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Request for Proposal

Steel Market Development Institute (SMDI), a business unit of American Iron and Steel Institute (AISI), is seeking R&D proposals to develop steels expected to be required for future manufacture of pipes and tubes for Oil and Gas industry.

Background

The North American Oil and Gas industry uses steel extensively and in particular pipes of various sizes in extraction, refining and transportation of its products. Currently, there are 15,000 miles of pipes with ranges from 16" to 56" OD installed for transportation of products. In addition to this, pipes are used for drilling, casing and other activities. With the increase in demand for oil and natural gas, new technologies are being used by the oil and gas industry to recover new reserves with different environments. This in turn demands increased properties of steels that can be used. The aim of this research project is to define characteristics of 2025 steel criteria as listed in the table below as well as process changes to produce them.

Scope of Work

The research consists of developing steels with properties expected to be needed by 2025 as well as identifying the possible processes to manufacture such steels. This project also involves establishing current volume and trends of the steels used today. This would require coordination with the pipe manufacturers, oil and gas industry and also information from welding specialists and other ancillary product manufacturers. Brief information on issues that need to be addressed is as follows.

- Current market information – consumption by grade and size for both Line Pipe and Oil Country Tubular Goods (OCTG)—[2007-2011]
    - Any other relevant information
- Non-availability of thick walled mechanical tubing with restricted phosphorus and sulfur
- Requirement of future steels to handle 50,000 to 75,000 psi pressure
- Future requirement of high temperature/high performance steels with corrosion resistance limitations
- Requirement for improved impact test values
- Weldability issues for pipes to forgings and fittings including failure rate of welds
- Heat treatment requirements
- Issues with regard to alloy bolting and corrosion resistant alloys

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A comparison of current values to anticipated 2025 requirements of some of the properties and performance criteria for pipes and tubes used by the oil and gas industry is shown in the following table. It is only indicative and the researcher is expected to fill in the gaps in information and add other criteria. The values for the criteria could be different for Line Pipes used for transportation of products and for Oil Country Tubular Goods used in the extraction of the products. The researcher is expected to establish them for each category separately.

Criteria	**Today**	**2025**
Inside Pressure	20K	30K Working 45K Test
Welding Process	Some steels need stress relieving	No stress relieving requirement
Joint Weld Details	Information to be obtained by the researcher	Information to be obtained by the researcher
Service Temperature	450 Degrees F	550+ degrees F
Material toughness	20 ft lbs at -50 degrees F	Similar toughness at -75 degrees F
Special testing criteria	Information to be obtained by the researcher	Information to be obtained by the researcher
Heat Treatment	Information to be obtained by the researcher	Information to be obtained by the researcher
Carbon Equivalent Formula	Information to be obtained by the researcher	Information to be obtained by the researcher
Special Coatings	Information to be obtained by the researcher	Information to be obtained by the researcher
Mechanical Properties	80-85 K Yield Strength (Sour service)	Up to 120 K. Sour service excluding Inconel
Repair Welding Requirements	Information to be obtained by the researcher	Information to be obtained by the researcher
Service Environment		Steels that withstand high H_2S and CO_2 environments

The pipe and tubing manufactured using the steels that are developed should meet or exceed the criteria established.

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Typical chemistries of steels that are currently being used by the oil and gas industry are as follows.

For Line Pipes:

Typical Chemical Compositions of API 5L ERW Linepipe Steels

API Grade	Chemical Composition, Mass %												
	C	Mn	Si	P	S	Al	Nb	V	Cr	Mo	Ti	N	Ca
X70	0.085	1.50	0.32	0.015	0.001	0.030	0.045	0.050	-	-	0.013	0.0045	0.0008
X70	0.095	1.55	0.32	0.015	0.001	0.030	0.040	0.060	-	-	0.013	0.0045	-
X70	0.060	1.35	0.32	0.013	0.003	0.030	0.060	-	-	0.23	0.014	0.0050	0.0008
X70	0.070	1.50	0.32	0.012	0.005	0.030	0.060	-	-	0.11	0.015	0.0050	0.0008
X70	0.075	1.20	0.26	0.013	0.003	0.034	0.059	-	-	0.10	0.020	0.0045	0.0007
X70	0.075	1.40	0.34	0.010	0.002	0.033	0.063	-	-	0.10	0.020	0.0047	0.0008
X80	0.075	1.59	0.31	0.018	0.001	0.026	0.057	-	-	0.22	0.013	0.0060	0.0011
X80	0.067	1.54	0.32	0.012	0.002	0.030	0.069	-	-	0.28	0.019	0.0055	0.0010

For Oil Country Tubular Goods:

OTCG Steel Grades						
API Grade Code	% Alloy Content					
	C	Mn	Ni	Cr	Mo	Cu
H40	0.5	1.5				
K55	0.5	1.5				
C75-1	0.5	1.7	0.5	0.5	0.4	0.5
C90-1	0.35	1.9	0.9	1.2	0.75	
T95-1	0.35	1.2	0.9	1.5	0.85	
Q125	0.35	1	0.9	1.2	0.75	

The above lists are not exhaustive and only indicative.

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Submission Process

You may provide multiple proposals. All proposals submitted to SMDI will be carefully reviewed for funding consideration; however, acceptance of a proposal does not guarantee funding.

SMDI Proposal submission guidelines are described below. Proposals must be submitted electronically in word format to manufacturingt@steel.org on or before: February 22, 2013. Please direct any questions to manufacturingt@steel.org.

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SMDI R & D Proposal Submission Guidelines

Proposals should not exceed 10 pages, plus the Proposal Summary Page.

Proposals must contain the following information:

1. **Executive Summary/Abstract:** (One page)

   Provide a non-proprietary description of project objective(s), plan, benefits and participant(s).

2. **Roles, Responsibilities, and Capabilities:** (1-2 pages, not part of 10 page limit)

   Provide a description (bios) of your team and its capabilities.
   - Education
   - R&D experience
   - Publications
   - Activities/awards related to proposed project
   - Identify any co-collaborators or co-editors within the last 4 years that may present a conflict of interest or bias towards reviewers. If none, state "none".
   - Provide a list of the available equipment, laboratory and demonstration facilities, analytic support and all other necessary resources (including appropriate manpower) for performing the work proposed.

3. **Project Narrative (8 pages max):**

   A: Project Description and Implementation Plan:

   - Project Objectives. Provide a clear, concise statement of the specific objectives/aims of the proposed project.

   - Provide a clear project description and implementation plan that achieves the research priorities.

   - Provide a clear discussion of the technical merit/feasibility of the proposed work, including scientific/engineering basis and current state of the art in the applicable industry with references to past developments in the work proposed).

- Provide a clear description of the project activities and schedule (description of each activity /tasks to be performed to accomplish the project/study goals/objectives and address environmental and safety issues, if appropriate).

- Include a complete Project/Study Management Plan (task structure, milestones, go/no-go decision points and associated criteria, schedules and performance measures for evaluating progress with regard to key tasks/ and/or deliverables) to achieve project/study objectives. This section should also discuss approaches to resolve challenges and barriers. This information should be included under a separate section labeled "Project Management Plan".

- Provide a discussion of the available resources (budget under various categories), and the resource distribution to the team members to complete the proposed project and accomplish the stated objectives.

B: Project Viability:

- Provide a discussion of project's chances of success and any technical barriers

4. Budget (1-2 pages):

Detail total project cost by year, broken down by labor, equipment, travel, materials, overhead, etc. for each participating organization. **Show separately the budget for the item "Current market information" [first bullet under "Scope of Work"].** Indicate any cost share contributed.

Submit Proposals electronically in word format to manufacturingt@steel.org.

Proposals are due: February 22, 2013.

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R & D Proposal Summary Page

1. Name of Proposing Organization(s):

2. Date:

3. Descriptive Project Title: _____

4. Total Project Cost: . Duration: _____.
   % of Total Cost Contributed by Proposer(s) _____.

5. Provide the objective and a brief description of the proposed project.

6. Contact Name: _____

7. Contact Address: _____

   _____

   _____

8. Contact Phone: _____

   E-Mail: _____

Signature and Date