



Security Printing and Minting Corporation of India Limited

16th Floor, Jawahar Vyapar Bhawan, Janpath

New Delhi- 110001

Tel: 011-23701256, 011-43582200/262, Fax: 011-23701223

Email: info@spmcil.com Website: www.spmcil.com

1.	Name of the organization	:	Security Printing and Minting Corporation of India Limited
2.	Type of the organization	:	A Miniratna Category-I CPSE and Wholly owned by Government of India
3.	EOI Reference No.	:	SPMCIL/EOI/363/2020-21 dated 06.01.2021
4.	EOI Title	:	Expression of Interest (EOI) from reputed organizations/institutions/consulting-firms for providing "Consultancy Support in the implementation of advanced manufacturing processes and solutions such as Industry 4.0, IIoT, Real Time Manufacturing, Predictive Maintenance for its Security Paper Mill and Currency/security Presses located at Hoshangabad Nashik and Dewas".
5.	Category	:	Non-security
6.	Sub-category	:	-
7.	Date of Announcement	:	07.01.2021
8.	Last date for submission	:	01.02.2021, 15:30Hrs.
9.	Brief scope of work	:	Placed at Annexure 2
10.	Eligibility criteria	:	Placed at Annexure 3
11.	Specimen Response letter to EOI	:	Placed at Annexure 4

Expression of Interest (EOI) from reputed organizations/institutions/consulting-firms for providing “Consultancy Support in the implementation of advanced manufacturing processes and solutions such as Industry 4.0, IIoT, Real Time Manufacturing, Predictive Maintenance for its Security Paper Mill and Currency/security Presses located at Hoshangabad Nashik and Dewas”.

SPMCIL/EOI/363/2020-21 dated 06.01.2021

Security Printing and Minting Corporation of India Limited (SPMCIL), a Mini-Ratna Category-I CPSE, and Schedule ‘A’ Company wholly owned by Government of India, is engaged in the manufacturing of circulation coins, currency notes and security documents such as passports, NJ & Excise Stamps, Postal Stationery etc. As a part of transformation initiative in manufacturing, SPMCIL invites **Expression of Interest** from competent and resourceful firm (proprietor/Society/Partnership firm/ Limited Liability Partnership (LLP)/Company) for providing “Consultancy Support in the implementation of advanced manufacturing processes and solutions such as Industry 4.0, IIoT (Industrial Internet of Things), Real Time Manufacturing, Predictive Maintenance for its Security Paper Mill and Currency/security Presses located at Hoshangabad Nashik and Dewas”.

Interested organizations/agencies fulfilling the eligibility criteria as given in Annexure 3 are requested to submit Expression of Interest as per format given in Annexure 4 to this expression of interest. The Expression of Interest must be submitted with the brief profile of the firm, their past performance in similar operation, financial background etc. in support of the eligibility criteria. The Expression of Interest must be sent to the following address:

Director (Technical)

Security Printing and Minting Corporation of India Limited

16th Floor, Jawahar Vyapar Bhawan,

Janpath, New Delhi- 110001, India Phone No. 011-43582256

Email: dt@spmcil.com

Last date and Time for receipt of Expression of Interest **01.02.2021 at 15:30 Hrs. (IST)**

Date and Time of opening of Expression of Interest: **16:00 Hrs. (IST) on 01.02.2021**

Place of opening of Expression of Interest:

Security Printing and Minting Corporation of India Limited

16th Floor, Jawahar Vyapar Bhawan, Janpath

New Delhi- 110001, India.

Tender received after the due date and time will not be accepted.

Details of Annexures:

1. Brief background of the company – Annexure 1
2. Brief scope of work – Annexure 2
3. Eligibility Criteria- Annexure 3
4. Specimen Response letter to EOI as Annexure 4

For and on-behalf of Security Printing and Minting Corporation of India Limited (SPMCIL)

Shri D.K. Rath

AGM (T.O.)

CHO SPMCIL, New Delhi- 110001

Note:

1. **SPMCIL reserves the right to accept/reject any application at its sole discretion and / or cancel the entire exercise. Mere fulfilling the minimum eligibility criteria will not confer any right on the applicant to be called for discussion/selection.**
2. **All Addendum/Corrigendum to this EOI shall be uploaded only on website i.e. www.spmcil.com**

SPMCIL/EOI/363/2020-21 dated 06.01.2021**Background of the company:**

Security Printing and Minting Corporation of India Limited (SPMCIL) is a Mini-Ratna Category-I CPSE and a wholly owned schedule 'A' Company of Government of India and is under the administrative control of Department of Economic Affairs, Ministry of Finance, Government of India. SPMCIL is engaged in the manufacturing of currency/security paper, minting of coins, printing of banknotes, non-judicial stamp papers, postage stamps, travel documents, etc. having nine units including four mints (India Government Mint-Kolkata; India Government Mint-Hyderabad; India Government Mint-Mumbai and India Government Mint-Noida), two security presses (India Security Press-Nashik and Security Printing Press-Hyderabad), two currency presses (Currency Note Press-Nashik and Bank Note Press-Dewas) and one paper mill (Security Paper Mill-Hoshangabad) across the country.

Journey towards adoption of advanced manufacturing practices:

SPMCIL has in recent times taken up several modernization and capacity augmentation initiatives. These has been executed with a vision of progressively transitioning from manual to an automated setup thereby significantly improving production efficiency in a sustainable manner. The corporation is undertaking various systematic efforts in areas of maintaining & sustaining process improvements, and empowering SPMCIL's core group of end users.

As part of the modernization plan, SPMCIL has already undertaken upgradation of machines across various manufacturing units in a phased manner. SPMCIL intends to become agile in manufacturing and improve its productivity to become more responsive to market trends and demands. The corporation intends to undertake implementation of advanced manufacturing processes and technologies in its manufacturing units with focus on following overarching objectives:

- (a) *To develop faster, efficient and customer-centric advanced manufacturing capabilities.*
- (b) *To minimize instances of machine failure and production stoppages.*
- (c) *To develop on-demand manufacturing capabilities.*
- (d) *To reach a stage of optimization where semi-autonomous and autonomous machine systems can meet customer demands effectively and profitably.*
- (e) *To develop a skilled labor base which is adept to handle advances in manufacturing technologies.*
- (f) *To develop a mechanism of continuous shop-floor optimization based on analytical framework.*

To achieve the above, the Industry 4.0 implementation is planned to be carried out in four SPMCIL manufacturing units at this stage, i.e., **Currency Note Press (Nashik), Bank Note Press (Dewas), India Security Press (Nashik) and Security Paper Mill (Hoshangabad)**. These units use a mix of machines (both with old and new advanced technology). SPMCIL desires that the existing production processes along with other production related shop-floor activities are assessed and recalibrated, if required. A labor productivity analysis of the shop-floor also needs to be undertaken along with suitable interventions. Furthermore, smart machine upgradations are

required in older machines to make them Industry 4.0 ready. A detailed scope of work related to activities planned to be undertaken is elucidated in the subsequent section. An overview of the manufacturing units to be covered is mentioned below:

i. Currency Note Press (Nashik) and Bank Note Press (Dewas)

SPMCIL has two state-of-the-art Bank Note Printing Presses, i.e., Currency Note Press (CNP) (Nashik) and Bank Note Press (BNP) (Dewas) which are engaged in the production of Bank Notes as per the requirements and indents placed by the Reserve Bank of India & Ministry of Finance, Government of India. The presses constitute approximately 40% of Bank Note production of India.

SPMCIL has undertaken phased modernization of both the Currency Presses including procurement of Bank Note printing and finishing lines consisting of Offset, Intaglio, WSRTTP, Numbering with Varnish Coating & CRN, Finishing System under replacement basis.

ii. India Security Press (Nashik)

India Security Press (ISP) (Nashik) is engaged in **manufacturing of passport** and other key security documents for Government of India such as **postage stamps, post cards, inland letters, envelopes, non-postal adhesives, non-judicial stamps, revenue stamps** etc.

SPMCIL is under process for introduction of e-Passport by incorporating contactless inlays in Indian Passport as per ICAO standards. This will further enhance existing security feature of Passports. SPMCIL is under process of procurement of state-of-the-art fully automated & integrated e-passport (e-MRTD) booklets manufacturing system.

iii. Security Paper Mill (Hoshangabad)

SPMCIL has set-up state-of-the-art **Banknote Paper manufacturing** facility (PM#5) at Security Paper Mill (SPM), Hoshangabad with an annual capacity of 6,000 MT. SPMCIL is evaluating proposal for a new state-of-the-art security/Banknote Paper line with an additional annual capacity of 6,000 MT. After adding this proposed paper line, SPMCIL would be able to meet 100% CWBN paper requirement of the nation indigenously.

Overview of machinery across specific units

1. **Currency Note Press, Nashik** – The unit has around 20 machines which carry out processes such as printing, numbering, cutting & packaging, finishing and inspection. Around 10 new machines are under procurement for undertaking job works more efficiently and for further capacity augmentation.
2. **Bank Note Press, Dewas** – The unit has around 15 machines which carry out processes such as printing, numbering, cutting & packaging, finishing and inspection. Around 10 new machines are under procurement for undertaking job works more efficiently and for further capacity augmentation.
3. **India Security Press, Nashik** – The unit has two numbers of e-passport manufacturing lines and Procurement of new state-of-the-art fully automated & integrated e-passport (e-MRTD) booklets manufacturing system is under process.

4. **Security Paper Mill, Hoshangabad** – The unit has a paper manufacturing line with capacity of 6000 MT per annum. Set-up of a new paper manufacturing line of similar capacity is under consideration.

SPMCIL/EOI/363/2020-21 dated 06.01.2021**Brief Scope of Work**

As highlighted in Annexure 1, SPMCIL intends to adopt advance manufacturing processes and technologies aligned to Industry 4.0 practices across four of its manufacturing units – Currency Note Press (Nashik), Bank Note Press (Dewas), India Security Press (Nashik) and Security Paper Mill (Hoshangabad). The activities that need to be undertaken by the organizations/agencies are described as follows:

1.1 Re-design and re-engineering of Manufacturing Business Process

- i. Undertake as-is study of current processes on the shop floor.
- ii. Identification of key characteristics of the production system such as OEE, throughput, Manufacturing setup (single piece/batch/job shop), layouts (Cell/Continuous flow), production capacity, workload analysis, product variants, processing stages, order sizes, delivery times, parallel operations, bottleneck management, daily management etc.
- iii. Provide a gap analysis based on Industry 4.0 benchmarking.
- iv. Propose the To- Be Operating model
- v. Develop an analytical framework that provides insights on shop floor efficiency. Provide a plan for continuous shop floor optimization based on the analytical framework.
- vi. Deliver the final re-designed Manufacturing Business Process/Production Control Model, incorporating advanced manufacturing technologies such as Predictive Maintenance, IoT, Additive Manufacturing, Industry 4.0, etc.
- vii. Recommendation on skilling interventions to support implementation of Industry 4.0

1.2 Support in implementation of Re-designed and Re-engineered Manufacturing Business Process

The organizations/agencies shall evaluate the existing manufacturing processes and propose suitable advanced manufacturing technology interventions. A plan may be created for phased implementation of various Industry 4.0 solutions. Some of the identified modules for implementation are given below:

A. Production Program Module

- i. All the bank note/security paper printing program/data of each and every machine will be centrally stored in a secure data warehouse.
- ii. Provision for scheduled daily backup of the bank note/security paper printing program from each and every machine shall be provided.
- iii. In order to get unique identification and sorting facility, the program from each and every machine shall be provided.
- iv. Facilities to be provided for remote editing (with adequate cybersecurity controls) by the bank note/security paper printing program.
- v. Access, edit & transfer of the programs shall be done through multilayer authentication, access control and encryption methods.
- vi. Provision shall be made to store data machine wise, product wise, set up wise tool list, gauge list, process lay-out, drawing file, etc. Suitable query facility to be provided to filter data as per requirement.
- vii. Uploading and downloading of Bank note/security paper printing program, Tool-offsets, Zero-offsets, NC & PLC data through secured Wi-Fi Network.

- viii. 2D, 3D module on CAD/CAM software compatible to machines to be configured.
- ix. Secure data warehouse for storage of 2D, 3D designs.

B. Production Planning and Control Module

- i. Production planning and control through system with limited manual interventions.
- ii. Realtime monitoring of plan vs actual production and trigger real-time actions to enable plan adherence.
- iii. Root cause analysis of plan vs production variance and trigger preventive and corrective action.
- iv. Rough Cut Capacity Planning (RCCP) and Manpower Planning to optimize productivity and enable plan adherence.

C. Productivity Module

- i. Automatic generation of OEE (Overall Equipment Effectiveness) without machine operator's intervention.
- ii. Suitable hardware & software (if any) to fetch required data (availability, performance & quality) automatically from each machine.
- iii. Suitable software to calculate the OEE automatically from the data fetched by the hardware connected with machine.
- iv. Hourly/daily/weekly/monthly/quarterly/annual reports of each machine on following parameters (a) Run time, (b) Breakdown time with reason/remark, (c) other stoppage with reason/remark, (d) total no. & types of parts produced, (e) good count of each type of product, (f) bad count of each type of product, (g) cycle time for each type of product.
- v. The organizations/agencies to provide (a) detail specification of the hardware required for fetching the data, (b) detail of the software describing the display of the OEE module
- vi. The organizations/agencies should also describe the method of fetching data automatically by the hardware from the machine duly mentioning the exact signals required from the machine.
- vii. Ability to integrate with the existing embedded systems/ control systems/ OEM solutions.

D. Maintenance Modules

- i. Provide a Return on Investment analysis for implementation of predictive maintenance system.
- ii. Provide effective predictive maintenance methodologies which are suitable for SPMCIL units.
- iii. Review available records on downtime, equipment defects, losses (yield and energy), potential regulation fines and workplace safety.
- iv. Compile an equipment inventory and conduct appraisal of current equipment conditions.
- v. Understand Failure patterns and Failure modes equipment wise
- vi. Evaluate adequacy of existing preventive or predictive maintenance schedule.
- vii. Decide which systems to include and what to inspect for.
- viii. Define the program's criticality and establishing PdM frequency and schedule type.
- ix. Evaluate the anticipated resources and assign personnel roles and responsibilities.
- x. Organizing the program and integrating it into the scheduling system.
- xi. Conduct intelligent upgradations for equipment and conduct training.
- xii. A HMI (Human Machine Interface) shall be connected with each machine. The

- HMI should have at least 3 push/on-screen buttons for recording (i) breakdown, (ii) restoration and (iii) stoppages due to other reasons. There may be more push buttons if felt necessary by vendor. The HMI should have on-screen QWERTY keyboard for operator's input.
- xiii. The reason of all stoppages (including breakdown & other stoppages) to be entered by the operator of the machine through HMI. All the reasons of stoppages shall be selectable by the operator of the machine through HMI. The dropdown menu should be customizable by SPMCIL using a dashboard application.
 - xiv. Access to HMI screen should have authentication through RFID (Radio Frequency Identification Device) based access card or biometrics, with additional functionality of logging in using operator's ID & Password.

E. Quality Module

- i. All quality issues including Rejections, Rework, First Time Right (FTR), Root Cause, Root Cause Analysis, Preventive and Corrective action to be maintained in system.
- ii. All quality issues should trigger Root Cause Analysis and Workflow in system to ensure thorough root cause analysis and implementation of both corrective and preventive actions.
- iii. Data base of quality issues, root causes, preventive and corrective actions to be maintained in the system for easy retrieval and analysis.

F. Dashboard for monitoring manufacturing KPI's

- i. A dashboard with four key features – Asset Monitoring, Application Monitoring, Business KPI monitoring and Incident monitoring.
- ii. The asset monitoring feature to measure various parameters of machines on the shop floor. It will create alerts before the occurrence of any critical incidents on real-time dashboard and send alerts (Email, SMS, Mobile App Push notification) to relevant personnel.
- iii. The application monitoring feature to monitor critical parameters of the shop floor production programs and generates alerts (Email, SMS, Mobile App Push notification) before occurrence of critical incidents.
- iv. The Business KPI monitoring feature to monitor business KPIs of a production line i.e. asset uptime, OEE and generate alert based on triggers set during system design
- v. The incident monitoring system feature, integrated with ticketing system, to generate alerts for possible SLA violations. It will have feature of real-time dashboard tracking of tickets and feature of setting ticket SLAs. It will also be enabled for possible ticket resolutions through AI/ML.
- vi. The dashboard application shall have functionality of creating triggers, editing content of messages and configuring profile information of concerned person who will receive notification.
- vii. Ability to create user accounts for dashboard with different levels of access, such as machine level access, manufacturing unit level access, head office level access and admin console for backend management of the software.

2.3 Procurement Advisory

In order to implement various Industry 4.0 solutions, SPMCIL may contract hardware & software vendors for implementation of IIoT (Industrial Internet of Things), Additive Manufacturing, Industry 4.0, etc. in phased manner. The organizations/agencies shall provide procurement advisory support which shall include the activities given below:

- i. Provide hardware & software specifications/requirements for implementation of

advanced manufacturing technology, Industry 4.0, etc. solutions based on the gap assessment done by consultant

- ii. Support in drafting of RFPs.
- iii. Participate in bid meetings and draft response to bid queries.
- iv. Support in evaluation of bids.
- v. Facilitate contract signing and onboarding of implementation partners.

2.4 Project management for Implementation of Industry 4.0

To support implementation of Industry 4.0 solutions across SPMCIL unit's through implementation partners, project management activities shall be undertaken by organizations/agencies. An indicative list of activities in this phase is as below:

- i. Weekly and monthly programme management throughout the project lifecycle.
- ii. Planning the overall programme and monitoring the progress.
- iii. Managing stakeholder communication.
- iv. Managing KPIs of implementation partners, identification of project risks and suggestions on mitigating risks.
- v. Other support in terms of technical advice on any matter related to implementation of advance production systems.
- vi. Track KPI Improvements against baselines.
- vii. Provide services of suitable specialists on reasonable terms on-need basis.

SPMCIL/EOI/363/2020-21 dated 06.01.2021

Eligibility Criteria

1. Status:

The applicant should be either proprietary firm/ Limited Liability Partnership (LLP)/Company/Partnership/ (legal entity) registered under relevant regulation of the respective Country **(Attach copy of certificate of incorporation/ registration)**

2. Experience:

The applicant should be in the business of providing consultancy services in Manufacturing excellence and Operations transformation country during the period of last five years ending on 31.03.2020 as well as in business of providing consultancy services for Implementation of Advanced Manufacturing Technologies such as Industry 4.0, Predictive Maintenance country during the period of last five years ending on 31.03.2020 and should be able to bring in experts/thought leaders who are anchoring these initiatives in the firm globally. The details for the same should be submitted along with documentary evidence **(Attach copy of LOE/Work order/completion certificates/ Credential letter)**

The interested applicants should also submit along with this Expression of Interest a list of companies for whom they have provided consultancy services for Implementation of Advanced Manufacturing Technologies and mention specific region(s) of operation. **(Attach list)**

3. The applicant should also confirm specifically that:

- a. Applicant is competent and legally authorized to submit and/or to enable into legally binding contract.
- b. Applicant will absolve the purchaser against any infringement of patent rights and other contract provisions.

4. The bidder firm should have not been blacklisted/debarred by BNPMIPL/BRBNMPL/SPMCIL/Government of India for participation in tender as on the last date of submission of EOI. An undertaking for the same be furnished. (Self-certificate on applicant's letterhead signed by authorized signatory)

5. The **copy of audited balance sheet and Profit & loss statements for last three financial years** ending 31.03.2020 are to be submitted along with the proposal.
6. All documents are to be submitted in English language only. If the documents are in other language English translation copy shall be furnished along with the documents.

On Applicant Letterhead

Date:

The Director (Technical)
Security Printing and Minting Corporation of India Limited
16th Floor, Jawahar Vyapar Bhawan, Janpath
New Delhi- 110001, India

SPMCIL/EOI/363/2020-21 dated 06.01.2021

Sir,

We have gone through the above referred EOI and understood your requirements for “Implementation of Advanced Manufacturing Processes and Technologies such as Predictive Maintenance, IIoT, Additive Manufacturing, Industry 4.0, etc.”.

We fulfill the eligibility criteria and undertake that:

1. We have noted, understood and agreed to all the terms and condition of the EOI. In token of our acceptance, we have enclosed the EOI documents duly signed by the authorized representative.
2. I/We are Proprietary firm/ Limited Liability Partnership (LLP)/Company/Partnership and I/We have enclosed the registration/incorporation certificate issued by the concerned authorities as applicable in the country of origin as documentary evidence.
3. I/We have supplied similar services to _____nos. of private/state-owned companies from year _____ to _____. I/we have enclosed the LOE/work order/completion certificates/ Credential letter issued by our clients as documentary evidence.
4. I/We have provided services to _____nos. of CPSE/s from year _____ to _____. I/we have enclosed the LOE/work order/completion certificates/ Credential letter issued by our clients as documentary evidence.
5. I/We have total experience of _____ years in the related field as on 31.03.2020. The average annual turnover for the last three financial years i.e. 2019-2020, 2018-19 and 2017-18 is INR _____.
6. I/We declare that have not been black listed/debarred by BNPMIPL/BRBNMPL/SPMCIL/Government of India for participation in tender.

7. We also enclose our brief profile and list of our major clients for your consideration.
8. We are enclosing copy of English translation of the documents which are not in English.

For____

(Name and designation of officer)

Encl:

1. Duly signed EOI
2. Registration/ Incorporation certificates
3. LOE or Work order or completion certificates or credential letter
4. Audited Financial statements; Statement of average turnover
5. Self-certification regarding Blacklisting
6. Brief profile and list of major clients