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COMMISSION OF THE EUROPEAN COMMUNITIES

COM(84) 568 final

Brussels, 23 October 1984

MEMORANDUM

on the implementation and execution of a steel pilot/demonstration
project programme with a view to obtaining financial aid under
Article 55(2)(c) of the ECSC Treaty

(submitted to the Council by the Commission)

COM(84) 568 final

MEMORANDUM

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I. INTRODUCTION

This memorandum consists of seven projects that will form the ECSC programme of pilot and demonstration projects in the iron and steel industry for 1984 for which aid under Article 55,2(c) of the ECSC Treaty is requested.

After the detailed examination of a total of 24 proposals by the services of the Commission in collaboration with the Iron and Steel Technical Development Committee, they have been selected as first priority for inclusion in this second year of a projected five year programme (*).

In the evaluation of the proposals, priority has been given to those that satisfy the following conditions:

- relate to pilot industrial installations or demonstration installations;
- exploit techniques or processes which are innovating in themselves or in their application;
- reasonable prospects of technical and economic success;
- must be of value to the Community.

The technical scope of the programme covers three main fields which are listed below along with their respective level of funding:

- | | |
|--|---------|
| - steelmaking (PP 027, PP 053) | 44.18 % |
| - rolling mills and mechanical working
(PP 029/2, PP 031/2, PP 042, PP 055) | 53.06 % |
| - Product treatment (PP 043) | 2.76 % |

With the aim of stimulating intracommunity collaboration and taking into account the additional costs involved, it is proposed again this year to award financial aid of 50% of total costs for joint projects

 (*) Official Journal C81, vol. 26 of 24 March 1983

involving collaboration between organisations coming from two or more Member States; the aid proposed for other projects is 40% of total costs.

Subject to funding, the financial aid for the 7 proposals outlined below will amount to a total of 6.372.100 ECU.

II. THE PILOT/DEMONSTRATION PROJECTS

PP.027 Horizontal continuous casting with oscillating mould for high-alloy steels and superalloys

This project submitted by Krupp Stahl AG was selected as a pilot/demonstration project for 1983 (*) with financial aid amounting to 40% of the total cost. At that time it was not clear that there would be intra-Community cooperation on this project. This is now certain since Imperial Metals Industry Refiners Ltd at Wallsall (United Kingdom) will be a sub-contractor in the project as well as Krupp Industrietechnik GmbH. In this case the ECSC aid can be increased to 50% of the total budget, the additional 10% being charged to the 1984 programme.

Applicants : Krupp Stahl AG, Essen
Krupp Industrietechnik GmbH
IMI Refiners, Wallsall (GB)
Total budget : 6.419.000 ECU
Probable duration: 4 years

PP.053 Horizontal continuous casting of stainless steel and special steel billets

The development of vertical continuous casting machines started in the 1950's. They now meet steelmaker's requirements in terms of both product quality and productivity.

More recently some horizontal continuous casting processes have been designed with varying success: many technological problems still have to be overcome to obtain equivalent performances to vertical continuous casting machines in a field accessible to them: limited production capacities and very special steels and alloys.

The purpose of project PP 053 is to demonstrate the potential of the Horicast process developed by Davy McKeen for the casting of special steels, especially stainless steels.

Although this company has put in substantial effort, the work must be continued in Europe. As Davy McKeen has no steelworks of its own, a demonstration plant has to be developed preferably in a company operating in a field in which there has not yet been any development.

The plant to be developed in PP 053 will operate as part of the normal activities of C3F-Ondaine: the production of high-alloy and stainless steels. It is also planned to produce a wide range of semi-finished products.

(*) COM(83)705 final of 2 December 1983

The research will be carried out at the Ondaine steelworks of the C3F company.

Applicants : Compagnie Française de Forge et Fonderies, Puteaux
Davy McKeen, Sheffield
Irsid, St. Germain-en-Laye
Total budget : 6.904.000 ECU
Probable duration: 2,5 years

PP.029/2 Thermomechanical working of steel bars

Methods of thermomechanical treatment during rolling (controlled rolling) were developed long since to improve the mechanical properties of heavy plate and wide strip. Weldability is also better.

Since 1962 the process has been extended to high-weldability steel sections produced by the Klöckner-Mannstaedt works. The maximum thickness of the products treated is 10 mm.

Following the encouraging results obtained in preliminary tests, Klöckner wishes to extend this technique to round bars (25-44 mm in diameter) and flats (60x8 to 110x25 mm) rolled at Osnabrück.

It hopes to satisfy the requirements of standards DIN 17100, 17155, 17102 and 17200 by means of grain refining. The process can also be of benefit for other steels.

The three-year project comprises two research phases:

- a) in the laboratory at RWTH at Aachen
- b) in the rolling mill at Klöckner Osnabrück

Applicants : Klöckner Werke, Osnabrück
RWTH, Aachen
Total budget : 2.856.500 ECU
Probable duration: 3 years

PP.031/2 Development of a hot-rolled strip sampling station

Thyssen Stahl operates two wide strip mills at Duisburg.

To ensure that coils delivered to customers are of the required quality, a growing number of mechanical tests (especially hardness tests) are carried out on test pieces taken from the tail end of the strip (outer turns) and to an increasing extent from the front end of the strip (corresponding to the inside turns of the coils), whatever the strip thickness (up to 20 mm).

In addition some customers using strip as a raw material (tube makers, slitters, etc.) order coils of a thickness up to 25 mm and have to rely on statistical results to ascertain the probable value of the mechanical properties. Coil by coil inspection would be possible with the sampling station that is the subject of the research.

The aim of this project is to construct a station capable of taking samples from both the inside and the outside of hot-rolled coils, suitable for coils of any width or thickness and any steel grade, up to maximum dimensions of 2.000 mm x 25 mm.

The machine will be incorporated in the production line.

A project of this kind has already been tried but without success.

It is hoped that project 031/2 will overcome all the existing difficulties.

In short, the aim is to develop a sampling machine that can improve production quality while reducing cost and risk to the labour force.

The test will be carried out on the Beeckerwerth wide strip mill.

Applicants : Thyssen Stahl AG, Duisburg
Blohm&Voss, Hamburg
Total Budget : 1.544.500 ECU
Probable duration: 3 years

PP.042 Industrial demonstration testing of removable rolls on two finishing stands at TLB Dunkirk

The widths of finished products rolled from hot coils are more or less standardized (e.g. tin plate, deep-drawing sheet, etc.). Obviously therefore there are preferential widths for hot coils.

The rolling mill classifies these widths in a few standard families, bearing in mind also the width of the slab semis, which in turn depends on the width of the conventionally cast ingots or continuously cast slabs.

The rolling of coils in the same family tends to mark the work rolls in the finishing stands of a wide strip mill. Rolling obviously starts with the greatest widths and finishes with the narrowest products ("rolling cone" programming).

The advantage of the system proposed by project PP 042 is that roll wear can be distributed over a greater generatrix length so as to obtain a wear profile capable of accepting the successive rolling of different strip dimensions in any order of width without jeopardizing the physical quality (profile - flatness) of the strip.

Applied to all the stands in the finishing mill, it can nullify or reduce the current constraint of the "rolling cone" which requires strip to be rolled in decreasing order of width and can give strip mills greater flexibility, thus allowing faster metal circulation right up to the loading of the coils with the following main effects:

- reduction in stocks of semis
- reduction in energy consumption
- reduction in technical time laps.

This principle is applied on the most efficient strip mills of our main Japanese competitors in the form of stands using a new technology; this is the six-high stand that is almost impossible to substitute for the four-high stands in existing wide strip mills. The problem in Europe is rather to adapt existing stands at minimum cost, which is the aim of this project:

- 1) technological development of an electromechanical system capable of displacing by 100 mm along their respective axes the two rolls of a four-high finishing stand in a strip mill, symmetrically on either side of the rolling mill axis.
- 2) assessment of the effects on the strip as regards profile and flatness by equipping two adjoining highly-stressed stands in the finishing mill and definition of the optimum strategy for the use of the system.

The research work will be carried out on Usinor's wide strip mill at Dunkirk.

Applicants : Usinor, Dunkirk
Clecim, Courbevoie
Total budget : 2.267.500 ECU
Probable duration: 2 years

PP.043 Pilot plant for high current density electroplating (zinc on alloy, multilayer and composites) on cold-rolled steel strip

In the same way as tin plating 20 years ago, galvanizing methods are now being developed from the old hot-dip process towards electrolytic techniques with which it is possible to manufacture products successfully meeting the increasingly stringent requirements of customers, especially the motor industry and the electrical appliance industry.

In order to increase the thickness of the zinc layer deposited or improve the productivity of electrolytic lines, laboratory research (aided by the EEC in the case of PP 043) has shown that it is sufficient:

1. to increase the current density, although this may be limited by electrolyte temperature and viscosity problems,
2. to reduce the distance between cathode and anode,
3. to create turbulent conditions in the cells.

These new techniques also allow deposition of layers of alloys such as Zn-Mn, Co, Cr, the corrosion resistance of which may be further improved.

For this purpose the pilot electrodeposition line installed at the CSM in Rome will be fitted with two vertical and horizontal cells of a new type, with a high current density and forced electrolyte circulation.

The research is being conducted in parallel with PP 018. There is provision for exchanges of information between PP 018 and PP 043.

Applicant : CSM, Rome
Total budget : 440.000 ECU
Probable duration: 2 years

PP.055 Improvement of strip flatness in tandem mills and skin-pass mill stands by means of axially movable rolls with special camber

The most important quality specified for a cold-rolled sheet is its flatness, which is required in addition to its mechanical properties, dimensional tolerances and surface appearance. The cold-rolling mill must also be able to adapt to the hot-rolled product in order to produce sheets of the best possible flatness. There are already various ways of doing this but the results are variable and sometimes costly (Japanese six-high stands).

SMS has developed the CVC technique which consists of a facility for displacing axially the work rolls of a four-high stand, the profile of which has been specially designed. The results of the research can be applied to all European cold rolling mills and to skin-pass stands.

The tests will be carried out on stands 3 and 4 of the cold tandem mill in the Krupp Stahl works at Bochum.

The results of this project should contribute to a modernization programme scheduled for this rolling mill which must be completed by the end of 1985. In order to meet plant delivery dates and not overstep this deadline, it is essential for the work to start around mid-1984. It is consequently proposed that 1 August 1984 be accepted as the date of the start of the project.

It is proposed to finance this project in two phases; the first corresponds to the conception, construction and installation of the CVC system on the cold-rolling mill at Bochum, the second phase will be concerned with performance and demonstration tests.

Applicants : Krupp Stahl, Bochum
SMS, Düsseldorf
Total budget : 1.784.600 ECU
Probable duration: 1,5 year

SUMMARY TABLE

ANNEX

No. Proposal	TITLE OF PROPOSAL	Proposal submitted			Financial Aid	
		by	duration (year)	Budget ECU (29.2.84)	%	Amount ECU (29.2.84)
	<u>PRODUCTION OF STEEL</u>					
027	Horizontal continuous casting with oscillating mould for high-alloy steels and superalloys	Krupp	4.0	6.419.000	10	641.900
053	Horizontal continuous casting of stainless steel and special steel billets	C3F Davy McK Insid	2.5	6.904.000	31.5	2.173.000
	<u>MECHANICAL WORKING</u>					
029/2	Thermomechanical working of bar steel	Klöckner RWTH	3.0	2.856.500	40	1.142.600
031/2	Development of a hot-rolled strip sampling station	Thyssen Blohm & Voss	3.0	1.544.500	40	617.800
042	Industrial demonstration testing of removable rolls on two finishing stands at TLB Dunkirk	Usinor Clecim	2.0	2.267.500	40	907.000
055	Improvement of strip flatness in tandem mills and skin-pass mill stands by means of axially movable rolls with special camber	Krupp Stahl. SMS	1.5	1.784.600	40	713.800
	<u>PRODUCT TREATMENT</u>					
043	Pilot plant for high current density electroplating (zinc on alloy, multilayer and composites) on cold-rolled steel strip.	Nuova Italsider	2.0	440.000	40	176.000
	TOTAL			22.216.100		6.372.100