Enterprise] for the purposes of the broadcast. [Text] [Luanda JORNAL DE ANGOLA in Portuguese 26 Jul 77 p 1] 10,992

PAN-AFRICAN TELECOMMUNICATIONS NETWORK--Gabriel Tedros of Ethiopia has been in Luanda since 11 July in representation of the International Telecommunications Union. The visit by this consultant is primarily for the purpose of studying the possibilities for incorporating the People's Republic of Angola into PANAFTEL (Pan-African Telecommunications Network), which is being established to interconnect the countries of Africa. During his stay, the representative of the International Telecommunications Union has already visited the telecommunications installations of the Luanda area, and in particular the telephone exchanges, the satellite communications station at Funda, and the Center for Vocational Training in Telecommunications and Electronics at Luanda Airport. He was accompanied on these visits by the Director General of Telecommunications, Comrade Humberto Bessa Victor, and also took the opportunity to confer directly with the directors of the Postal and Telecommunications Services, Public Telecommunications Enterprise, and Civil Aeronautics Service, and with top officials of the individual installations visited. Tedros is scheduled to continue his stay in Angola for several more days. [Text] [Luanda JORNAL DE ANGOLA in Portuguese 26 Jul 77 p 2] 10,992

ADMINISTRATIVE TELECOMMUNICATIONS CENTER--The present communications service of the Directorate of Information and Security of Angola is going to come under the direct jurisdiction of the prime minister, and will be known as the Administrative Telecommunications Center (CTA), according to a decree issued by the office of president of the republic just published in the official gazette. According to the aforementioned decree, the organic statutes governing the Administrative Telecommunications Center just established have also been approved. The purpose of the aforesaid center will be to establish and ensure the radio communications considered necessary in support of the executive department of the government, provide for the security of the materials transmitted, and to keep in operating condition the communications equipment and auxilliary components which constitute the Administrative Telecommunications Network (RTA). On the other hand, according to the published decree, the facilities belonging to the defunct Ministry of Information which have to do with the communications service are also transferred to the center just established. Finally, the Administrative Telecommunications Network will be under the control of the center. [Text] [Luanda JORNAL DE ANGOLA in Portuguese 21 Jul 77 p 2] 7428

CSO: 5500

SECOND EARTH STATION TO GIVE GLOBAL COMMUNICATION

Kampala VOICE OF UGANDA in English 25 Jul 77 p 5

[Article by Zulf Khalfan]

[Text] **ANOTHER earth satellite station will mushroom on Uganda's landscape in less than two years time.**

Though it will follow the already completed — and about to be commissioned — Arua earth station, it was in fact the originally planned earth station for the country.

This one will be a much bigger project than the Arua one, both in costs, size, and capacity. Technically, it will be known as earth satellite station Standard "A", while the Arua station is known as Standard "B".

For the layman, however, the basic structural features of the two main types of earth stations are more or less the same in appearance — the main apparent difference being in their relative sizes.

Each consists of a dome-shaped structure or antenna, sometimes called the "dish", a microwave link tower, a power station with stand-by diesel power generators, and administrative offices.

The TV link is two-way capable of receiving and transmitting, telecasts between the International Telephone Exchange in Kampala, and the UTV studios at Nakasero Hill.

Similarly, the microwave link is for telephone and TV signals between the earth station and the International Telephone Exchange.

The Standard "A" station will have a fully electronic telex switching system, with an initial capacity of 24 trunks.

While the Arua standard "B" station will have to use only one satellite station to get its transmissions in and out of the country known as "gateway" station, the proposed Standard "A" station will be capable of communicating through a number of satellites — at least this is how those in the know put it.

In a joint UTV-VOICE discussion, recently, with representatives of Nippon Electric Co Ltd (NEC) of Japan, contractors of the proposed Standard "A" station, those of the Posts and Telecommunications, and Ministry of Transport, Communications, and Works it was indicated by the Posts' Chief Project Engineer Mr Eliphaz Mbabaali, that most of the planning work for the civil work on the site, 16 km from Kampala, somewhere near Mukono, has been completed.

According to the information given by the Harris Corp — contractors for the Arua station — the gateway station for the Arua station will be Goon Hilly and from there to various points, while according to the NEC representative, Mr Kenyi Yoda, Gen Manager for Communication Systems Division, the proposed Standard "A" station will be capable of linking with a number of countries directly.

Some of these links will be on a "pre-assigned" basis, that is they will be permanent, while some of them will be on "demand basis," that is they will be available only when required.

The Arua station was a short-term project started and completed within a record time, mainly to make Uganda independent in her communications with the outside world.

However, some questions have been raised since the public came to know of the Arua Satellite Station, on the degree of independence of that station.

In an earlier interview with the VOICE a Harris Corp. representative maintained that though the Goon Hilly earth station is in Britain, according to INTELSAT regulations, Britain cannot interfere with any communications from various points and countries.

Of course all countries, including Kenya, where the Longonot earth station is located, have bilateral agreements with Britain for transmitting their communications through the Goon Hilly gateway station.

The NEC representative, Mr Yoda, quotes his company stating that: "The reliability of communications (of a Standard "B" station) depends on the political goodwill and cooperation of the government owning the gateway station." which implies that some control exists on the gateway station.

According to Farooq Malik, UBC's Superintendent Engineer, Goon Hilly is one of the earth stations through which many earth stations of world are linked. So Uganda would not be an exception.

Malik maintains that almost all earth stations have to abide by INTELSAT regulations, to which Uganda is a signatory. Thus if a country, after agreeing to let in and out another country's communications, breaks any of these regulations, the INTELSAT Board of Governors have the power to "switch off" its earth station.

Basically, it seems, whether it is standard "A" or Standard "B" from an earth Station, signals have to be transmitted to a satellite, stationed about 36,000 kms in orbit owned by INTELSAT.

Except in very rare cases, and from there to either other earth Stations or directly to various points.

The proposed Uganda Standard "A" station will have direct communication with seven destinations: Zaire, Nigeria, USA, UK, West Germany, Italy, and Saudi Arabia. These will be on a "pre-assigned basis".

It will also have direct communication with 31 destinations on "demand assigned basis." These include several countries in Latin America, North America, Africa, Western and Eastern Europe.

While the Arua station will have a capability of 24 channels, the Standard "A" station will be equipped with 150 channels, which can be extended to 972 channels, on a pre-assinged basis.

It will have an additional capacity of 12 channels, which can be extended to 60 chanels. All of these combined will be capable of receiving and transmitting telephone, radio, telex, and TV (colour of monochrome) signals.

In the joint UTV-VOICE discussion, attended also by Mr Louis Kerulik, Under Secretary, Communications, Ministry of Transport, Communications and Works, I was interested in knowing how the proposed satellite station would affect the already completed Standard "B" station in Arua.

Will it make the Arua station obsolete or will it be possible for the two to be coordinated to supplement each other.?

The NEC representative said the two can be coordinated jointly to serve a national and international communications system.

More specifically, NEC has recommended in a (proposed?) symposium with the Uganda Government, that the Arua Standard "B" station be used "temporarily" with INTELSAT's Atlantic Ocean region satellite.

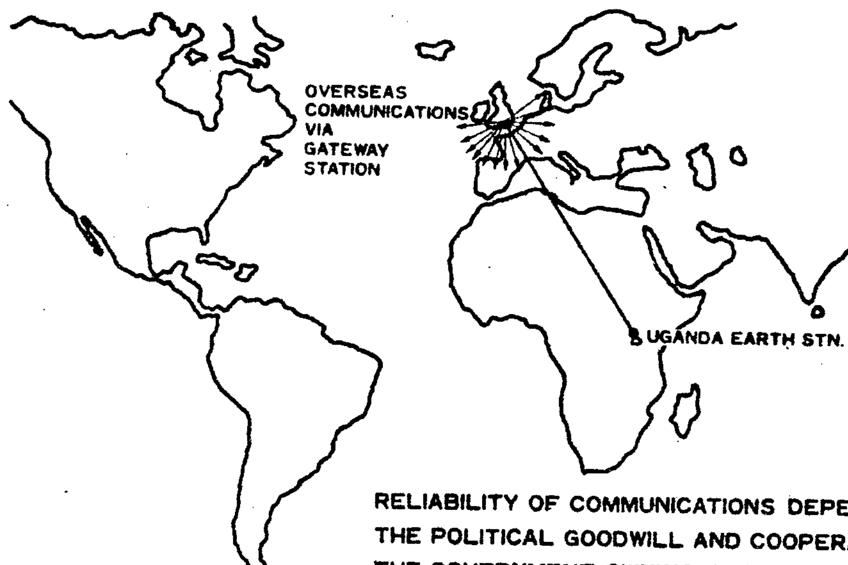
When the proposed Standard "A" Station is completed, by about the end of 1978, the Arua station should be repositioned to operate with INTELSAT'S Indian Ocean region satellite, to offer Uganda international communication with the Middle and Far Eastern regions

Thus by coordinating and merging the two stations into a single national system, Uganda could have a complete global international communication as is the case, reports NEC in Egypt, Libyan Jamahiriyah, and Poland.

Alternatively, NEC is recommending that the Harris—built Standard "B" station be totally integrated into the existing domestic satellite communications network in Uganda.

It will be up to the Uganda government to consider and decide these recommendations. If and when that is accepted and implemented, according to what the wizards say, most regions of the world will be within reach of Uganda on the touch of a button. Remember, 1978 is not so far away.

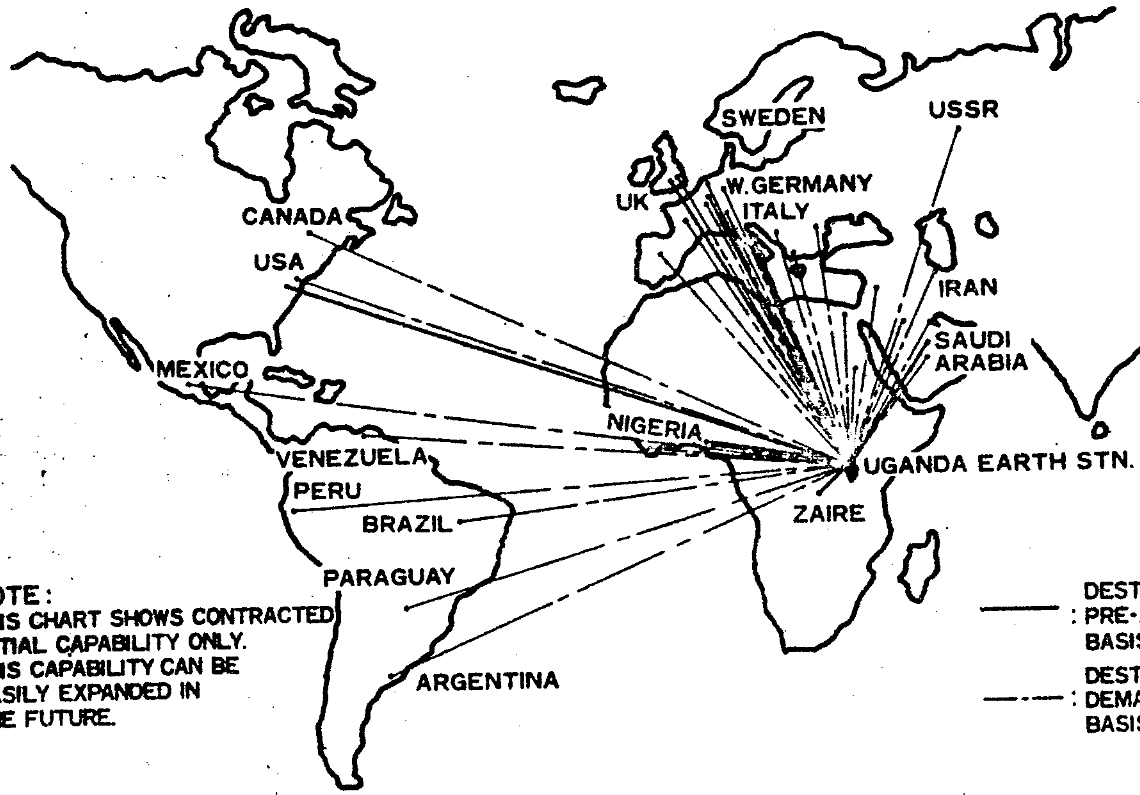
METHOD OF OVERSEAS COMMUNICATIONS VIA GATEWAY STATION BY UGANDA EARTH STATION (INTELSAT STANDARD "B")



RELIABILITY OF COMMUNICATIONS DEPENDS ON THE POLITICAL GOODWILL AND COOPERATION OF THE GOVERNMENT OWNING THE GATEWAY STATION.

CSO: 5500

COUNTRIES TO BE CONNECTED DIRECTLY TO UGANDA EARTH STATION (INTELSAT STANDARD "A")



NOTE:
THIS CHART SHOWS CONTRACTED INITIAL CAPABILITY ONLY.
THIS CAPABILITY CAN BE EASILY EXPANDED IN THE FUTURE.

——— : DESTINATIONS ON PRE-ASSIGNED BASIS

—·—·— : DESTINATIONS ON DEMAND ASSIGNED BASIS

INTERNATIONAL SATELLITE BROADCASTING POLICIES DEBATED IN VIENNA

Frankfurt/Main FRANKFURTER ALLGEMEINE in German 5 Jul 77 p 2

[Article: "Discussion of Future Legal Maxims in Space"]

[Text] Ko. Vienna, 4 July. Is a state that undertakes direct television transmissions via satellites obligated to request permission of a receiver-state before broadcasting into that state's territory? This question gave rise to tough debates at the 20th conference of the UN-Committee for the Peaceful Utilization of Space, which came to an end over the weekend in Vienna. Through the frequencies for direct transmissions via satellites given away to interested states by the International Telecommunication Union (ITU) in Geneva in January of this year a certain delimitation was, indeed, attained, but the question of the intentional or unintentional "overspill," the transmission of broadcasts into the territory of neighboring countries, was not solved by this. Technically such an "overspill" cannot be completely eliminated. It would be easy, on the other hand, to amplify it still further.

The fundamental question remains, therefore, what rights a state is to have which is the victim of the transmission of direct television broadcasts via satellite not acceptable to it. In the UN Space Committee, of which 37 states are members -- only 34 took part in the Vienna conference though -- there was far-reaching agreement that in such cases there should be consultations and, if need be, interstate agreements between the transmitter-state and the receiver-state in order to clear up conflicts that have developed on a bilateral level. A number of states, of course -- especially those of the East bloc countries, but also various developing countries -- desire that the United Nations establish an obligatory character of such consultations with certain rights of intervention, the Western industrial states, on the other hand, are pushing for a rather loose formulation of these rules.

Apart from this question, which is henceforth being further considered by a subcommittee, the Vienna meeting produced such far-reaching agreement concerning particular international principles governing the new communications medium of direct satellite transmission of television broadcasts that the Soviet delegate proposed to call them "Vienna Principles" -- even though they should not be launched finally until next year in a different place. The chairman of the UN Space Committee, Austria 's ambassador to the United Nations, Jankowitsch, expects these principles governing media policies to be decided in 1978 by the UN General Assembly. Thus the international political basis for the new communications system of direct television transmissions via satellites would come into existence earlier than will the technical preconditions for such television transmissions. For it will still be a few years before the individual television participant will be able to receive a television broadcast via satellite from a remote part of the world directly, without the aid of a relay station. This unusual forging ahead of the political regulation within the framework of the United Nations, according to Ambassador Jankowitsch at any rate, is an advantage because the international consensus on a subject whose consequences are not known in practice can probably be produced more easily.

The principles governing direct television transmissions via satellites elaborated so far do not constitute a contractual agreement in the narrower legal sense, but rather international principles. Inter alia, they determine that such television transmissions must not conduct any hostile propaganda or "stirring up the people" and that they must also take into consideration the cultural values of the receiver-area. The fear that such TV transmissions via satellites could result in the introduction of disturbance factors in the receiver-country exists, of course, by no means only on the political plane, but just as much on the cultural-religious plane. Television transmissions showing barely clothed women, as they are perhaps already nearly commonplace in the Western World, would, for example, have a shocking effect in an Islamic country.

8970
CSO: 5500

ITALY

ATTENUATION INCREASE FOR INTENTIONAL, SERPENTINE BENDS IN LONG DISTANCE CIRCULAR WAVEGUIDE

Rome NOTE, RECENSIONI, NOTIZIE in English Vol 25, Nos 3, 4, May-Aug 76 pp 134-147

/Article by S. Rogai[1]/

/Text/

1 - Introduction

As it is known, the use of circular waveguides for long-distance communication involves a number of problems because of the low-attenuation TE_{01} mode energy conversion on unwanted modes propagating in the frequency band of practical interest: any waveguide deviation from the straight circular cylinder ideal geometry does in fact determine a mode conversion, with an ensuing transmission impairment. Of importance, in this connection, are the intentional bends (required, for instance, for an actual route) and the "serpentine" bends, the latter being caused by the elastic deformation the waveguide undergoes for its own weight, owing to the supports on which it rests.

The purpose of this work is to obtain the expressions for the attenuation increase calculation relating to the said deformations, which expressions are valid for any type of waveguide.

In the case of the "serpentine" bends, the theoretical example is mentioned of the BICC guide, whose electrical and mechanical characteristics are known in all their details (table 1): the results obtained where found to be quite in agreement with the relevant experimental data; these results are also intended to be a forecast of the behaviour of the transmission medium in view of the installation of such guide at the field trial of Ozzano Emilia.

2.1 *Intentional bends*

In the case under review, as well as in that of the "serpentine" bends, we will assume as valid the perturbation theory at the 2.o

(1) Dr. Ing. Sergio Rogai - Fondazione Ugo Bordoni.
(2) Work carried out at Centro Onde Millimetriche of Fondazione Ugo Bordoni under the agreement with Istituto Superiore P.T.

TABLE 1 - Electrical and mechanical characteristics of BICC waveguide

type of waveguide	helix
internal diameter	50 mm
dielectric thickness	3.1 mm
ε_r of dielectric	3.95
tgδ of dielectric	0.01
wire cross section	0.1214 mm
enamel thickness	0.02
ε_r of enamel	0.0 m
unit lenght	3.0 m
Young module	10 N/m^2
moment of inertia	2.436 10^{-7} m^4
unit weight	1 5 Kg/m

order (1), (2) of the coupling among the TE_{01} mode and the propagating unwanted modes, supposing to this purpose that the guide deviation from the ideal geometry may allow to move in the framework of this hypothesis. As it is known, this way of operating makes is possible to analyze the problem taking into account the coupling between the TE_{01} mode and one unwanted mode at a time, and then adding up each partial contribution thus obtained, in view of the overall attenuation increase calculation. No account will be taken, either for the intentional bends or for the serpentine bends, of the coupling involving the reflected waves, such a phenomenon being assumed as negligible.

2.2 *Attenuation increase calculation*

Reference is made to the general *i-th* bend, l_i long, letting $R_i(z)$ be the bending radius with z longitudinal current abscissa originating where the curve itself starts. For a bending, the coupling coefficient between the TE_{01} mode and the *k-th* unwanted mode, is given by (3) :

[1] $$c_{i,k}(z) = \frac{C_k}{R_i(z)} ,$$

where C_k, generally complex, is, a function of the difference between the propagation constants of the two considered modes.

The attenuation increase (in Neper), caused by the *k-th* unwanted mode for the *i-th* bend, is then given, according to the [25] of (3), by

$$[2] \qquad \Delta A_{k,i} = -\frac{1}{2} \; Re\left\{ \int_{-\infty}^{+\infty} |D(\zeta)|^2 . F_{kc}(2\pi\zeta - \Delta B_k) d\zeta \right\},$$

where ζ (in m^{-1}) is the spatial frequency and

$$[3] \qquad |D(\zeta)|^2 = |F[1/R(z)]|^2,$$

$$F_{kc}(\Delta\beta_k) = 2\, C_k^2 \frac{|\Delta\alpha_k| - j\,\Delta\beta_k}{|\Delta\alpha_k|^2 + (\Delta\beta_k)^2},$$

where

$$[4] \qquad \begin{aligned} \Delta\alpha_k &= \alpha_o - \alpha_k, \\ \Delta\beta_k &= \beta_o - \beta_k, \end{aligned}$$

α and β being the attenuation and phase constants in the waveguide, for the mode under consideration; the subscript o is for the TE_{01} mode and subscript k for the *k-th* unwanted mode. Assuming that

$$[5] \qquad C_k^2 = P_k + j\,Q_k$$

and account being taken of [3], expression [2] is re-written as:

$$[6] \qquad \Delta A_{k,i} = \int_{-\infty}^{+\infty} |D(\zeta)|^2 \; \frac{P_k\,|\Delta\alpha_k| + Q_k\,(2\pi\zeta - \Delta\beta_k)}{|\Delta\alpha_k|^2 + (2\pi\zeta - \Delta\beta_k)^2} \; d\zeta.$$

If it is assumed to refer to bends each with a R_i constant bending radius, then for the *i-th* bend we have:

$$[7] \qquad |D(\zeta)|^2 = \frac{l_i^2}{R_i^2} \; \frac{\sin^2(\pi\, l_i\, \zeta)}{(\pi\, l_i\, \zeta)^2}.$$

Expression [6] then becomes

$$[8] \qquad \Delta A_{k,i} = \frac{l_i^2}{R_i^2} \int_{-\infty}^{+\infty} \frac{sin^2(\pi l_i \zeta)}{(\pi l_i \zeta)^2} \; \frac{P_k \,|\, \Delta \alpha_k \,| + Q_k (2\pi\zeta - \Delta\beta_k)}{|\, \Delta \alpha_k \,|^2 + (2\pi\zeta - \Delta \beta_k)^2} \, d\zeta.$$

Replacing the $\frac{sin^2 x}{x^2}$ within the integral, with a δ of Dirac of an equivalent power (*), expression [8] becomes:

$$[9] \qquad \Delta A_{k,i} = \frac{l_i}{R_i^2} \int_{-\infty}^{+\infty} \delta(\zeta) \; \frac{P_k \,|\, \Delta \alpha_k \,| + Q_k (2\pi\zeta - \Delta\beta_k)}{|\, \Delta \alpha_k \,|^2 + (2\pi\zeta - \Delta \beta_k)^2} \, d\zeta.$$

Since for generic function $f(x)$ is

$$[10] \qquad f(x) = \int_{-\infty}^{+\infty} \delta(t) \, f(x - t) \, dt.$$

we have

$$[11] \qquad \Delta A_{k,i} = \frac{l_i}{R_i^2} \; \frac{P_k \,|\, \Delta \alpha_k \,| - Q_k \cdot \Delta \beta_k}{|\, \Delta \alpha_k \,|^2 + (\Delta \beta_k)^2}.$$

The δ- substitution is dependent upon the behaviour of term $\frac{sin^2 (\pi l_i \zeta)}{(\pi l_i \zeta)^2}$ vis-à-vis the other factor of the function to be integrated.

(*) It must be $\int_{-\infty}^{+\infty} A \, \delta(\zeta) \, d\zeta = \int_{-\infty}^{+\infty} \frac{sin^2 (\pi l_i \zeta)}{(\pi l_i \zeta)^2} \, d\zeta$

with A power of δ; on the other hand, since

$\int_{-\infty}^{+\infty} \frac{sin^2 p x}{x^2} = \pi p$, it is then $A = \frac{1}{l_i}$

Since the modes coupled by the bending are characterized by large $|\Delta\gamma_k|$, the bandwidth of $Re\ [F_{kc}(\zeta)]$ is large too (3): it is then sufficient for l_i to have a not too small value to ensure that the term $\frac{sin^2 x}{x^2}$ may behave like a spectrum sampler and may be replaced with a δ of Dirac. At any rate, expression [8] is independent on the length of the general bend.

Let us denote:

[12] $$M_k = \frac{1}{2}\ Re\ F_{kc},$$

[13] $$M = \sum_1^N {}_k M_k$$

were N is the number of the coupled modes, for the general i-th curve we have then

[14] $$\Delta A_i = \frac{l_i}{R_i^2}\ M.$$

If we consider a section of route with K intentional bends, the overall attenuation increase for a length L is given by:

[15] $$\Delta A = M \sum_1^k {}_i \frac{l_i}{R_i^2}$$

Assuming that we may introduce an attenuation constant increase for intentional bends, dividing [15] by the lenght L of the section under consideration, we obtain

[16] $$\alpha_s = \left(\frac{1}{L} \sum_{i=1}^{k} \frac{l_i}{R_i^2} \right) M$$

2.3 *Bending figure*

In the second member of [16], there appear two independent factors, one as a function only of the type of waveguide used, the

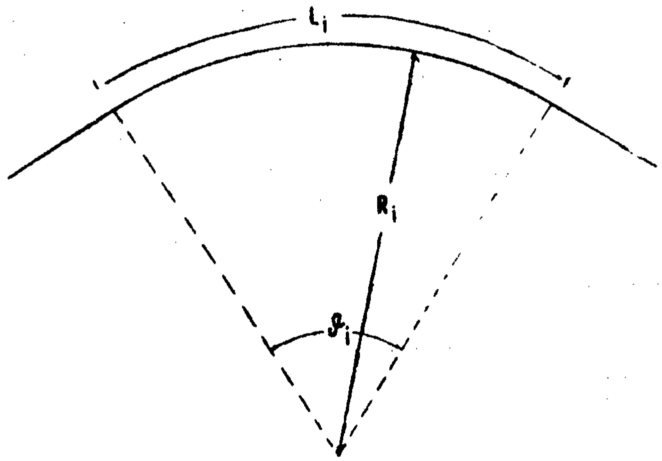


Fig. 1 - ***Constant radius intentional general curve.***

other only of the route chosen. The bending figure of the route, is then defined as:

[17] $$F_e = \frac{1}{L} \sum_{i=1}^{k} \frac{l_i}{R_i^2}$$

whereby [18] becomes

[16] $$\alpha_s = F_e M.$$

with reference to fig. 1, being $l_i = R_i \theta_i$ [17] yields:

[17'] $$F_e = \frac{1}{L} \sum_{i=1}^{k} \frac{\theta_i}{R_i}$$

If we express L, l_i and R_i in km, F_e is expressed in km^{-2} according to [17].

Expression [17] may be generalized to the case of a variable intentional bending; in this case

[17''] $$F_e = \frac{1}{L} \int_0^L \frac{dz}{R^2(z)} \; .$$

The [17''] shows the physical meaning of the bending figure: it is in fact the mean square radius of the bending of the route or, otherwise, the power of the deformation described by $R(z)$. To give an idea about the possible values of F_c in the cases of practical interest, their values have been shown in table 2, according to different bending percentages of the route, assuming that all the bends of the route have the same bending radius. In (4), the influence may be quantitatively observed of the intentional bends and hence or F_c, for some experimental links sither completed or under laying aboard. Summing up in regard of the intentional bends, the attenuation increase is given by:

$$\Delta A = L F_c M ; \qquad [18]$$

this relation may prove very useful in the route choice, once the type of waveguide and hence M is fixed.
Numerical results computed are very close to those coming from the expressions shown in 5 and 6 for the attenuation increase calculation, if any discontinuity between curved and straight section is not considered.

TABLE 2 - F_c in km^{-2} for differen bending radius and percentages of curved route.

	10	20	30	40	50	60	70	80	90	100
0	∞	∞	∞	∞	∞	∞	∞	∞	∞	∞
50	40.	80.	120.	160.	200.	240.	280.	320.	360.	400.
100	10.	20.	30.	40.	50.	60.	70.	80.	90.	100.
200	2.5	5	7.5	10.	12.5	15.	17.5	20.	22.5	25
300	1.11	2.22	3.33	4.44	5.55	6.66	7.77	8.88	10.	11.1
400	.625	1.25	1.87	2.5	3.125	3.75	4.375	5.	5.625	6.25
500	.4	.8	1.2	1.6	2.	2.4	2.8	3.2	3.6	4
1000	.1	.2	.3	.4	.5	.6	.7	.8	.9	1.
∞	0	0	0	0	0	0	0	0	0	0

3.1 *Serpentine bends*

By the term "serpentine" (7) we mean the elastic deformation the waveguide undergoes for its own weight to the presence of equally spaced discrete supports. In the case under examination the waveguide between two supports deforms like a beam fixed at both ends. The problem of the attenuation increase calculation due to serpentines has been already dealt with in [8]; we will now take it up again to deal with it in a way similar to that previously adopted for the intentional bends, and this with a view to showing how [25] of (3) has an altogether general validity, and also to giving a calculation formula to be used for any waveguide, frequency and mode.

Assuming that also in this case the deformations may be treated as small perturbations of the ideal geometrical structure, and confusing therefore abscissa x with the axial coordinate z (fig. 2) the deflection of the axis on the vertical plane is given by (7) for $0 \leq x \leq l$:

$$[19] \qquad y = \frac{w\,l^4}{24\,EI}\,\frac{x^2}{l^2}\,\left(1 - \frac{x}{l}\right)^2$$

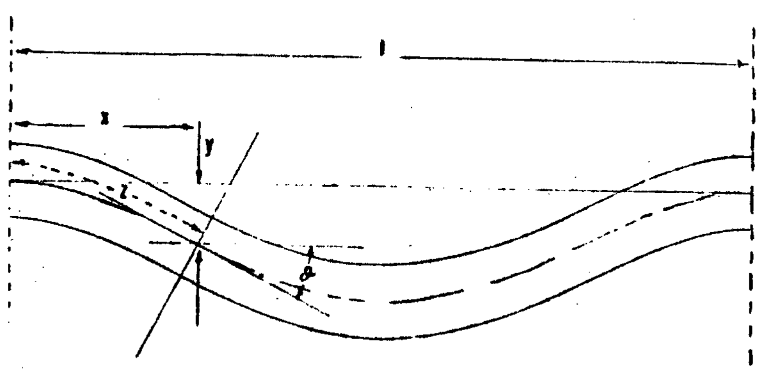


Fig. 2 - *Serpentine between two successive supports.* —

where

w is the weight of the guide per unit lenght,
E is the Young module,
I is the moment of inertia of the section,
l is the support spacing.

In general, the curvature of a function $y = f(x)$ is given by

$$\text{[20]} \qquad \frac{1}{R(x)} \doteq \frac{\dfrac{d^2y}{dx}}{\left[1 + \left(\dfrac{dy}{dx} \right)^2 \right]^{3/2}} .$$

Since we are concerned with small deformations, we have $\left| \frac{dy}{dx} \right| < 1$; thus, by [19], the curvature of the waveguide for $0 \leq x \leq 1$ becomes:

$$\text{[21]} \qquad \frac{1}{R(x)} = \frac{w\, l^2}{12\, EI} \left(1 - \frac{6\, x}{l} + \frac{6\, x^2}{l^2}\right).$$

3.2 *Deformation spectrum*

The actual curvature of the waveguide due to equally spaced supports is a periodic function with period l; the expression for every x is given by the Fourier series:

$$\text{[22]} \qquad \frac{1}{R(x)} = \frac{w\, l^2}{4\, \pi^2\, EI} \sum_{\substack{-\infty \\ n \neq o}}^{+\infty} \frac{1}{n^2}\, e^{j\, n \frac{2\pi}{l} x}$$

If we introduce the spatial frequency ζ and assuming $D(\zeta) = F[1/R(\zeta)]$, there will result:

$$\text{[23]} \qquad D(\zeta) = \frac{w\, l^2}{4\, \pi^2\, EI} \sum_{\substack{-\infty \\ n \neq o}}^{+\infty} \frac{1}{n^2}\, \delta\left(\frac{n}{l} - \zeta \right).$$

In the case of a section of route of a lenght L, the curvature is defined for $0 \leq x \leq L$ only, hence its F - transform (ζ) is obtained from the convolution of [23] with the F-transform $H(\zeta)$ of the rectangular pulse of unit amplitude and L width:

$$\text{[24]} \qquad H(\zeta) = L\, \frac{\sin(\pi\, L\, \zeta)}{(\pi\, L\, \zeta)} .$$

So we have:

$$D(\zeta) = \frac{w\, l^2 L}{4\pi^2 EI} \sum_{\substack{n=-\infty \\ n\neq o}}^{+\infty} \frac{1}{n^2}\, S(n,\zeta) \qquad [25]$$

where

$$S(n,\zeta) = \frac{\sin \pi L\left(\frac{n}{l} - \zeta\right)}{\pi L\left(\frac{n}{l} - \zeta\right)} \qquad [26]$$

The power spectrum $G(\zeta)$ is given by

$$G(\zeta) = \frac{1}{L}\, D(\zeta) \cdot D^*(\zeta) \qquad [27]$$

namely:

$$G(\zeta) = L\left(\frac{w\, l^2}{4\pi^2 EI}\right)^2 \sum_{\substack{n,m=-\infty \\ n\neq o \\ m\neq o}}^{+\infty} \frac{1}{n^2 m^2}\, S(n,\zeta).\, S(m,\zeta) \qquad [27']$$

3.3 *Attenuation increase for serpentine bends*

With reference to [27'] and [6], the increase attenuation for TE_{01} mode caused by the *k-th* spurious mode, is given by:

$$\Delta A_k = L^2\left(\frac{w\, l^2}{4\pi^2 EI}\right)^2 \sum_{\substack{n,m=-\infty \\ n\neq o \\ m\neq o}}^{+\infty} \frac{1}{n^2 m^2} \int_{-\infty}^{+\infty} \frac{P_k\,|\Delta\alpha_k| + Q_k\,(2\pi\zeta - \Delta\beta_k)}{|\Delta\alpha_k|^2 + (2\pi\zeta - \Delta\beta_k)^2} \times \qquad [28]$$

$$\times\, S(n,\zeta)\, .\, S(m,\zeta)\ d\zeta.$$

In the cases of practical interest L is in the order of kms and l is in the order of meters. Thus for every $n \neq m$ the contribution of the product $S(n,\zeta) . S(m,\zeta)$ to the integral [28] is negligible.

Then [28] becomes:

$$[29] \qquad \Delta A_k = L^2 \left(\frac{w\, l^2}{4 \pi^2 EI} \right)^2 \sum_{\substack{n=-\infty \\ n \neq o}}^{+\infty} \frac{1}{n^4} \int_{-\infty}^{+\infty} \frac{P_k \,|\, \Delta \alpha_k \,| + Q_k \,(2\pi\zeta - \Delta\beta_k)}{|\, \Delta \alpha_k \,|^2 + (2\pi\zeta - \Delta \beta_k)^2} \times$$

$$\cdot\, S^2 (n,\zeta)\; d\zeta.$$

For the same reasons stated above, it is possible to replace $S^2 (n, \zeta)$ with a δ of Dirac having an equal power, as we done in sec. 2-2. This being made, [29] becomes

$$[30] \qquad \Delta A_k = L \left(\frac{w\, l^2}{4 \pi^2 EI} \right)^2 \sum_{\substack{n=-\infty \\ n \neq o}}^{+\infty} \frac{1}{n^4} \int_{-\infty}^{+\infty} \frac{P_k \,|\, \Delta \alpha_k \,| + Q_k \,(2\pi\zeta - \Delta\beta_k)}{|\, \Delta \alpha_k \,|^2 + (2\pi\zeta - \Delta \beta_k)^2} \times$$

$$\times\; \delta \left(\frac{n}{l} - \zeta \right) d\zeta.$$

By [10], we obtain:

$$[31] \quad \Delta A_k = L \left(\frac{w\, l^2}{4 \pi^2 EI} \right)^2 \sum_{\substack{n=-\infty \\ n \neq o}}^{+\infty} \frac{1}{n^4} \frac{P_k \,|\, \Delta \alpha_k \,| + Q_k \,(2\pi \,(n/l) - \Delta\beta_k)}{|\, \Delta\alpha_k \,|^2 + \; (2\pi \,(n/l) - \Delta\beta_k)} \,.$$

For N modes coupled with TE_{01} mode because of serpentine bends, we have:

$$[32] \qquad\qquad \Delta A = \sum_{k=1}^{N} \Delta A_k.$$

Finally, the attenuation constant increase due to serpentine bends is given by:

$$[33] \quad \alpha_{serp} = \left(\frac{w\, l^2}{4 \pi^2 EI} \right)^2 \sum_{k=1}^{N} \sum_{\substack{n=-\infty \\ n \neq o}}^{+\infty} \frac{1}{n^4} \; \frac{P_k \,|\, \Delta \alpha_k \,| + Q_k \left(2\pi \dfrac{n}{l} - \Delta\beta_k\right)}{|\, \Delta \alpha_k \,|^2 + \left(2\pi \dfrac{n}{l} - \Delta \beta_k\right)^2}$$

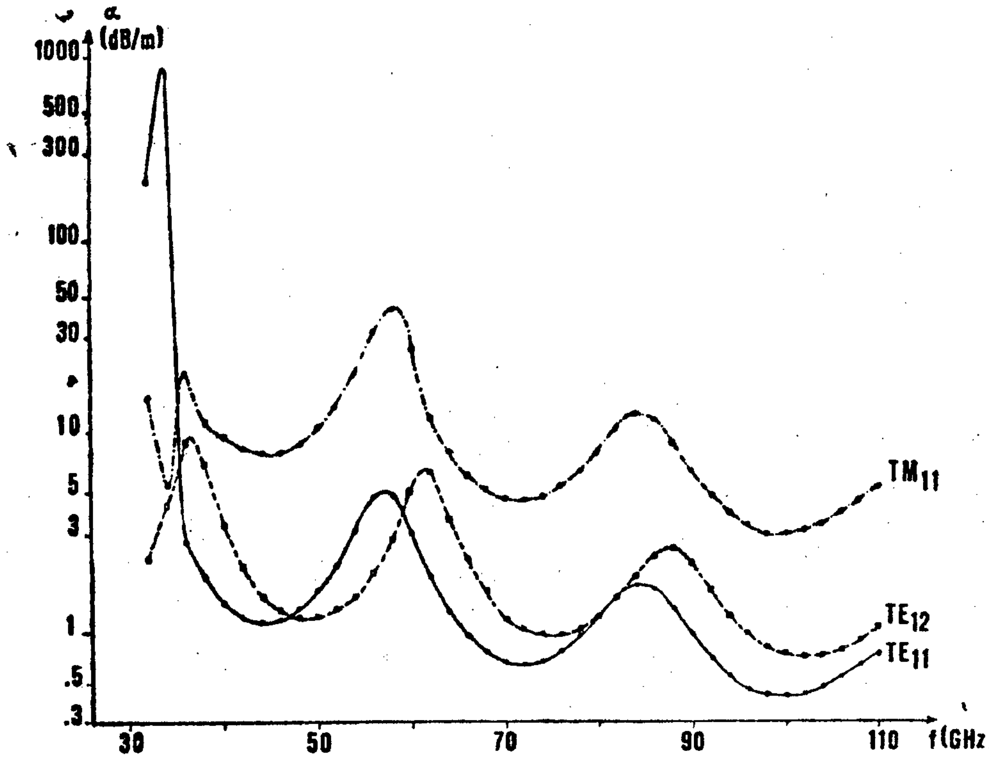


Fig. 3 - *BICC waveguide: attenuation of unwanted modes.*

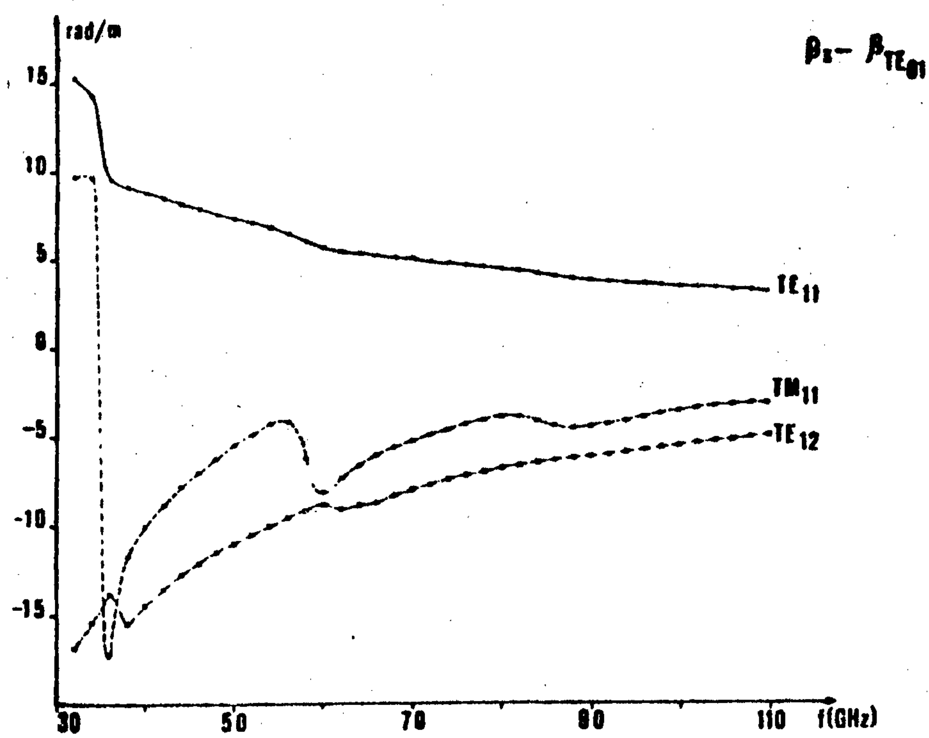


Fig. 4 - *BICC waveguide: difference between the phase constants. from TE_{01} and the indicated unwanted modes.*

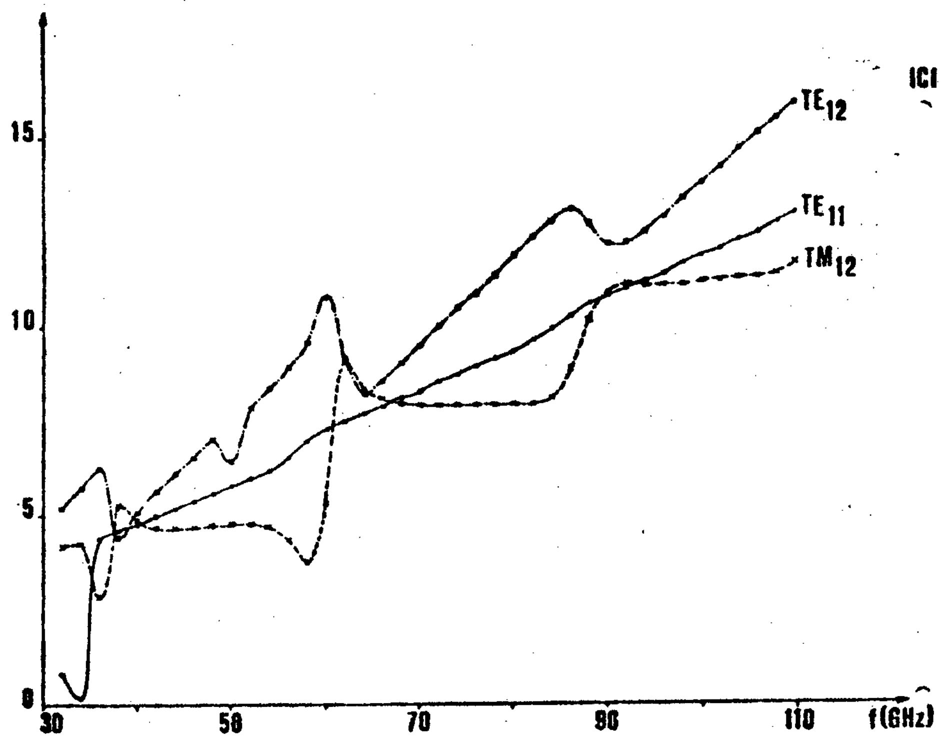


Fig. 5 - *BICC waveguide: coupling coefficient module.*

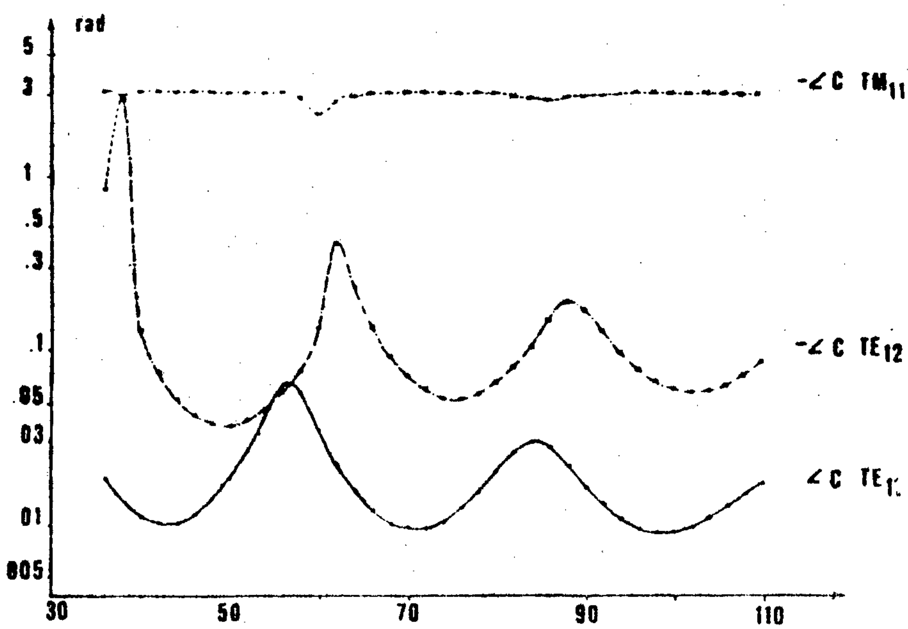


Fig. 6 - *BICC waveguide: coupling coefficient argument.*

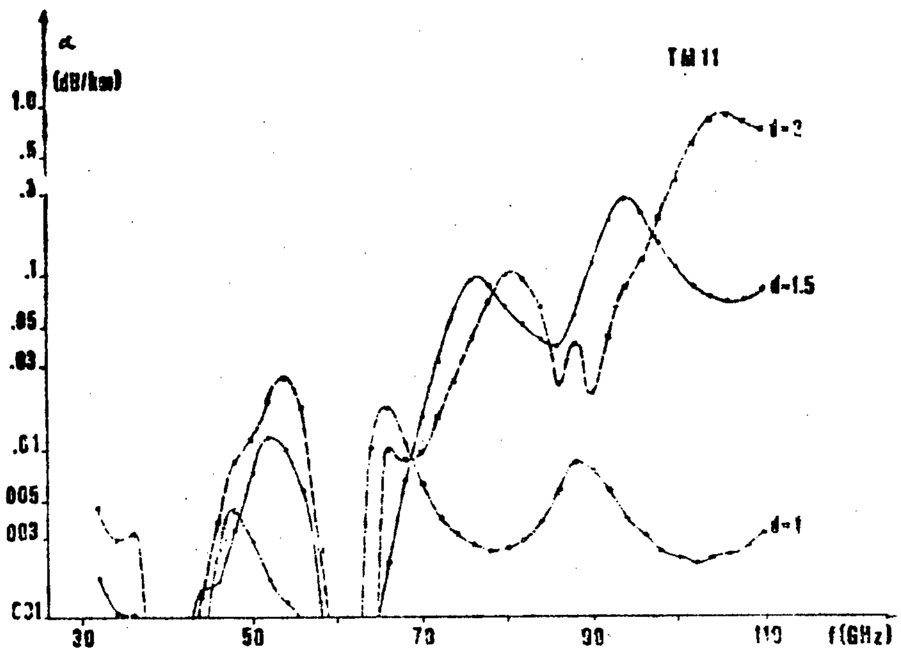


Fig. 9 - *BICC waveguide: attenuation for serpentine bends due to TM_{11} mode.*

In practice, only TE_{11}, TM_{11}, and TE_{1}, must be taken into account; moreover, it is sufficient to consider only the first three or four deformation harmonics. In fig. 3-6 the values are plotted- for the BICC guide indicated in table 1, of the parameters used for the calculation of [23], in figures 7-10 the theoretical results of the attenuation constant increase are shown for different support spacing *d* (in meters). The data of figures 3-6 were obtained through the Program PACOM 9. The calculation of α_{serp} was made taking into account the first three or four harmonics of the deformation, obtaining negligible differences.

4 - Conclusions

The problem of the attenuation increase computation for serpentine and intentional bends was already solved, under particular hypotheses. In this paper more general expressions are obtained;

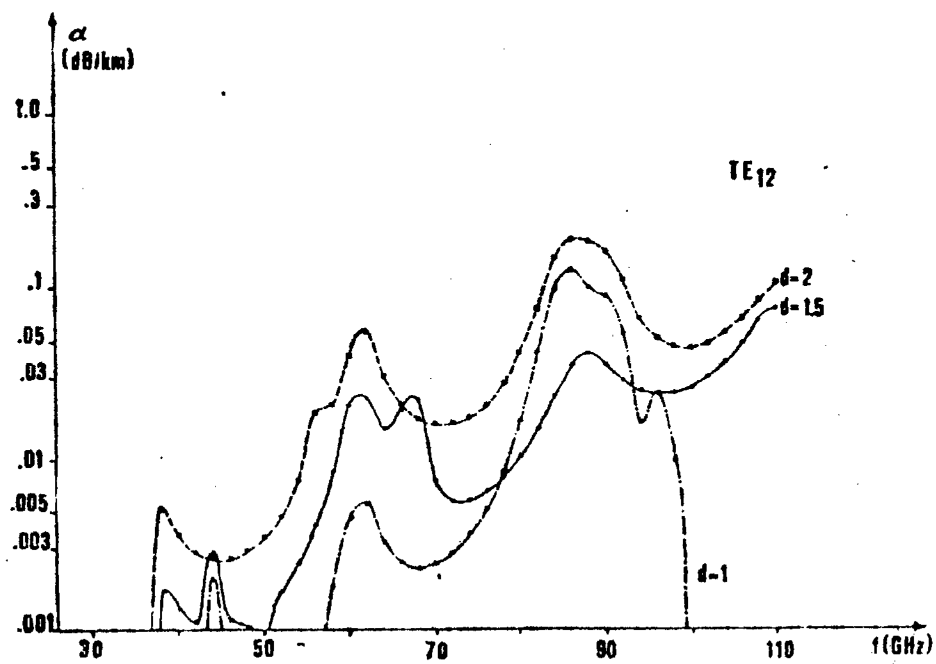


Fig. 10 - *BICC waveguide: attenuation for serpentine bends due to RE_{11} mode.*

these expressions are consistent with the mathematical procedure already used at the C.O.M. in view of solving analogous problems.

The final formulae were programmed and entered as subprograms in the Program PAGOM; so PAGOM is able to perform a complete analysis about an actual link wich make use of the circular waveguide as transmission medium.

BIBLIOGRAFIA

(1) M.E. ROWE and W.D. WARTERS: « Transmission in Multimode Waveguide with Random Imperfections ». B.S.T.J., May 1962, pp. 1031-1170.

(2) H.E. ROWE: « Approximate Solutions for the Coupled Line Equations », B.S.T.J., May 1962, pp. 1011-1819.

(3) P. BERNARDI and G. FALCIASECCA: « The TE_{01} Mode Attenuation in a Circular Waveguide Link with Continuous Imperfections ». Alta Frequenza, August 1973, pp. 190-195.

(4) P. BERNARDI, G. FALCIASECCA, S. ROGAI and F. VALDONI: « Circular Waveguide Link Analysis by Program PAGOM ». Fondazione Ugo Bordoni. Internal report, -23 w2.

(5) H.G. UNGER: « Helix Theory and Applications ». B.S.T.J., November 1958, pp. 1599-1647.

(6) H.G. UNGER: « Normal Mode Bends for Circular Electric Waves ». B.S.T.J., September 1967, pp. 1279.

(7) H.G. UNGER: « Circular Electric Wave Transmission through Serpentine Bends ». B.S.T.J., September 1957, pp. 1279-1291.

(8) E. CARLI, T. CORZANI, G.B. STRACCA: « Distorsioni introdotte dalle curve intenzionali e da quelle periodiche nei sistemi di trasmissione in guida circolare ». Fondazione Ugo Bordoni, internal report, Aprile 1974.

(9) P. BERNARDI, G. FALCIASECCA, G. GRASSO and F. VALDONI: « Computer Aided Design of Circular Waveguides for Long Distance Communication » - Alta Frequenza, August 1975.

(10) P. BERNARDI and S. ROGAI: « PAGOM: progetto e analisi di guide d'onda millimetriche ». Fondazione Ugo Bordoni, internal report, still to be published.

CSO: 5500

RECEIVER DESIGN FOR DIGITAL FIBER OPTIC COMMUNICATION SYSTEM

Rome NOTE,RECENSIONI,NOTIZIE in Italian Vol XXV, Nos 3-4, May-Aug 76 pp 109-120

[Article by C. Antodicola and F. Lombardi]

[Text] Introduction

The possibility of manufacturing low loss fibers (4db/km [1], has opened the path to numerous applications in the field of communications.

The effective implementation of the systems will depend on various factors, such as the distribution, cost of the fiber, information capacity, cost of the terminals, etc.

The present paper is concerned with designing a receiver for 8,448 Mbit/sec fiber optic telecommunication systems. The skeleton diagram of the receiver is that assumed by Goell in [2].

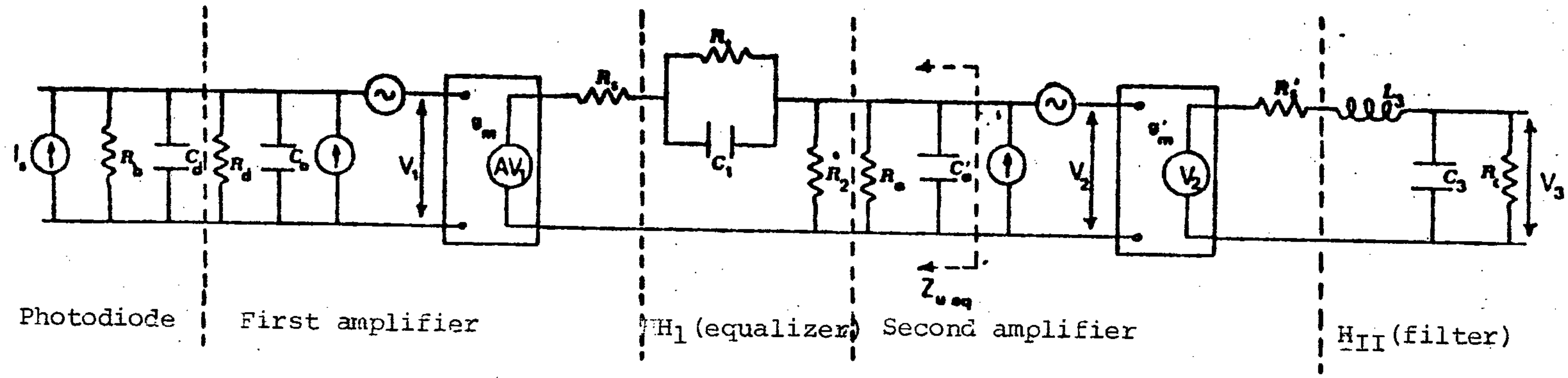
In particular, the circuit under investigation consists of two trunks separated by an amplifier stage: the first trunk is designed in such a way as to fix a pole at the operating frequency, thus cancelling out the low frequency pole due to the capacity of the photodetector and to its load resistor, while the second trunk has the function of minimizing either the intersymbol interference or the thermal noise of the entire receiver.

Also examined are the sensitivity of the receiver to varying the cutoff frequency ω_d of the final filter as well as the behavior from the standpoint of the rate of error and the optic power required upon varying the size of the input pulses.

The Gaussian form was chosen for the input pulses with a characteristic parameter $\alpha=\sigma/T$ (where σ represents the r.m.s. of the Gaussian and T the repetition period of the pulses). This is justified by the experimental measurements made and by the results reported in previous papers.

This study was carried out disregarding in the calculations the noise factor due to the current generation process in the photodetector diode (shot-noise).

The vailidity of the results obtained was sound, comparing the present results with those reported in [5].



$R_1 = R_b // R_d$ $C_1 = C_b + C_e$ $R_2' = R_2 // R_e$

$R_b = R_d = 1M\Omega$ $g_m = 6_{mmhos}$ $R_s = R_s' = 50\Omega$ $R_e = 100\Omega$ $g_m' = 12.5_{mmhos}$ $R_t = 1K\Omega$

$C_d = 3pF$ $C_e = 7pF$ $C_e' = 10pF$

Fig. 1

1 - Model of the Receiver

The receiving chain (Figure 1) consists of a PIN type photodiode, a preamplifier, a balancing system, a second amplifying stage, an LC network, and a load R_c which represents the input impedance of a possible decision mechanism.

The balancing network is made necessary by the fact that the photodiode has a FET type high impedance input amplifying stage. The use of this amplifying stage permits the cancellation of the pole at low frequency of the transfer function of the entire unit photodiode + amplifier and the formation of a new pole at the frequency under investigation.

The transfer function of the network that satisfies the above-described specifics consists of a zero and two poles. One of the two poles is the one that is fixed around the frequency under investigation, while the position of the other is chosen based on a criterion that optimizes the ratio between the amplitude of the output signal and the noise introduced by the internal receiver.

The input impedance of the second amplifier is considered an integral part of the equalizer.

2 - Calculation of the Transfer Function of the Receiver

As may be seen in Figure 1, disregarding for the moment the noise generators of the two amplifiers, indicating by:

R_T - The parallel between the resistance of the diode and of the amplifier
C_T - the sum of the capacitance of the diode and of the input capacitance of the amplifier
$\tau_1 = R_T\ C_T$
$K_1 = 1/C_T$
V_1 - the input voltage of the first amplifying stage
I_s - the photocurrent

one obtains:

[1]
$$Z_{fd}(s) = \frac{V_1}{I_1} = \frac{K_1}{s + \frac{1}{\tau_1}}$$

With respect to the network indicated in Figure 1 with H_1 we assume:

R'_2 - The parallel of R_2 with the input resistance of the video amplifier
R_s - the output resistance of the video amplifier
C'_a - the input capacitance of the video amplifier
$K_2 = A/R_s\ C'_a$

we obtained:

[2] $H_I(s) =$

$$\frac{AV_2}{V_1} = \frac{A}{R_xC'_a} \frac{s + \frac{1}{R_1C_1}}{\left[s^2 + \left(\frac{1}{R_1C_2} + \frac{1}{R'_2C'_a} + \frac{1}{R_xC_1} + \frac{1}{R_xC'_a}\right)s + \frac{R_x + R_1 + R'_2}{R_1R'_2R_xC_1C'_a}\right]} =$$

$$= K_2 \frac{s + \frac{1}{\tau_1{}^*}}{\left(s + \frac{1}{\tau_2}\right)\left(s + \frac{1}{\tau_3}\right)}$$

where $\frac{1}{\tau_{1*}} = \frac{1}{R_1C_1}$ represents the zero of the equalizer while $\frac{1}{\tau_2}$ and $\frac{1}{\tau_3}$ represent the poles.

With respect to the LC network indicating by:

R'_2 - the output resistance of the second amplifying stage
R_c - the cutoff resistance of the filter
$K_3 = 1/L_3C_3$
$C = (R'_s/L_3 + 1/R_cC_3)$
$D = (R_c + R_s)/L_3C_3R_c$

we obtain

[4] $$H_{II}(s) = \frac{V_3}{V_2} = \frac{K_3}{s^2 + Cs + D}$$

Posulating that the zero of the equalizer $1/\tau_1{}^*$ is capable of cancelling out the low frequency pole of the photodiode $1/\tau_1$, the following expression is obtained for the transfer impedance of the entire receiver:

[5] $$Z_{tot}(s) = \frac{K_1K_2K_3}{\left(s + \frac{1}{\tau_2}\right)\left(s + \frac{1}{\tau_3}\right)\left(s^2 + Cs + D\right)}$$

Antitransforming [5] one obtains:

[6] $$Z_{tot}(t) = R_1e^{-At} + R_2e^{-Bt} + 2e^{\sigma^* t}[\alpha^* \cos\omega_d t - \beta^* \mathrm{sen}\,\omega_d t]$$

where:

$$A = 1/\tau_2$$
$$B = 1/\tau_3$$
$$R_1 = 1/(B - A)(A^2 - AC + D)$$
$$R_2 = 1/(A - B)(B^2 - BC + D)$$
$$\alpha^* = -\frac{1}{2}(R_1 + R_2)$$
$$\beta^* = \frac{1}{2\omega_d}\left\{ -C\alpha^* + \frac{1}{AB}\left[1 - D(BR_1 + AR_2)\right]\right\}$$
$$\sigma^* = -\frac{C}{2}$$
$$\omega_d = \sqrt{D - C^2/4}$$

3 - Dimensioning of the Components of the Network

We used the following method for dimensioning the equalizing network:

- we initially disregarded the capacitance C'_a and found the transfer function thus modified;
- we imposed the requirement either that this have the zero $1/\tau_1^*$ coincident with the pole $1/\tau_1$ which we wish to cancel out, or that the resistance R'_2 be as high as possible compatible with the fixed value for R_a; with the above-mentioned positions we found values for R_1 and C_1;
- having found these two values, we now introduce the capacitance C'_a initially disregarded, which enables us to calculate from [2] the value for R'_2 — having the pole $1/\tau_2$ at the pulse under investigation.

We therefore suppose initially that the network with transfer function $H_I(s)$ is followed by an amplifier whose input capacitance C'_a is disregarded:

[7]

$$H_{eq}(s) = \frac{V_2}{V_1} = \frac{R'_2}{R'_2 + R_1} \cdot \frac{\left(s + \frac{1}{R_1C_1}\right)}{s + \frac{1}{R_1C_1}\left[1 + \frac{R_1}{R'_2 + R_1}\right]} = K_2^* \, \frac{s + \frac{1}{\tau_1}}{s + \frac{1}{\tau_2^*}}$$

where:

$$K_2^* = R'_2/(R'_2 + R_1)$$

$$\frac{1}{\tau_2^*} = \frac{1}{R_1C_1}\left[1 + \frac{R_1}{R'_2 + R_s}\right]$$

$\frac{1}{\tau_2^*}$ represents the pulse pole under investigation.

Assuming for the components the values deducible from Figure 1, from the condition $\tau_1 = \tau_1^*$, we obtain the following values for R_1 and C_1:

$R_1 = 40 \cdot 7\ K\ \Omega$

$C_1 = 123\ pF$

Now considering the effect of the capacitance initially disregarded on the position of the pole under investigation, it is found that the insertion of C'_a produces two effects on the overall transfer function:

1) a small variation in the position of $1/\tau_2^*$

2) creation of a new pole at a pulse far from that under investigation.

From (2), for polynomial equality we find for $1/\tau_2$ an expression which, with respect to R'_2, gives us:

[8] $$R'_2 = \frac{R_s + R_1 - R_1R_sC_1/\tau_2}{\frac{R_1R_sC_1C_a}{\tau_2}\left(\frac{1}{R_1C_1} + \frac{1}{R_sC_1} + \frac{1}{R_sC_a} - \frac{1}{\tau_2}\right) - 1}$$

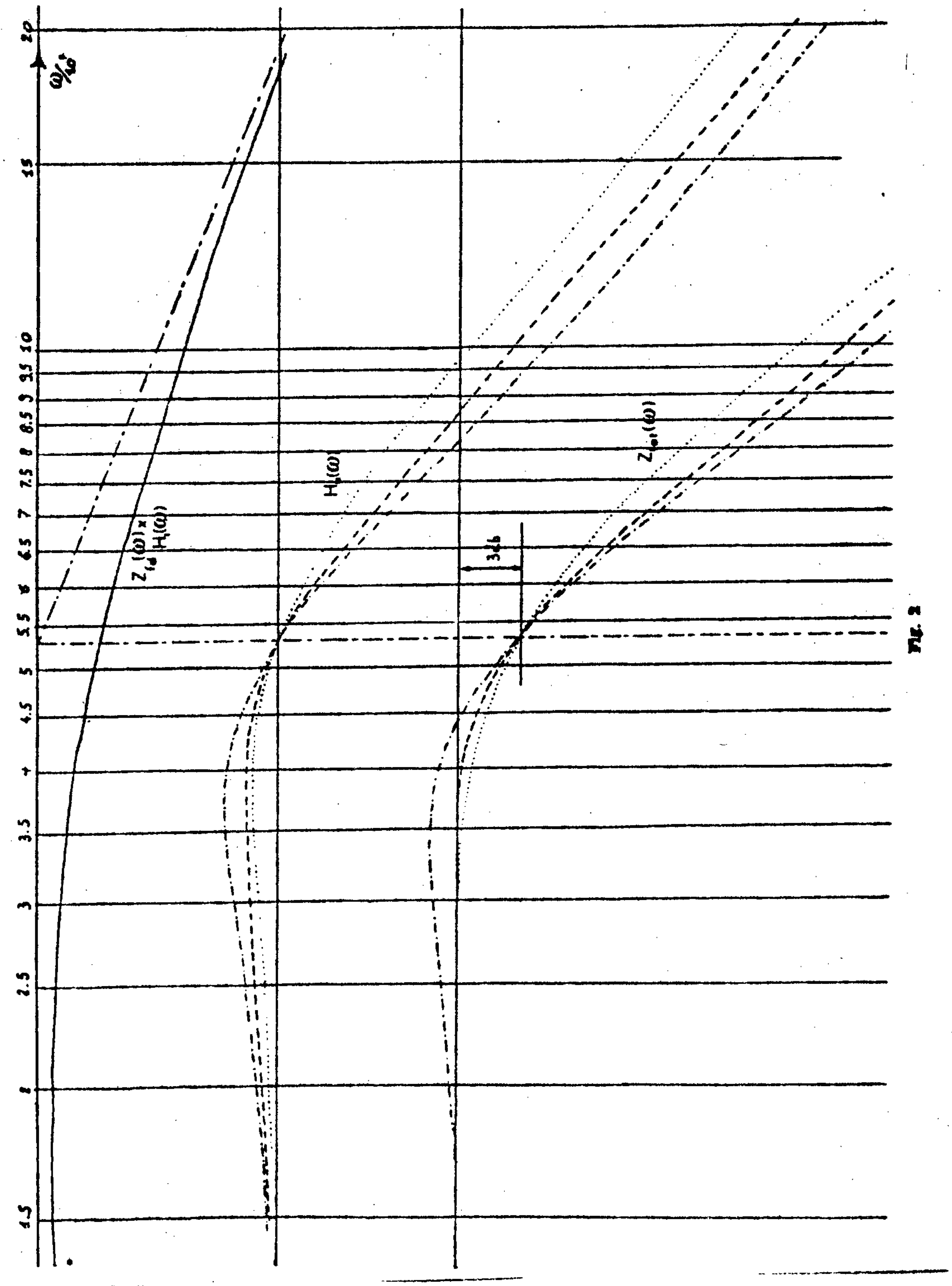
and representing the new pole by $1/\tau_3$ we have:

[9] $$\frac{1}{\tau_3} = \frac{R_s + R_1 + R'_2}{R_sR_1C_1C_a\ \frac{1}{\tau_2}\ R'_2}$$

Due to the preceding selections we obtain $R'_2 = 98.46\ \Omega$ and $1/\tau_3 = \cdot 3125 \times 10^{10}$.

In dimensioning the components the filter LC was designed to have a gain of 0db at the operating frequency in the transfer function of the same filter so that the cutoff frequency at 3db of the total network is not altered, as may be seen from Figure 2.

Representing the cutoff frequency of the total transfer function by ω_c and the cutoff frequency of the final filter LC alone by ω_d, in order to satisfy the above-described specifics we obtain the following expressions for C and D:



ω/ω0
1.5
2
2.5
3
3.5
4
4.5
5
5.5
6
6.5
7
7.5
8
8.5
9
9.5
10
15
20
Z1d(ω) x H1(ω)
H1(ω)
Z01(ω)
3db

Fig. 2

$$C = \sqrt{E + 2\omega_d \sqrt{\omega_d^2 + E}}$$

[10] $$D = \omega_d \sqrt{\omega_d^2 + E}$$

whence: $$E = \frac{\omega_d^4(K_0 - 1) - \omega_c^4}{\omega_d^2(1 - K_0) + \omega_c^2}$$

$$K_0 = \frac{\dfrac{2}{\tau_2^2\tau_3^2}}{\left(\omega_c^2 + \dfrac{1}{\tau_2^2}\right)\left(\omega_c^2 + \dfrac{1}{\tau_3^2}\right)}$$

From these relations we see a doubly unequivocal correspondence between ω_d values and pairs of C and D values.

Table 1 gives the C and D values in terms of ω_d and the corresponding L_3 and C_3 values as a result of relations [3].

4 - Calculation of the Noise

From the Figure 1 network one obtains the following expression for the output noise power at the final filter:

$$N = < n^2(t) > =$$

$$= \frac{k\vartheta}{\pi} A_2^2 \left[\frac{A_I^2}{R_T} \int_{-\infty}^{+\infty} |Z_{td}(\omega) H_I(\omega) H_{II}(\omega)|^2 d\omega + \frac{A_I^2}{g_m} \int_{-\infty}^{+\infty} |H_I(\omega) H_{II}(\omega)|^2 d\omega + \right.$$

[11] $$\left. + \frac{1}{R'_2} \int_{-\infty}^{+\infty} |Z_{ueq}(\omega) H_{II}(\omega)|^2 d\omega + \frac{1}{g'_m} \int_{-\infty}^{+\infty} |H_{II}(\omega)|^2 d\omega \right]$$

assuming:

A_1 the voltage gain of the first amplifier

A_2 the voltage gain of the second amplifier

$H_1(\omega)$ the transfer function at no-load voltage of the first part of the equalizer

$H_{II}(\omega)$ the transfer function at no-load voltage of the filter LC.

$Z_{ueq}(\omega)$ the impedance from the standpoint of the second amplifier.

As will become clear in the text below, the gain of the second amplifier is non-essential for the successive developments and is therefore considered equal to 1.

For sufficiently elevated values of A_1, it can be observed that the thermal noise introduced by the second amplifier is negligible with respect to the preceding one.

Under these conditions, indicating with:

$$Y_3 = \frac{2k\vartheta}{\pi}$$

$$Y_1 = K_1^2 K_2^2 K_3^2 / R_T$$

[12] $$P_1 = \int_0^\infty \frac{d\omega}{[\omega^4 + (C^2 - 2D)\omega^2 + D^2]\left(\omega^2 + \frac{1}{\tau_2^2}\right)\left(\omega^2 + \frac{1}{\tau_3^2}\right)}$$

$$Y_2 = K_2^2 K_3^2 / g_m$$

$$P_2 = \int_0^\infty \frac{\left(\omega^2 + \frac{1}{\tau_1^2}\right) d\omega}{[\omega^4 + (C^2 - 2D)\omega^2 + D^2]\left(\omega^2 + \frac{1}{\tau_2^2}\right)\left(\omega^2 + \frac{1}{\tau_3^2}\right)}$$

relation [11] can be written

[13] $$N = Y_3 \{Y_1 P_1 + Y_2 P_2\}$$

Table 1 gives the values of N in terms of ω_d.

5 - Calculation of the Signal/Noise Ratio for a Fixed P_e

Considering a Gaussian form input photocurrent characterized by the parameter α, by doing digital convolutions we find various forms for the output signal corresponding to the various selections for the parameter ω_d as shown in Figure 3, in which a normalization has been carried out with respect to the maximum value.

For each pair of values α and ω_d, it is possible to calculate the course of the probability of error P_e in terms of the ratio $S/\sqrt{N}$, between the peak value of the signal at the moment of sampling and the effective value of the noise. To continue this calculation, some results of which are shown in Fig. 4, we used the method reported in (7).

$\omega_0/2\pi \cdot 10^{-8}$ [s^{-1}]	$\varepsilon \cdot 10^{-8}$ [s^{-1}]	$D \cdot 10^{-16}$ [s^{-2}]	L_3 [μH]	C_3 [pF]	$\sqrt{N} \cdot 10^{7}$ [V]	ξ [V]$\cdot 10^{-19}$ 0.1	0.2	0.3	0.4	H 0.1	0.2	0.3	0.4	$P_{rich.}$ [dbm] α=0.1	α=0.2	α=0.3	α=0.4
10.0	.3749	.2111	17.19	28.91	21.98	2.206	1.705	1.282	.9913	12.09	12.24	12.66	12.37	-51.3	-50.3	-49.0	-47.7
10.4	.4649	.2489	18.46	22.83	21.88	2.173	1.655	1.242	.9629	12.02	12.09	12.24	12.37	-51.3	-49.5	-48.7	-47.5
10.6	.5401	.2868	18.80	19.47	22.24	2.170	1.632	1.220	.9481	11.90	12.02	12.02	12.44	-51.3	-49.4	-48.6	-46.4
11.2	.6068	.3250	18.74	17.23	22.76	2.178	1.619	1.205	.9388	11.89	11.90	11.90	12.52	-50.6	-49.3	-48.5	-46.6
11.6	.6678	.3639	18.48	15.60	23.35	2.193	1.612	1.197	.9321	11.90	11.89	11.89	12.59	-50.5	-49.2	-47.4	-46.1

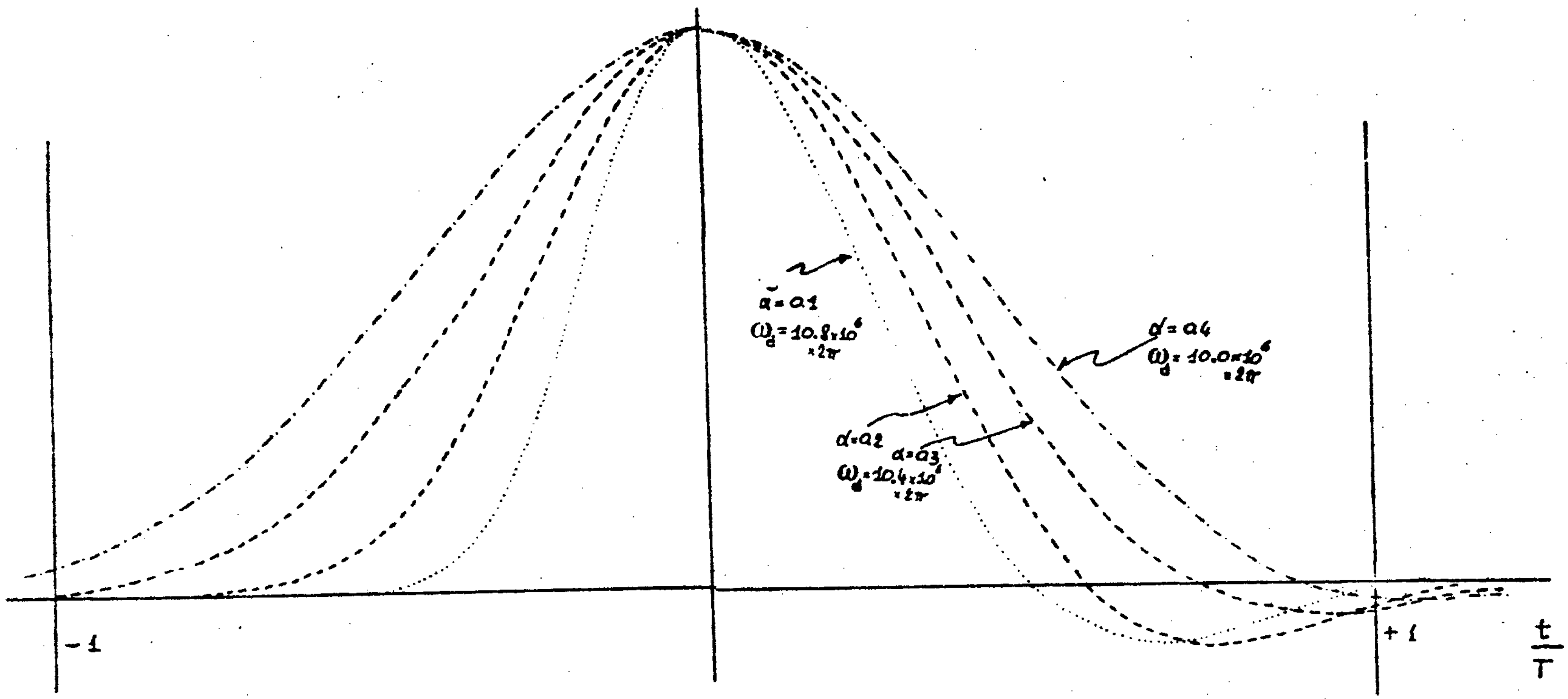
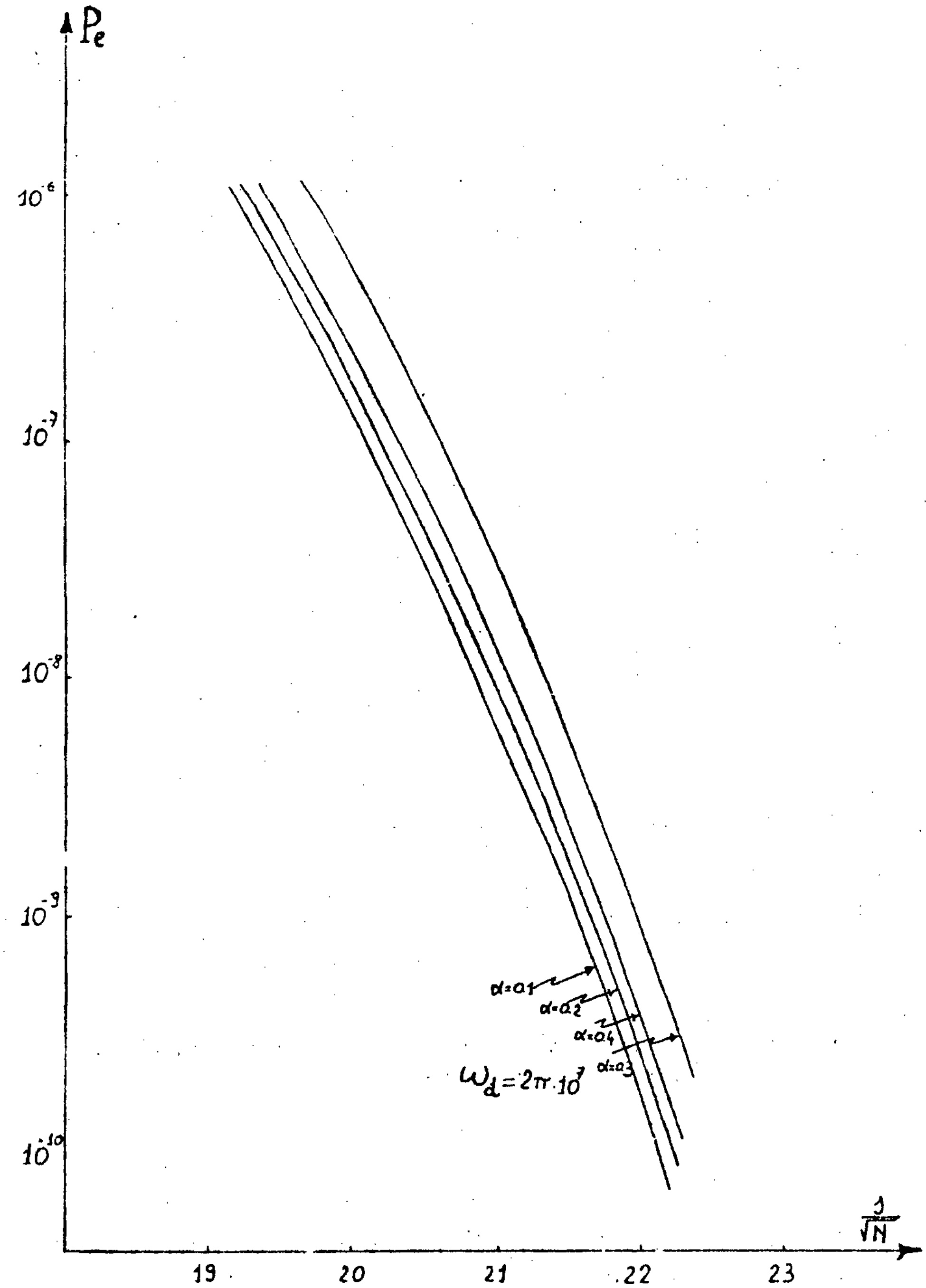


Fig. 3



P_e
10^{-6}
10^{-7}
10^{-8}
10^{-9}
10^{-10}
$\alpha = 0.1$
$\alpha = 0.2$
$\alpha = 0.4$
$\alpha = 0.3$
$\omega_d = 2\pi \cdot 10^7$
$\frac{1}{\sqrt{N}}$
19
20
21
22
23

Fig. 4

Fig. 4 shows some of these curves, each of which has been calculated for various values of the parameter α for $\omega_d = 2\pi \times 10^7$.

6 - Calculation of the Required Power

Based on what has previously been set forth, it is found that a particular value of the signal/noise ratio $H = s^*/\sqrt{N}$ leaving the final filter corresponds to each value of α and ω_d, for a $P_e = 10^{-9}$, while the value of N is fixed only by the parameter ω_d.

Table 1 shows some values of $s^*/\sqrt{N}$ (in natural values) in terms of α and ω_d.

Now having access to the values of $\sqrt{N}$ and H for the various pairs of α and ω_d values, we can calculate the value of a signal $s^* = H \times \sqrt{N}$ for the cases under investigation.

Keeping in mind that the network under investigation is linear, we use s to represent the peak voltage value of the output signal when a photocurrent is present in input whose maximum value is
$\hat{I}i = 1/\sqrt{2\pi}\ \alpha T$.

The s values corresponding to the previously made selections of α and ω_d are reported in Table 1.

Knowing in addition that the optical power in input is linked to the photocurrent by:

(b) $$P_i(t) = \frac{h\nu}{\eta e} I_i(t)$$

or also

(c) $$P_i(t) = \frac{h\nu}{\eta e} \hat{I}_i e \quad exp - [t^2/(\sqrt{2}\alpha T)^2]$$

and furthermore that the energy required is:

(d) $$E = \frac{h\nu}{\eta e} \hat{I}_i \sqrt{2}\alpha T$$

the following expression is obtained for the average optical power per impulse required to have a $P_e = 10^{-9}$:

[14] $$P_{rich} = \frac{h\nu}{2\eta e T} \frac{s^*}{s}$$

Table 1 shows some values of the average power per impulse required for different values of the parameters α and ω_d.

The values of the power required, selecting $\omega_d = 2\pi \times 10^7$, are reported in Figure 5.

The curve plotted is that calculated by Personick, assuming as the pulse at the output of the equalizer that relative to the raised cosine with roll-off equal to 1.

Conclusions

A receiving network design was studied for optic communication systems operating at a frequency of 8,448 Mbit/sec.

In particular the equalizer was built with two networks separated by one amplifying stage.

The objective of the first is to cancel the low frequency pole introduced by the cutoff impedance of the photodetector and the purpose of the second network is to optimize the intersymbolic interference and the thermal noise of the internal transmission channel.

The optic power required to have a $P_e = 10^{-9}$ was calculated, upon varying the size of the input pulses, assumed to be of Gaussian form, and upon varying the cutoff frequency ω_d of the final filter LC.

A comparison was made between the results obtained in the present paper and those that are obtained when the equalizer is designed on the basis of the raised cosine functions.

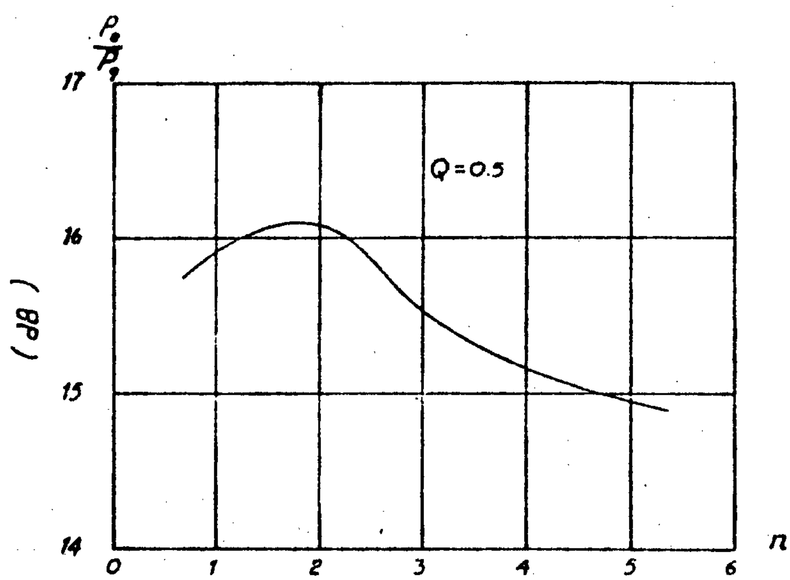


Fig. 5

This comparison shows a diverse worsening of performance according to the value of α but contained within acceptable limits, for which reason in view of the simplicity of design of the receiving network analyzed here, a subsequent investigation might prove interesting at frequencies of higher figures than those to which reference is made in the present paper.

BIBLIOGRAPHY

1. S. D. Personick: "Optimal trade-off of mode-mixing optical filtering and index difference in digital fiber optic communication systems." B.S.T.J., Vol. 53, n. 5, May-June 1974, pp. 785-800.

2. J. E. Goell: "An optical repeater with high-impedance input amplifier", B.S.T.J., Vol. 53, n. 4, April 1974, pp. 629-643.

3. B. Daino, F. Lombardi: "Ottimizzazione di un sistema di trasmissione su fibra ottice", LXXV, Riunione Annuale AEI, Roma, September, 1974

4. F. Lombardi, G. Orlandi: "Design considerations for receiver for digital-optic communication systems", Electronics Letters, September, 1975, Vol. 11, n. 18.

5. S. D. Personick: "Receiver design for digital fiber optic communication systems", B.S.T.J., Vol. 52, n. 6, July-August 1973, pp. 843-885.

6. F. Lombardi, G. Orlandi: "Receiver design and equalization for digital fiber optic communication systems", August 1975, To be published.

7. L. Giacomelli, R. Pietroiusti, A. Roveri: "Transmission impairments due to impedance irregularities of the 2.6/9.5 mm coaxial cable in a high-capacity PCM systems", 1975, to be published on Alta Frequenza.

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INFLUENCE OF POLITICS ON BROADCASTING DISCUSSED

Hamburg DIE ZEIT in German 22 Jul 77 p 9

/Article by "Telebiss": "The Kiel Killers"7

/Text7 Broadcasting is the business of the Lands and must be conducted pluralistically. This valid, wise and porous judgment stems from the Federal Constitutional Court. There is not much that can be made of it -- or, quite the contrary, if one wants to make something of it, one can make everything of it. Stoltenberg, for example.

The Kiel minister-president wants to kill off the NDR/North German Broadcasting Network7, and there is no doubt that he could do it. Since the tri-Land institution is based on a government contract, a cancellation -- correct, incontestable and with due notice -- would make the Hamburg station a nullity.

But what then? Stoltenberg's threat would be truly alarming only if the poor Land of Schleswig-Holstein were in a position to establish its own broadcasting company. But the Kiel killers know full well that this is impossible. Broadcasting is expensive, especially when television transmission is included. A fully equipped station on Kiel Bay would require investments estimated at a billion marks in the initial years.

And here Stoltenberg has to pass. He, like other provincial heads, would like very much to have his own private station. His party associate Kohl wanted the same when he was still minister-president of Rhineland-Palatinate. It annoyed him that his little Land was doomed to provincialism in the matter of broadcasting policy and that, to make matters worse, every programing decision he would so like to have made or passed judgment on was being made by the director in the resort city of Baden-Baden, the headquarters of Southwest Radio. But Kohl's cronies did some figuring, the result being that it would be too expensive for the Rhineland-Palatinate to have its own station. The investment-train pulled out years ago. As far as

Southwest Radio is concerned, the expensive electronic equipment is installed in Baden-Baden; for the NDR it is located in Hamburg.

But what does Stoltenberg want? By threatening murder, he wants to drive the unloved Hamburg "Red Radio" to commit hara-kiri. The Hamburg City Assembly, on the other hand, is playing lifesaver. Oil drips from the official statement to the effect that no move will be made to destroy the public structure of German broadcasting.

Those in Hannover were taken by surprise; at first they said both yes and no. But as nonplused as he was, Minister Hasselmann still let out a smidgen of truth: Improvements must be sought at the NDR, especially in view of the inadequate attention to the concerns of Lower Saxony in their reporting.

Hannover also yearns for its own governmental station, which would be expected to assume the role of an electronic "government gazette." But the reigning sovereign on the Leine /River/ would be equally incapable of financing such an institution.

In the opinion of "Telebiss," the NDR will continue to exist for the simple reason that it is too expensive. Operating costs -- not to mention investments -- run to 500 million marks per year. Almost 80 million marks of this amount are deficits.

What Stoltenberg is seeking is nothing more than a so-called amending cancellation. Those in Kiel want henceforth to play a more intensive and reliable part in deciding what will be broadcast out of Hamburg, only they do not quite know how to go about it. As the voice of his lord and master, press chief Arthur Rathke let it be known that the government desired greater orientation of certain parts of the program toward journalistic soundness and responsible journalism.

This is meaningless verbal nonsense that deserves equally absurd reaction. Hamburg's deputy mayor, Professor Biallas of the FDP, was not to be outdone. He wondered aloud whether an NDR confined to Hamburg should not also publish a daily newspaper in the future -- for purposes of rounding out the journalistic opinion picture.

It is difficult to decide whether Professor Biallas is a nitwit or a sagacious man. He would be stupid if he believed it possible to finance a daily newspaper on top of the NDR's deficits. One would have to call him sagacious if his vaguely worded statement was meant to suggest that henceforth the communications package should be tied up differently. According to Biallas, if broadcasting can get into the newspaper business, then newspapers can certainly go into the broadcasting business.

Each in his way, Stoltenberg and Biallas have hoisted a signal. Public broadcasting is being mismanaged -- in the financial as well as (and particularly) in the journalistic sense. Many journalists within the "system" -- the good ones in particular -- would prefer a hard-headed publisher as a supervisor rather than a director dependent upon party directives.

Just how wretched this public system really is, with its queer constituent supervisory bodies, has just been shown in Saarbruecken. Chosen as the director there was a party hack, not a journalistic expert -- of which there were several to choose from. In future the deputy president of the provincial legislature will preside over the station.

The conclusion for "Telebiss" is this: Radio and television are too important for all of us to be left to selfseeking politicians. Stoltenberg has sounded the alarm, and he quite obviously has not reflected upon the reaction.

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STOLTENBERG'S RELATIONS WITH LOCAL BROADCASTING AUTHORITY EXAMINED

Hamburg DIE ZEIT in German 22 Jul 77 p 9

/Article by Nina Grunenberg: "Stoltenberg's Dangerous Game"7

/Text7 The same ugly refrain has been resounding for a long time at the NDR/North German Broadcasting Network7: The CDU reproved the director "for a lack of political impartiality"; the SPD reproved the CDU "for arbitrary political acts." The director went to court to seek rights that the parties were indeed no longer granting him. And there was nothing left for the editorial board but to see "its worst expectations confirmed" once again.

This unmitigated lamentation was abruptly interrupted on 14 July by CDU Minister-President Stoltenberg's threat of /contract7 cancellation. The move came unexpectedly. True, politicians of other persuasions had secretly indulged in similar reflections. The Hamburg FDP as well as the Schleswig-Holstein SPD -- both of them Land associations ensconced on the left fringe of their own parties -- have already conferred on changes in the structure of the tri-Land institution. But no one in the SPD in Schleswig-Holstein, Hamburg and Lower Saxony -- the FDP has little to say with regard to the NDR -- caught on in time that Stoltenberg was just as serious in his wrath toward the NDR as he has been saying repeatedly since the Brokdorf demonstrations.

Now good counsel is dear, and where it is to come from, no one knows. Ernst Albrecht, CDU minister-president of Lower Saxony, is refraining from comment, a situation made easier for him by a vacation in the Steiermark. But original thoughts on broadcasting policy are rare in Hannover at any time.

Hans-Ulrich Klose, as Hamburg's chief mayor the third member of the group of governmental heads responsible for the NDR, similarly seems not to have understood yet that the NDR crisis opens up "for discussion the basic conception of the public broadcasting system"

(Peter Christian Hall in "medium"). Indeed, the carelessness with which both SPD and CDU are treating the NDR borders on the adventurous.

Even Gerhard Stoltenberg does not want to let the NDR "fall apart." With his threat of last Thursday he wants to achieve only that which in his opinion has always been his due but has been denied him by the NDR: fair treatment. He considered the latest blatant abuse to be the NDR's reporting on Brokdorf.

Brokdorf is a name that has become a bitter fixation with Stoltenberg. This is not only because his CDU government in Schleswig-Holstein had to go out on a limb for the Bonn SPD/FDP government's energy program, but also because Stoltenberg the conservative politician of order, equipped with neither compassion nor vision for the concerns and nuclear fears of the younger generation, saw the state in serious danger there, undermined by the "devotees of chaos" and the critical view of the NDR on this subject.

In the second place, Stoltenberg's burning interest in the NDR is explained by his party's bare majority in the provincial legislature in Kiel. Wherever voter margins are becoming increasingly smaller, politicians increasingly believe that they have a right to support and aid from the media. Stoltenberg's attack on the NDR thus definitely relates to the Schleswig-Holstein legislative elections scheduled for 1979.

Thirdly, the NDR's 80-million-mark deficit enrages Stoltenberg. The institution's hitherto rather modest cost-cutting deliberations are viewed in Kiel as proof that the NDR not only does not seriously intend to economize but at best intends in case of bankruptcy to shift its debts to its so-called "parent corporation" -- to Schleswig -Holstein, Lower Saxony and Hamburg. To be sure, Stoltenberg's rage becomes less convincing in view of the fact that the parties on the NDR's board of governors, his own party included, have given their blessing to the institution's budgets.

Right for the Wrong Reasons

Those in Kiel wish to make specific changes in the following points of the government contract with the NDR: first of all, legal control which has been exercised by the Land where the NDR is located, the Hanseatic City of Hamburg, acting for the other two Lands. The Kiel view is that legal control should rotate among the three Lands so that each of them can have a turn at "fulfillment."

Secondly, Stoltenberg wants very much to give a more concrete final form to the program principles formulated in the government contract with the NDR. He believes this to be the only way to obtain that "program balance" that he sees violated by the NDR journalists.

Gerhard Stoltenberg has begun a dangerous game with his threat of cancellation. He started the race, but whether he can still control its course is questionable. In truth, his CDU is upset about very few people in very few programs, and it is right in this regard. But it is right for the wrong reasons. "Objective reporting" at the NDR will be impossible as long as the parties continue to apportion among themselves positions and editors and enlist their sympathies for their own interests, and as long as the employees continue to earn their freedom to maneuver not through good journalism but through membership in the SPD's Ahrensburg group or friendships in the CDU.

There is no one among the politicians who exercise control within the NDR's board of governors who might have the stature and the will to "grab the tiger by the tail" and take Stoltenberg's concerns seriously. The flags of both CDU and SPD are signaling struggle and strife. This could bring the breakup of the NDR although no one actually wants it. It is for this very reason that Stoltenberg's game is risky.

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STOLTENBERG INTERVIEWED ON LOCAL BROADCASTING PROBLEMS

Cologne RHEINISCHER MERKUR in German 22 Jul 77 p 11

/Interview with Schleswig-Holstein Minister-President Gerhard Stoltenberg by RHEINISCHE MERKUR on 22 July; place not given: "Ban on Radio Brokdorf"/

/Text/ Question: Herr Minister-President, following your statement on renouncing the government contract with the NDR/North German Broadcasting Network/, is there any chance at all for the institution to continue to exist in its present form?

Answer: That depends on the negotiations that we plan to conduct in order to establish a new and decidedly improved legal basis. If we succeed in formulating those provisions which make obligatory a non-partisan and balanced approach in reporting so clearly that they are also subsequently binding and are adhered to, and if financial problems can be solved satisfactorily, I do not rule out a continuation of the NDR as a tri-Land institution.

Question: In what respect, then, do you think the NDR's program principles are being violated?

Answer: Criticism of the NDR and doubts about whether its program conforms to the government contract in all areas apply primarily to political broadcasts in the broadest sense. Included here are the radio and TV magazines, also the musical programs frequently interspersed with political comment by many editors and the one-sided, Marxist-oriented, so-called cultural broadcasts, primarily on the second program. The precepts of journalistic impartiality, exactness and obligation to truth are disregarded very often here. And in this area we even had a whole series of grievances and counterclaims which in some instances were aired only after court rulings had forced the issue.

Question: Is the NDR then truly tinged with red through and through?

Answer: I have always stressed that the great majority of NDR employees produce good journalism and also abide by the terms of the government contract. This applies, let us say, in the case of news, television plays or documentaries, but in many political broadcasts such as "Panorama" journalists talk about almost anything without having appropriate information or qualifications. Too often, ideological blinders are taking the place of concrete knowledge.

Question: What should the new legal foundation be like, then?

Answer: We want to increase the very limited opportunities for the democratically elected broadcasting boards to exert their influence and the especially limited opportunities for legal control by the state. These have already been expanded to a much greater extent in other government contracts involving Land broadcasting institutions. But it has been our experience that even majority decisions of the board of governors have simply not been acknowledged by the director.

Question: Does this not indicate the desire for more influence on program content?

Answer: Our opponents insinuate that we want a Stoltenberg government broadcasting company. We wish only to make one of our Land's most important instruments for forming public opinion into an institution that is capable of functioning once again, one in which programing is again characterized by objectivity and exactness. Right now we are faced with financial mismanagement and the fact that the institution's organs are increasingly losing their ability to function because leftist influences are politicizing the NDR in a one-sided manner.

Question: Your critics in the ranks of the SPD and FDP charge you with an "arbitrary political act" and political "extortion"...

Answer: ...thereby missing the target completely. I do not understand this commotion. We have resolved to take a step that is expressly provided for in the government contract. If the SPD and FDP are truly concerned about the NDR's future and not merely about providing a new emotional push for its left-wing socialist employees, then they should be joining with us to help solve these serious problems, not sending up a smoke screen in order to divert attention from the facts.

Question: At the NDR there is great uneasiness over your announcement on the one hand, but on the other there is the hope that perhaps it was only a warning shot not to be taken very seriously...

Answer: I can only warn against such a frivolous assessment of our resolve. Of course, we shall first examine the situation thoroughly to see whether a sweeping reform of the NDR is possible in its present form. If, however, we are unsuccessful in bringing about this reform we are prepared to accept other solutions...

Question: ... And establish Radio Kiel?

Answer: It is possible to think of several structures in use at two or three institutions that are more balanced and convincing than the present condition. We shall be prompt in informing the public of our definitive ideas. Indeed, what surprises me is that of all people the SPD and FDP, who everywhere else speak out for change and for cracking open encrusted structures, are opposing a constructive and open-ended debate on the very question of reforming the NDR.

Question: In its 1977 budget the NDR shows a deficit of 78.8 million marks. How could a deficit like this have developed?

Answer: For years the NDR has spent freely. Personnel costs have contributed substantially to the poor state of its finances. For example, these costs rose by 156 percent at the NDR between 1970 and 1977; at the WDR/West German Broadcasting Network/ they increased by only 102 percent for the same period. A further example: in 1976 the NDR's personnel expenses per employee, excluding old-age pension contributions, were considerably higher -- 4,125 marks per year higher -- than the ARD/Working Group of FRG Broadcasting Institutes/ average. Had the NDR kept to the ARD average in 1976, it would have saved 13.7 million marks in expenses on its active employees alone. This sample calculation makes clear what kind of sums are involved here.

Question: How do you hope to bring light into the financial jungle?

Answer: The Land government has resolved to negotiate with the other Lands party to the contract on how to guarantee an examination of the NDR which will give a comprehensive overview of all the reasons for the institution's catastrophic financial situation. The seriousness of the situation cannot be described more aptly than was done by the Hamburg Office of Audit in its most recent report: "A businessman in a comparable situation would have to take immediate and drastic measures to reorganize his financial affairs." Whereas, we are still waiting in vain for the responsible director to present a convincing plan for meeting the crisis.

Question: What is your conception of a precise examination?

Answer: Hitherto the Hamburg Office of Audit has not been empowered to conduct a comprehensive audit of overall business and budgetary management. We want to change that. We intend to use negotiations on a new contractual arrangement to make this right of audit permanent and binding and to adapt it according to scope and content to the auditing procedures of other public institutions. Moreover, we intend to make certain that the auditing offices of all the Lands party to the contract are permitted to make an examination and that the reports are made available to the governments and parliaments.

Question: Who will actually pay off the debts in the theoretical case of bankruptcy?

Answer: Herr Neuffer made a remarkable statement about that. In case of bankruptcy the three founding Lands, as a "parent corporation," would be liable for the institution's debts. It is interesting to know that the Land government -- which in the director's view should otherwise be merely an object of reporting or possibly criticism -- may in the theoretical case of bankruptcy assume at least the role of a parent corporation. On this point I can only say unequivocally that in no event will we accept the fact that one day the Schleswig-Holstein taxpayers could be sharing the consequences of the NDR's deficient and in some instances extravagant financial policies.

Question: But why are you so late with your public criticism of the NDR's financial policies?

Answer: Out of loyalty to the institution and its credit standing for years, we attempted to submit our criticism in internal discussions and correspondence. We went to the public only after we were forced to conclude that our arguments were repeatedly being disregarded, and with a large measure of arrogance and in some instances a lack of objectivity as well.

Question: Do you think, for example, that cable television is a suitable lever to use in challenging the broadcasting monopoly?

Answer: Without a doubt, the new cable and media technology offers an important opportunity to broaden the spectrum of opinion in our media landscape, particularly as regards the monopolistic system of public broadcasting institutions. We are therefore encouraging the selection of as great a variety of experimental systems as possible in the cable pilot projects. In our opinion, alternative carriers should also be tried out here. This means that within the framework of cable pilot projects, programing is not to be the exclusive territory of the public broadcasting companies; the private sector must have its chance as well. In this way we intend to make possible fruitful competition that promotes a variety of opinions.

Question: Are you also thinking of participation by the regional press here?

Answer: Yes. We must be clear on one point: Cable television will develop in the local and regional sectors in particular, since once a city or town has been "cabled," the way will be open to local television without large technical and financial outlays.

Question: The government contract with the NDR, however, is still in conflict with the idea of a greater variety of views in the field of broadcasting in that the contract grants exclusively to the NDR the broadcasting monopoly for the territory encompassing the three Lands party to the contract...

Answer: ...But according to precedents of the Federal Constitutional Court, the present legal status is in no way an imperative because of technical developments that have been made in the meantime. So the Lands are not obligated to establish or sanction such a monopoly for a public institution. Also with a view to new developments in media technology, we shall therefore investigate just how much reason there is to use new regulations to broaden the spectrum of opinion in the field of broadcasting as well.

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WEST GERMANY

PRIVATELY PRODUCED VIDEOTEXT AUTHORIZED DURING BERLIN RADIO FAIR

Frankfurt/Main FEANKFURTER ALLGEMEINE in German 15 Jun 77 p 6

[Article: "Publishers Authorized To Show Video Newspaper"]

[Text] During the Berlin Radio Exhibition in August of this year, newspaper publishers may circulate their electronically transmitted video newspaper, videotext, throughout the cable network of the fairgrounds. "After thorough examination of the circumstantial and legal situation," the Berlin City Assembly yesterday decided to issue the clearance certificate applied for by the Federal Association of German Newspaper Publishers (BDZV). Thus, in addition to the videotext broadcast by the public television stations, an electronic text-transmission system produced by private business will be presented on the television screen for the first time during the exhibition. The Federal Laender consulted beforehand by the Berlin Senat are now as before of the opinion that videotext belongs within the realm of broadcasting and that it is the prerogative of the Land broadcasting institutes to sponsor this type of transmission. In their opinion this does not, however, apply to the premiere presentation of this new technique at an exposition. The newspaper publishers regard the new medium as a newspaper since the news texts are transmitted with the aid of a new kind of electronic distribution system.

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END