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M E M O R A N D U M

On the implementation of an iron and 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/85/387

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I. INTRODUCTION

This memorandum concerns eight projects which make up the ECSC pilot/demonstration programme for the steel industry in 1985 for which financial aid under Article 55 (2) (c) is requested.

After detailed examination of 22 proposals by the Commission in collaboration with the Technical Development Committee, the eight projects were selected as the first priority for inclusion in the third year of a five year programme (*).

In evaluating these proposals, priority was given to those which met the following conditions :

- to involve pilot and demonstration projects
- to make use of techniques and processes which are innovative both of themselves and by their application
- to have an acceptable degree of likely technical and economic success
- to be of interest to all of the Community.

The proposals accepted cover four main fields of action which are summarized below with their relative importance in the budget :

- steelmaking (PP 069, PP 007/3)	25.36 %
- transformation and other connected operations (PP 055, PP 061, PP 071 and PP 048/2)	51,00 %
- product treatment (PP 040/2)	20,00 %
- standards and analyses (PP 062)	3,56 %

With the aim of encouraging intra-Community collaboration and to take account of the additional cost of this collaboration it is proposed that financial aid amounting to 50 % of total costs should again be awarded this year for projects involving cooperation between undertakings in two or more Member States (PP 048/2, PP 062, PP 040/2).

(*) O.J. C81, 24 March 1983

The financial aid proposed for the other projects remains at 40 % of total costs. The aid requested for the eight projects described below amounts to 5.037.200 Ecu to which 806.400 Ecu is to be added for the financing of four research projects, P.1746, P.1660, P.1729 and P.1693 which were placed in reserve and were described in Doc. 1009/XII.C.2/84, and 41.400 Ecu for ancillary costs and the dissemination of information, giving a total financial commitment of 5.885.000 Ecu.

II. PILOT/DEMONSTRATION PROJECTS

PP 007/3 Industrial demonstration of a UHP dc arc furnace

The commissioning of UHP electric furnaces has always posed problems of noise. Levels of some 100 dBA or more on the steelworks shop floor are not uncommon. Various solutions have been tried with different degrees of success, including the use of dc current which has resulted in an improvement of 15 to 20 dBA. The use of direct current has also enabled certain other benefits to be obtained :

- a considerable reduction in the specific consumption of electrodes
- a reduction in specific energy consumption.

The tests were carried out on small capacity furnaces (20 t) with a single graphite electrode.

Project PP 007/3 aims at working with a 62 t furnace with three electrodes. In addition to the two points mentioned above, it is intended to examine the hearth electrode configuration and the regulation of arc length.

The work will be carried out at the SME Steel Works at Trith-St-Leger.

Applicant	:	Societe Metallurgique de l'Escaut, Valenciennes
In collaboration with	:	IRSID CLECIM
Budget	:	2.710.000 ECU (total cost of phase four)
Probable duration	:	1 year 1/4

PP 069 Reduction of the depth of vibration marks with mould using a servo-hydraulic control

Two ECSC research projects (7210-CA/805 and 7210-GB/802) have demonstrated the importance of controlling the vibrations in the continuous casting mould using a servo-hydraulic system to improve the cast product surface and to facilitate inspection.

For the pilot experiment, one of the four strands in an industrial continuous machine will be equipped with a servo-hydraulic control mechanism as an alternative to the existing vibration system.

This installation will enable full control to be achieved in regard to the length and frequency of vibration, it being possible to alter each of these two factors independently during casting.

A comprehensive study of the effect of vibration conditions on the formation of vibration marks will be conducted.

The system will also be capable of working under unusual conditions with high frequencies (up to 20 Hz) and low amplitudes (up to 1 mm). The research will be carried out at the Stockbridge works.

Applicants	:	BSC Special Steels Stockbridge Works BSC Swindon Laboratories Distington Engineering Contracting
Budget	:	484.000 ECU
Probable duration	:	3 years

PP 048/2 Construction of a multi-layer galvanization demonstration prototype (Zn-Cr-CrOx) for flat steel products (phase E)

The solution to corrosion problems in thin flat products has been to use galvanizing and more particularly electroplating. Greater protection can be obtained by increasing the thickness of the zinc layer. Unfortunately doing so brings about difficul e in use (welding, external aspect, etc.) and production losses.

ZINCO has developed in its laboratory an electroplating process using Zn, Cr and CrOx multi-layers to produce products to compete with those marketed in particular by Japan. Since European car manufacturers have decided to extend anti-corrosion protection systems to the whole of the bodywork and their choice of the most appropriate material is to be made at the beginning of next year - a choice which may be considered as irreversible - it is a matter of urgency that a demonstration plant be set up which will enable the technological development of the operation proper to be carried out and the products put at the disposal of the users for testing. This is the reason for proposing to the Commission that the date of 1 June 1985 be accepted as the starting date for the project and for the consideration of the expenditure involved.

ZINCOR is proposing to construct a demonstration line which will be equipped with four high-current-density radial cells with a specially developed vertical cell for the deposition of Cr-CrOx downstream (Varzi plant).

Applicant	:	Zincor Italia Spa, Varzi
In collaboration with	:	Delloye-Mathieu, Marchin Nuova Italsider - CSM - Italimpianti
Budget	:	2.535.000 ECU
Probable duration	:	1 year

PP 061 Heat treatment of colliery arches and large beams using rolling heat (colliery arches phase)

The techniques for thermo-mechanical treatment during rolling were developed many years ago to improve the mechanical properties of plate, wide strip and reinforcing rod. Weldability is also better.

Since 1982, the process has been extended to high-weldability merchant steel produced by the Klöckner-Mannstaedt. The maximum thickness of the products dealt with is 10 mm.

The technology which will have to be developed in the first place will concern colliery arches : regulation of the final cooling of these sections is aimed at refining the ferritic structure of grades with up to 0.3 % C. It is also wished to improve the strength properties of these sections.

Cooling will be controlled by means of water jets by proper adjustment of the flow of water and the direction of the jets. This process should avoid any further heat treatment. The tests will be carried out on the rolling mill at Valenciennes.

Applicants	:	Unimetal (long products Sacilor and Usinor), Valenciennes IRSID, St Germain en Laye
Budget	:	450.000 ECU (colliery arches phase)
Probable duration	:	1 year

PP 071 Installation of an electro-magnetically flushed distributor for the supply of a Hazelett continuous casting machine

An attempt was made to couple casting plant and rolling mill under ECSC Agreement 7215-CA/101. The caster used was a "twin-belt caster". That project showed that more attention needed to be paid to the consistency of the flow of the liquid steel.

The aim of this project is to investigate this aspect in more detail and thus deal with the regulation of the liquid steel by means of an electro-magnetic distribution system.

The first aim is to demonstrate long-term operational reliability and the consistency of the flow over a thin gap and a wide gap. These tests will be carried out a Krupp Stahl AG in Siegen. A unit supplied by AEG-Elotherm will be used as the electro-magnetic distributor.

Once these test phases have been successfully concluded, the electro-magnetic distributor will be installed to control the flow of liquid steel in the belt caster at Krupp Stahl AG in Bochum which was used for previous tests under project 7215-CA/101.

The following developments are planned :

1. Long-term tests with the electro-magnetic distributor (1-100 hours) using various refractory materials.

2. Development and testing of a special casting nozzle which connects the distributor runner with the belt caster.

3. Calculation of the flow characteristics for the system.

4. Evaluation of the influence of the refractories on the contamination of the steel.

5. Investigation of the thermal behaviour of the system especially in respect of heat losses.

6. Testing of the optimized unit on a twin-belt caster.

Applicant	:	Krupp Stahl AG, Bochum in collaboration with AEG-Elotherm, Remscheid and Krupp Industrietechnik, Essen
Budget	:	1.432.000 ECU
Probable duration	:	3 years 1/2

PP 055 Improvement of flatness in cold tandem mills by means of working rolls which can be moved axially with special curvature (final phase).

In addition to its mechanical properties, dimensional tolerances and surface quality, the most important requirement for a sheet is that it is perfectly flat.

In addition, the cold-rolling mill must accommodate the hot-rolled product to produce sheet with the best possible flatness.

There are different ways of achieving this, but the results are variable and/or costly (Japanese six-high stands).

The SMS company has developed the CVC technique which consists in moving the working rolls axially in a four-high stand, the profile of these rolls having been specially calculated. It will be possible to apply the results achieved to all European cold rolling mills and skin-pass stands.

The project was selected in its entirety at the third meeting of the TDC (March 1984). The prototype has been installed on stands 3 and 4 of the tandem cold-rolling mill at the Krupp Stahl Works at Bochum.

In 1984 it was suggested that the project be financed in two phases which allowed for the time necessary for the design, construction, commissioning of the CVC system at Bochum and the operating and demonstration tests. The commissioning tests will represent the final phase of the project.

Applicants	:	Krupp Stahl, Bochum SMS, Dusseldorf
Budget	:	1.382.000 ECU
Probable duration	:	1 year 1/2 (final phase)

PP 062 Development and testing of an emission spectrometry system for process control in steelmaking

The aim of this project is the construction and testing of a computer-controlled emission spectrometer for the steel industry which together with a sample preparation machine will be installed in a mobile container. The proposed system will be able to carry out spectrographic analysis on the shop floor, whereby the following advantages are to be expected :

- reduced analysis times, since the samples do not have to be transported,
- fully automatic analysis without the need for qualified personnel,
- a greatly reduced number of breakdowns,
- reduced investment costs.

The company Laborlux in Esch is responsible for the carrying out of the project as a whole.

The company Spectro Analytical Instruments in Kleve will supply the emission spectrometer and the "personal computer".

The company Knieps und Poeckler from Ennepetal is responsible for the sample preparation machine.

The testing of the final system will be carried out at ARBED's Esch-Belval Works.

Applicants	:	Laborlux, Esch/Alzette Spectro Analytical Instruments GmbH, Kleve Knieps und Poeckler, Ennepetal
Budget	:	359.000 ECU
Probable duration	:	1 year 1/2

PP 040/2 Manufacture of drink-can tops from steel-construction of a demonstration plant

This is the third and final phase of the work commenced under pilot and demonstration agreement 7215-UT/101.

The main aim is the technical development of a steel top for drink cans and the introduction thereof on the market.

The demonstration plant is intended to work under industrial production conditions. The rough-top plant is intended to produce 600 tops per minute and the finishing plant 300. The following work is planned for this third and final phase :

- construction testing of an automatic quality control unit which will test each top for shape and size, permeability, surface quality and the quality of the rubber and plastisol coating and will automatically reject inferior tops ;

- introduction of the tops on the market through customer demonstrations at the production plant with series manufacture conditions ;

- consumer tests, large-scale tests and storage tests with batches of 20.000 cans with various types of internal coating.

The test unit will be tested at the Andernach works of the Rasselstein Company.

The consumer tests will be carried out in the United Kingdom, the Netherlands and Germany.

Applicants	:	1) Rasselstein AG, Neuwied 2) BSC, Swansea 3) Hoogovens, Ijmuiden
Budget	:	2.014.000 ECU
Probable duration of last phase	:	2 years

S U M M A R Y T A B L E ANNEX.

PROJECT No	P R O J E C T T I T L E	PROJECT PROPOSED			FINANCIAL AID	
		BY	Duration (years)	Budget/ ECU (1.2.1985)	%	Amount / ECU
PP 007/3	Industrial demonstration of a UHP dc arc furnace	Soc.Metal.Escaut (F) IRSID / CLECIM (F)	1 1/4	2.710.000	40	1.084.000
PP 069	Reduction of the depth of vibration marks with a mould using a servo-hydraulic control	B.S.C.-Special steels (GB) B.S.C.-Laborator (GB	3	484.000	40	193.600
PP 048/2	Construction of a demonstration prototype for multi-layer (Zn-Cr-CrOx) galvanization of flat steel products	ZINCOR -Italia (I) DELLOYE-MATHIEU (B) ITALSIDER/CSM (I)	1	2.535.000	50	1.267.500
PP 061	Heat treatment using rolling heat for colliery arches and large beams (colliery arches phase)	UNIMETAL (F) IRSID (F)	1	450.000	40	180.000
PP 071	Installation of an electro-magnetic flushing distributor to feed a Hazelett continuous caster	KRUPP STAHL (D)	3 1/2	1.432.000	40	572.800
PP 055	Improvement of flatness in cold tandem mills by the use of working rolls which can be moved axially with special curvature (final phase)	KRUPP STAHL (D)	1 1/2	1.382.000	40	552.800
PP 062	Construction and testing of a system for process control in steelmaking by means of emission spectrometry	LABORLUX (L) Spectro Analytical (D) Instrument Knieps et Pöckler (D)	1 1/2	359.000	50	179.500
PP040/2	Pilot and demonstration plant for the production of steel drink-can tops (final phase)	RASSELSTEIN (D) HOOGOVENS (NL) B.S.C. (GB)	2	2.014.000	50	1.007.000
				11.366.000		5.037.200