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PRIORITIES FOR STANDARDIZATION IN SPECIFIC SECTORS 2/

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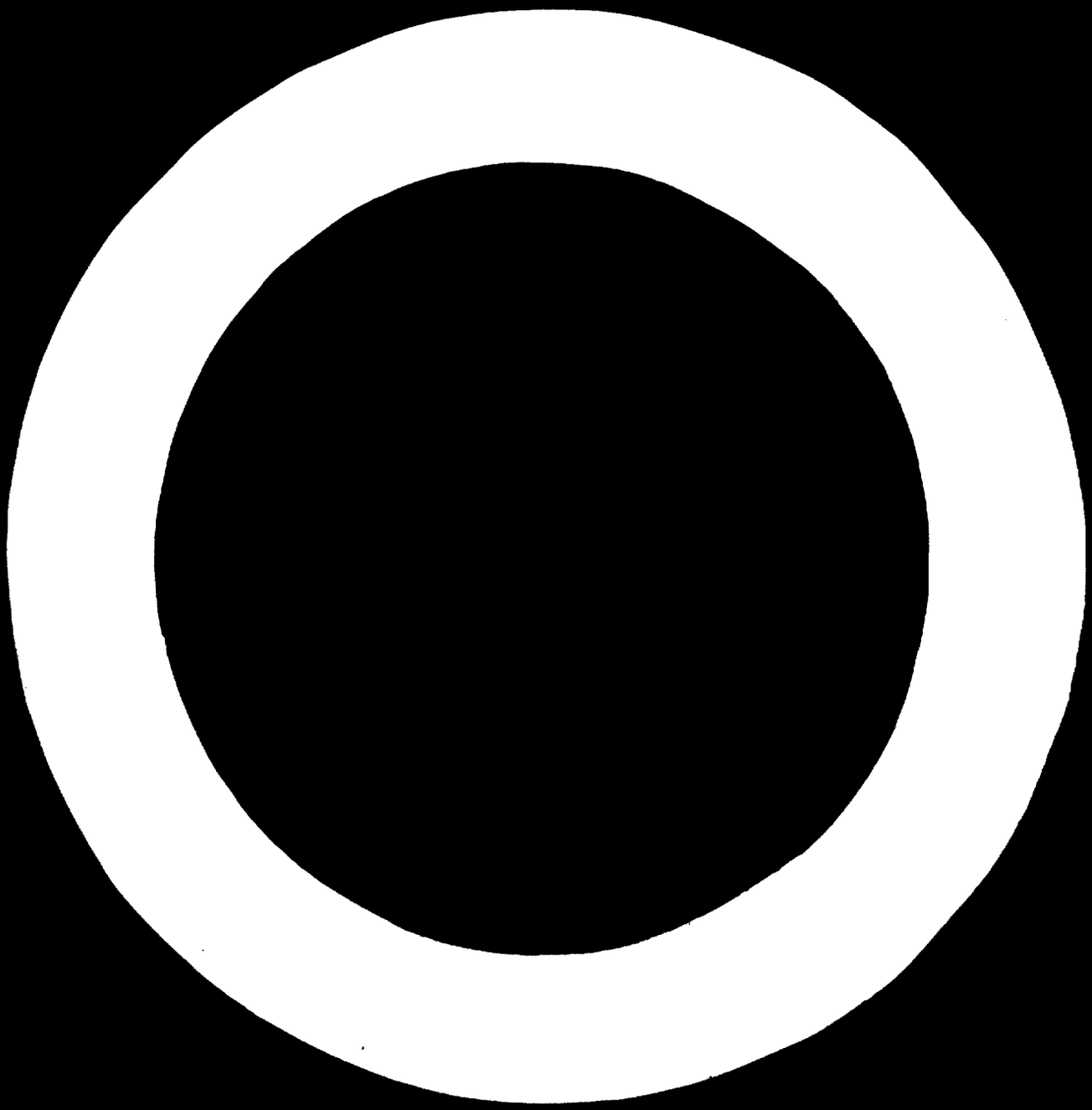

Priorities for Standardization in Specific Sectors

1 General

An analysis of the priorities for standardization must be individual for each country concerned. Regard must be taken to the degree of development the country has reached, to the main export products, to the standardization activities already in existence etc.

Especially the last mentioned "regard to" can need an explanation. Fact is that we have no country in the world where standardization is not going on. What makes this less obvious is that other words than standards and standardization are used. One ministry may speak and write about specifications, another governmental body of rules, codes of practice etc. However, where clear descriptive rules are aimed at these may in a broad sense be called standards. When a standards institution is under setting up or in its puppyhood the tasks are so many that those fields already tackled by some authority may still be left to it. A duplicate in efforts only to satisfy the prestige must not exist.

The state of affairs cannot in any country be changes "over the night" not even over the year. The time factor must be accepted where any change of importance is aimed at. In all developping countries great attention is therefore paid to the education on all levels. Standardisation can fcilitate the work. In the same way the health service under construction can get assistance from the standards people.

The capacity of a newly started standards institution - mainly a question of economical means - also influences upon the working programme.

Many discussions have been held to clarify which technical problems should be dealt with in legal documents and which in standards. I never heard a clear answer given. Especially where the form compulsory standards is approved the question is rather academic.

After having given those general points of view I repeat the first sentence in a somewhat modified form:

> Do not accept a complete working programme from another country without a thorough study.

Observe the different needs for developping and industrial countries.

Below some items are listed and commented upon. They are considered be of roughly the same interest and importance for all developping countries. The specific export problems and products are left out as they are dealt with in another paper.

Standardization of dimensions is important but not the only working task.

2 Quantities and units

A country can survive with a hotch-potch of units for use in trade, technique and physics. However, it can not develop efficiently.

Measuring devices used in the trade should be inspected. To develop sound rules for an inspectorate the units to be used must be stated and defined.

Many developping countries enjoy aid from other countries for the building up of schools on all levels. At a technical college I visited sixteen teachers represented eight different nationalities. Each lecturer used the units he was used to from his own studies twenty - thirty years ago. Poor students, they were simply confused.

Most people speak of the metric system as the ideal one. As this term does not at all define a system the one who speaks in favour of the metric system just explains his lack of deep knowledge in the field.

The international system under rapid spreading is the SI and the publishing of this in a national standard must be a task among the first. The implementation of it can best be organized by lectures and exercises in all types of schools. It must be understood that the pupils - as an average taken - are out in the practical life already after 5 - 6 years of studies and then able to introduce the system in their resp. sectors.

All national standards and other official documents should of course use the accepted units consistently.

3 Horse carriages

A horse is in the industrial countries something very rare and mainly used for the owner's recreation. All transportation of goods is made on lorries and railroads. The situation will be the same in the developping countries but it will take some time, this is a fact to be accepted.

In our developping countries lorries and railroads carry only a smaller part of the total freight amount. The bigger part is carried on the back of horses, mules and donkeys. This is quite natural as the system of roads atill mainly comprises paths. In all countries, however, the importance of a tighter network of roads is understood and the construction of new roads is a task with priority which will successively lead to a better road system. For some decades the use of horse carriages will be a natural intermediate stage between the transportation on packhorses and lorries.

The carriages must be cheap, as light as possible but still very strong. Broken parts should be possible to replace by spare parts.

If a standardization of carriages is started the study of the most suitable types can be centralized and thereby be kept cheap. Experience from abroad can be collected and made use of. The shaft and the wheels can be specified in detail. If e.g. the length of the shaft, form of the shaft and shaft ends, type and size of screw thread are laid down in a standard this can form the basis for a specialized production. The same is applicable to the wheels for which the design of the hub, wheel diameter and width are the fundamental features. The design should foresee use of locally available material in greatest possible extent.

For a small scale industry starting this type of production from scratch a standard seems me be the ideal basis. The result will be a good and cheap product. Through the standardization the interchangeability is taken care of.

I appreciate the local handicraft. However, when a carriage is concerned, handicraft cannot compete with an industrial production when price and quality are concerned.

4 Screw Threads

There have been many systems of screw threads in use for ordinary purposes during the past 40 - 50 years. Let me mention Whitworth, BA, metric, unified as the most important ones.

Except the US where unified screw threads dominate the increased use of the modern metric screw threads is remarkable. To a certain degree this development is linked to the changing over to the system of metric units in general, or to be more specific to the SI. The trend is obvious and it is no argument any longer to refer to the U.S.A.'s inch threads. Very likely in so short a time as twenty years the US practice will be more in direction of metric threads.

We try to create lasting systems. Changes after a short time means spoiled investments. In the mechanical industries and for mechanical designs the screw threads form an important part. As we all are anxious to reduce the industrial lead the wealthy countries have we must do something ourselves. We must establish systems in our standards.

The standards must be made known in technical schools and concerned workshops. All less current thread systems may be mentioned in textbooks etc. but it should be made clear that the metric system is that one to be used wherever possible. The international series is comprehensive and for less advanced countries an economic selection can be made.

As there are so many tools,,elements, components and other products related to the screw threads a correct choice of screw threads can save millions of dollars (US $) in some few years.

4. DIAMETER/PITCH COMBINATIONS

TABLE – Diameter/pitch

Dimensions in millimetres

Nominal diameters			Pitches									
Col. 1 1st choice	Col. 2 2nd choice	Col. 3 3rd choice	coarse	fine								
				3	2	1.5	1.25	1	0.75	0.5	0.35	0.25	0.2
1			0.25										0.2
1.2	1.1		0.25										0.2
	1.4		0.3										0.2
1.6			0.35										0.2
2	1.8		0.4									0.25	0.2
2.5	2.2		0.45								0.35	0.25	
3			0.5								0.35		

FIGURE 1

Those countries who have not suffered from the general hotch-potch can feel happy. Nevertheless they should hurry to standardise screw threads to avoid confusion. The ISO Recommendations R 261 and R 262 can easily be transformed into national standards.

5 Cans

Export of tinned fruit and other foodstuffs is of importance for many countries. There are international recommendations for the size of cylindrical cans and they are to be followed. In transportation abroad pallets are used to a very high extent. If the dimensions of the cans are just taken by a chance the foreign purchaser will find that the cans do not fit his pallets and shelves and requests the exporter to change. By observering ISO results in planning and standardization such a change can be avoided and the product enjoy constant confidence.

Cans are manufactured in many small industries that should be made familiar with the standard that may be set up.

The declaration of the contents should of course be done with SI units. The rest we leave to marketing people.

6 Social Life

Also in the social life standardization has a task. This goes back to the fact that it is unpractical to give too many technical details in a law.

The hygienic conditions in industries and on other working places must be specified in an official document to give the necessary background for the planning and construction of new buildings. E.g. number of toilets and wash stands per a certain number of employees is an example of what can be standardized as a minimum requirement. Where a special authority for buildings already exists this maybe is interested to do the necessary research work. However, the best form to publish the requirements is as standards. This type of

documents should be regularly checked in respect of their correctness and whenever need may arise be revised. Experience shows that no other types of documents can be so systematically kept up to date.

A standard should not go more into details than necessary. I can see no reasons to forbid that sides of a building are completely built up of glass. However, the technical requirement can simply say that the minimum area of the windows should be 1,5 m^2 per 10 m^2 floor area or what the figures agreed upon may be.

Such minimum standards can mean an important step towards better hygienic comfort and security for the employees. As new industries are successively started the need for requirements is great and appreciated by all parties concerned, architects, constructors, authorities, owners and workers.

7 Pipes

Pipes made of concrete, steel, cast iron and plastics are all of importance. Also other materials are used for pipes.

Sizes, screw threads and qualities of pipes must be standardized to give strict information to the producer and to the user.

The use of pipes is steadily increasing in pace with the urbanization. The supply of drinking water is often situated far from the dense living areas. Ten kilometers of water main pipes is not unusual.

In the street systems the total pipe length may be ten times the mentioned length and considerable quantities are also used in the modern buildings and in industries. As big quantities are concerned a low price must be aimed at.

An optimum number of diameters must be laid down to secure the economy of the long series. If we here in the first place think of the steel pipes it is obvious that the joints of the pipes must be reliable. Whether sockets (threaded couplings) or welded joints are used the dimensions must be the correct ones.

A reasonable number of sizes can make it possible to start a domestic pipe mill. Is this not the case a favourable agreement can be reached with a foreign supplier. Few sizes lead to larger quantities of each size and more suppliers get interested with a useful competition as a result. The succeaive deliveries can follow a plan agreed upon when the order of the total lot is placed.

The variety of necessary pipe fittings, values etc. will be very limited if the number of pipes is kept low.

By standardizing the pipes as a selection of the total international list it will be possible to replace the pipes after as long time as fifty years if necessary.

Threaded pipes exist within the diameter range 15 up to 100 mm. Two types of threads exist for pipes. This is definitely one type too much.

Pipe threads used in the U.S.A. do not conform with the ISO/R 7-1954 Recommendation. Nevertheless new factories are built up in some countries and non-ISO-threads introduced. The problem this creates if ISO pipes are imported can only be understood in the trenches where the pipes are laid down. Even more so after 20 years.

The production of pipes and hoses of plastics is in principle a rather simple one which does not need great investments. New small scale industries are therefore coming up. Here again we face the need of exact dimensions to secure interchangeability and possibility to use the products from different manufacturers. In other words the tolerances must be specified.

Most of our countries have a very hot climate. This must be regarded for the choice of material. Some materials loose their strength after some time and cannot stand the pressure of the water, oil, air or what it may be in the pipe. The material must be chosen in relation to temperature and pressure at use.

Special demands on the material is also necessary when the pipes are used for drinking water. The water must not dissolve any elements from the material and get a bad taste.

For the sewerages concrete pipes are often used. Besides the dimensions the tightness is here of importance. This means that the walls must be homogeneous and the materials carefully selected and mixed. The joints must also have the correct design.

With this I have tried to point out the need of standards for pipes. Regardless of sort of material the same parameters must be regarded: minor and major diameter, screw threads, sockets, properties of material and inspection.

To facilitate for the purchaser-consumer the pipes should be officially inspected and given a stamp of approval. The best is that the standards institution has a mark of its own to indicate conformity with standards.

By the use of such a mark the types and qualities that do not meet the specifications are sooner or later forced out of the market.

8 Electrical Apparatus and Devices

The classical example of standardization is that with electrical plugs and outlets that do not fit together. It is still valid for many countries.

By the adoption of the 220/380 volt system which I think is common for all countries represented here it would be possible to proceed and adopt one value for the diameters of the pins and the distance between pins. For the mentioned voltage we can learn quite a lot from the European practice which is rather uniform.

The increasing electrification is a strong argument for the standardization of plugs and outlets.

I have two examples from the export/import of electrical tablelamps. One lot came from Europe where the lamps had not met the current requirements in respect of safety. They were exported to an African country where they gladly passed the border. In this case I know that the exporter was very well familiar with regulations that reflect a common quality level. However, better to sell them to Africa than to scrap them was obviously his thinking.

The other lot came from the far east. In this case I do not know the quality consciousness of the producer. The lamps were very cheap. I would say too cheap. The best buy is not always the cheapest buy. You cannot very well assume that the customer - maybe he is illitterate - can have an opinion about type and dimension of cables, type of switcher etc.

As soon as safety is concerned the society must feel its responsibility. The best form to secure an acceptable minimum quality is to standardize the requirements. The national standards institution should have close contacts with IEC in one or another form. There are also other international organizations for testing to which the national institution should have open channels.

9 Gas cylinders

Different gases are used to an increasing extent in industries and in hospitals. Often they are produced at some few specialized industries. Of course these keep the different cylinders apart during the manufacturing processes and in stock. So does the purchaser whether this is a hospital, a workshop or a building place. However, labels, different sizes of cylinders etc. are not enough to indicate the contents. The cylinders should be clearly painted with the specific colours which are standardized for the different gases.

The developping countries are in a lucky position in respect of standardization in some fields. E.g. they have no great consumption of industrial and medical gases and they have no established practice for the marking of gas cylinders. Consequently they should hurry to accept the international rules. Those who can establish a prophlactic standard are really lucky.

The developping countries have to hurry with their standardization, otherwise it will mean an expensive and troublesome affair when standardization should come to clear up a mess. The prophylactic way is the better.

To fulfill the discussion of gas cylinders I would like to mention that also the screw threads and some essentional features of the valves are standardized.

10 Test methods for concrete

For a bridge it was specified in an appendix to the contract that "strength shall be minimum x kgf/cm^2". The contractor started work and sent test specimens to a specialized laboratory. The values reported showed that the minimum figure was not reached. Another more costly mixture had to be used and the contractor's profit margin was reduced.

Later on the constructor raised the question of the high figure x with the client, who strongly explained that the value which was quite normal never before had caused any problems. As a result of this it was found out that the two sides spoke two different languages. The client had foreseen a test method with cylindrical test specimens. The contractor and the laboratory hu used never thought of anything but the cubic specimen.

Values obtained for these two types of specimens cannot be compared or converted.

Let us also think of what could have happened with the bridge if the routines of the two parties had been the opposite.

To be able to specify a requirement and to dispute of a test result reached, the test method to be used must be clearly defined, the test specimen included. This type of standardization takes a good part of the time for a standards institution.

The related example with the misunderstood specimens reflect the European resp the American standards.

11 Paper

Also where labor is cheap the office work nevertheless represents a notable part of the total costs.

Standardized paper sizes can contribute to a reduction of this cost. This reduction has many ressons. By specifying the sizes to some few ones the benefit of the bulk quantities is reached. The paper mills can plan their production and avoid waste in the cutting.

The solution here is acceptance of the A-sizes, which means those having a side relation 1:1,41 (1: 2).

By the use of especially size A4 (210 x 297 mm) the design of forms is facilitated. Also typing of different forms can be made in one operation if the same paper size is used and the same basic rules for the forms.

You often meet the attitude that paper and office standardization is only to demonstrate systematization and of no real importance. This is completely wrong. The background is also here the better economy. E.g. the production of text-books for schools can be more strict. Binders cannot be standardized until the paper sizes are settled. The same is valid for envelopes etc.

18 Steel

In the construction of buildings, bridges, machines etc. steel plays an important role.

The quality - represented by tensile strength, brittleness, suitability for welding etc. - is of a fundamental importance for the calculation of strength and the dimensioning of current parts. The sizes available is another factor. Are there very many diameters of e.g. reinforcement steel and many heights of different types of beams we can almost feel sure they will not be able to get from stock just when we need them. If the number of varieties is very well planned all the products will be regularly asked for and available.

The specifications for qualities as well as for sizes are best published as national standards. The standards people can analyse the actual need and compare with the international and foreign standards and decide upon an economical selection in respect of qualities as well as sizes.

In consultation with concerned ministries and domestic producers it can be found out what should be produced in the country and what should be imported. An attempt to produce all standardized varieties in the own country is seldom correct. The standard does not primarily state where the products should be made. It indicates what is needed according to a sound technical - economical analysis.

The standard can form a basis for determining the customs duties. For what is produced in the country a protection may be needed, for other qualities and sizes the duties may be very much reduced or deleted.

This technique with graded customs duties is not applicable to steel only, but to all imported goods. As long as customs regulations exist between countries this weapon should be considered.

A considerable amount of standardizing must be attached to steel and steel products especially if the country has its own domestic production.

13 Standardization in Specific Sectors

A number of glimpses of standardization is mentioned in the foregoing without any strictly planned order. I myself deem all the examples mentioned be of importance for all developping countries and some of them for the industrial ones as well. Very likely they have their standards since long. However, standards should be regularly checked to find out if they are fully up-to-date, if they conform with international recommendations or other national standards. In other words, work with a standard is never definitely finished. Like for different products improvements in respect of functioning and production costs can always be done.

Let me now systemize the glimpses and examples to fulfil what is promised in the heading.

Sector	Current standardization task	Described in clause	Benefits from a standardization
Public life, Education	Quantities and units	2	A logical, simple system for trade, education and research
Transportation	Horse carriages	3	An accelerated change to the next development stage. Cheap constructions, spare parts
Industrialization, Technical education	Screw threads	4	A system to facilitate for an industrial development in the mechanical field
	Pipes	5	The economy of fewer, defined products. Stimulating domestic production
Social life Labor safety	Sanitary equipment, personal safety	6	Better health and working results, centralized rules for industrial buildings
	Gas cylinders	9	Increased safety
Packaging	Hermetically sealed cans	5	Increased economy in production. Adaption to export markets.
Process industries Industrialization	Steel	12	Increased economy, simplified specifications and ordering, systemized stock-keeping, impulses for domestic production
Electric appliances	Interchangeability and safety of plugs, sockets and household appliances	8	Increased safety, interchangeability without use of adaptors
Test methods (and certification)	Test methods, strength properties	10	Understandable and reproduceable results. Impulse to start central concrete-mixing stations
Administrative work	Sizes of paper and filing equipment. Width of printing columns Rationalized typeing	11	Increased economy. Simplified ordering. Impulse to start domestic production of products made of paper

Special points regarding standardization of export products are given in a separate paper and therefore left out here.

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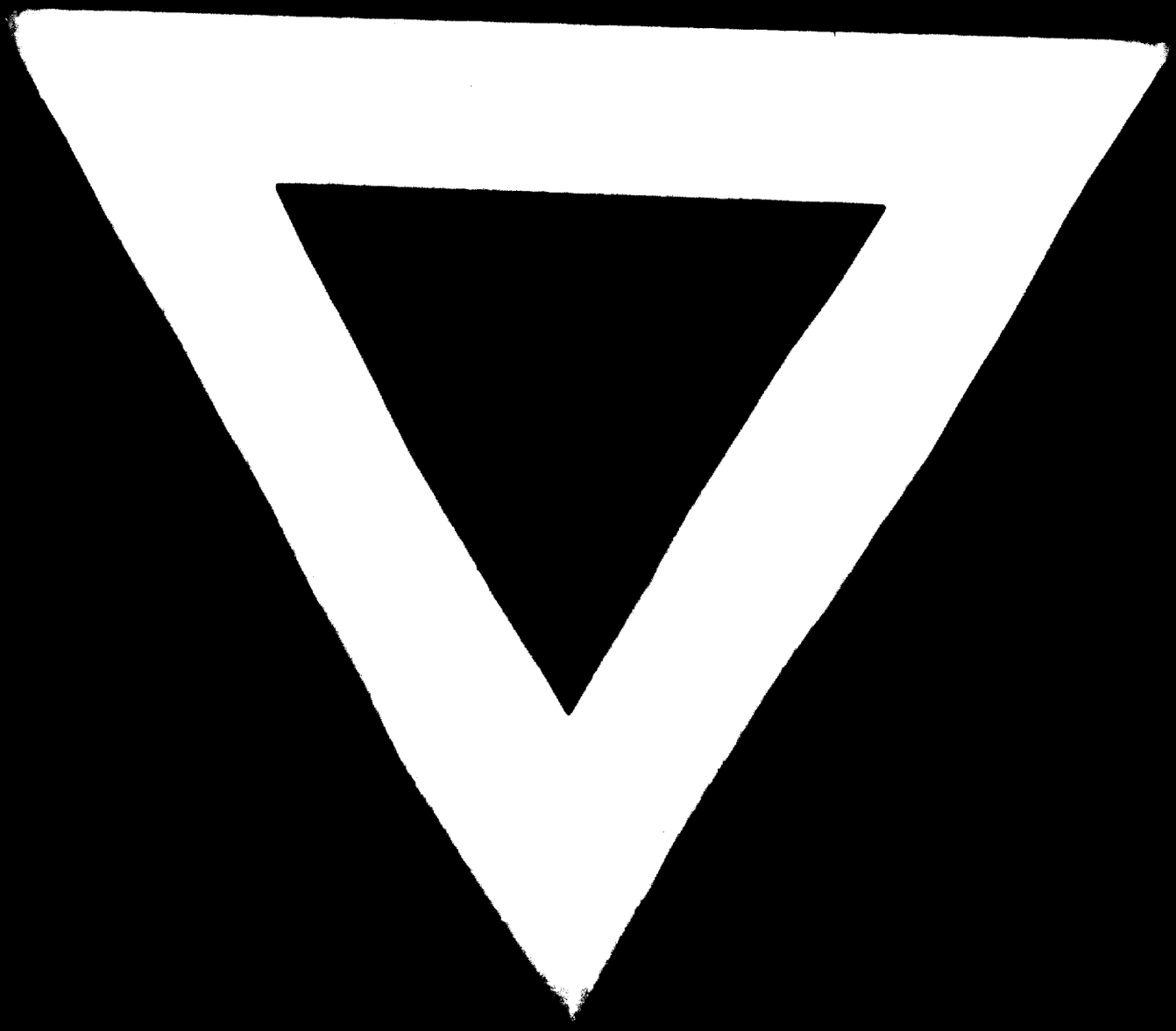

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