

## **STRATEGIC ROAD MAP**

### **PRODUCTION AND GENERAL ENGINEERING DIVISION COUNCIL (PGDC)**

#### **EXECUTIVE SUMMARY:**

Production Engineering deals with standardization of planning, designing, developing and managing of various manufacturing processes to produce high quality products. General engineering deals with subjects like measurement, design, symbols, etc that are horizontally utilized by other disciplines such as electrical, chemical, mechanical, civil, architectural and computer engineering. Production & Engineering Department (PGD) of BIS covers both these disciplines and has been formulating standards in various fields, such as basic engineering; engineering drawings, screw threads and fasteners; transmission devices; weights and measures; engineering metrology; ergonomics; bearings and tribology; gears; horology; machine tools, hand tools, cutting tools and pneumatic tools; fluid power systems; meteorological instruments; mountaineering equipment; arms and ammunition for civilian use; metal containers; automation in manufacturing and robotics; consumer products and allied equipment; metal forming machines; abrasives; lubricating equipment; educational instruments and equipment; optics and photonics; conveyor belts; and sports goods.

The policy making body of PGD, called Production and General Engineering Division Council (PGDC), has twenty-seven (27) Sectional Committees under its purview and these sectional committees have formulated more than 2500 standards as on date. Amongst these standards, 1462 are product standards, 161 are code of practice standards, 159 are test methods standards, 104 are terminology standards, 359 are dimensions standards, 5 are system standards, 28 are safety standards and 242 standards pertain to other categories. Many of the product standards including those of Tools for Pressing, Stamping or Punching and Ball Bearing & Roller Bearing Parts are also referred in various regulations to make their compliance mandatory for manufacturers.

The main functions of PGDC are given below:

- Advise on the subject areas to be taken up for formulation of standards in their respective areas keeping in view the national needs and priorities;
- Set up Sectional Committees within their areas, define their scopes, appoint their Chairmen and members and coordinate their activities;
- Approve proposals for work, decide which proposals should be taken up and direct the Sectional Committee(s) concerned to undertake the approved work and to determine the priority to be assigned to the work.
- Advise on matters relating to research and development needed for the establishment of standards or their revisions;

- Study the work of international organizations and their committees in standards formulation as related to the area of work of the Division Council and recommend on the extent and manner of participation in standardization activities at the international level;
- Advise on implementation of established standards;
- Receive and deal with activity reports and to make recommendations thereon to the Governing Council (GC) concerning matters in which the decision of the GC is necessary;
- Carry out such tasks as may be specifically referred to it by the Governing Council/Standards Advisory Committee.

The strategic roadmap has been prepared to identify the gaps where standards needs to be either prepared or updated (with latest domestic & international standards) and implemented so that the industry & consumers gets the maximum benefits out of them. The strategic road map also aim to identify the futuristic growth areas, latest technology upgradations and relevant stakeholders to participate in the standardization activity. It is also supposed to address the import substitutes by controlling varieties and improving quality of export goods.

### **INTRODUCTION:**

The Strategic Road Map of PGDC is being developed as a document to reflect the vision of national standardization in the Division Council's domain and to provide a broad standardization roadmap with a five-year perspective. It is expected to serve as an up-to-date overview & as a basis for Sectional Committees to develop their respective standardization plans to be shared with all interested stakeholders.

The Road Map covers the main objectives and current strategies in consideration of the socio-economic, regulatory and other environments in which the Division Council operates. The aim is to align the work program of all technical committees with business need, current trends and to allow respective committees to plan their work, set right priorities, identify the benefits of having national standards, and to ensure adequate resources for projects throughout their development.

### **BUSINESS ENVIRONMENT OF THE DIVISION COUNCIL:**

The standards formulated by PGD are important to number of organizations like Manufacturing Industry, Academic Institutions, Testing Labs, Govt Organizations, Regulatory Bodies, Scientific Organizations, Students, Exporters, Importers, and above all for common man. Some of the major industries being dealt by PGD are as mentioned below:

1. **Capital Good industries:** Machine tools, Pressing tools, Cutting tools, Conveyor tools, Abrasive tools, Conveyors belts. All machinery related to metal cutting, wood working and plastic and earth moving.
2. **Automobile industry:** Hand tools, Bearing, Gears, Fasteners, Robots and Machines tools for specific use of automobile industry.
3. **Defence manufacturing:** Mountaineering products, Fasteners for Parachutes, Arms and Amimation civilian use, Optic and photonics.
4. **Measurement:** Measurement of time, Measurement of length, Measurement of weights, volume.
5. **Packaging industry:** Metal containers.
6. **Educational Institutions:** Lab equipment for educational purpose, Drawing, Measurement and GD&T, Basic standard for preferred number, limits fits and tolerances, Symbols for use on equipment.
7. **Design Industries:** Ergonomics standards, drawing standards, Safety standards for inherently safe design of production machinery.

There are number of products and areas for which PGD has developed standards for consumers that comprises of manufacturers, R&D institutes, Academicians, Testing Labs, Govt deptts, Regulators, etc. Such standards varies from subjects such as basic terminologies like units, quantities, symbols to standards on manufacturing machines, their components, abrasives, bearings, tools, gears, fasteners, etc; from items meant for common man like shaving equipment, umbrella, etc, to high profile designing subjects like ergonomics, industrial automation, robotics; from Meteorological Instruments to educational equipment; from horology products like watch, clocks & their components to drawing codes for engineers; from arms and ammunition for civilian use to metal containers; from optics & photonics to sports goods, etc.

The scope of all sectional committees covered under PGDC is given below:

**PGD 01 - Basic Standards Sectional Committee** – (a) Formulation of Indian Standards on terminology, units, quantities, symbols and other basic subjects of general applicability to all Division Councils; (b) Formulation of Indian Standards for preferred number.

**PGD 04 - Metal Forming Machines Sectional Committee** - Standardization in the field of various technical aspects of metal forming machines both by hot and cold processes and their machines (Presses, press brakes shears, shear blades, moulds, forging machines, nibs and dies for wire and tube drawing operations etc. and their related tooling).

**PGD 08 - Pneumatic and Hydraulic Tools Sectional Committee** – Standardization in the field of portable type pneumatic tools and accessories.

**PGD 09 - Abrasives Sectional Committee** - Standardization in the field of coated abrasives, grinding wheels and diamond/cubic boron nitride abrasive tools.

**PGD 13 - Bearings Sectional Committee-** Formulation of standards for rolling element bearings and hydro-mechanic bearing (including plain, thrust bush bimetallic, hydrostatic bearing and hydrodynamic bearings etc.

**PGD 14 - Consumer Products and Allied Equipment Sectional Committee** – (a) Standardization in the field of: All types of (a) Fasteners for Consumer Goods; (b) Hair Cutting, Shaving and Shearing Equipment; (c) Umbrella & its Components, and (d) Miscellaneous Consumer Products not covered under any other Committee.

**PGD 15 - Ergonomics Sectional Committee** - Standardization in the field of ergonomics including terminology, technology, methodology and human and other factors related to ergonomics common to all the sphere of life.

**PGD 18 - Industrial and Production Automation Systems and Robotics Sectional Committee** - Standardization in the field of industrial automation systems and integration concerning discrete part manufacturing and encompassing the application of multiple technologies i.e. information systems, machines, equipment communication (Bus communication, telecommunication etc. excluded): - Process automation - Electrical electronics equipment - Programmable logical controllers for general application – Sensors.

**PGD 19 - Lubricating Equipment Sectional Committee** - Formulation of standards on lubricating equipment, systems and accessories.

**PGD 21 - Meteorological Instruments Sectional Committee** - Preparation of standards for rain gauge; air measures; anemometer; wind-vane; Psychrometer; thermometer screen (Single and double); Evaporimeter; barometer; thermograph; hygrograph, barograph, etc.

**PGD 22 - Educational Instruments and Equipment Sectional Committee** – (a) Formulation of standards for instruments and equipment for school and college Laboratories; (b) Formulation of standards for surveying instruments, drawing instruments; optical instruments (excluding medico – optical instruments) and their components and materials.

**PGD 23 - Horology Sectional Committee** - Formulation of standards for time measuring, time keeping and time recording devices.

**PGD 25 - Engineering Metrology Sectional Committee** - Formulation of standards on limits and fits and on gauges for plain and threaded work pieces; precision

measuring equipment; surface finish and other allied items.

**PGD 26 - Weights and Measures Sectional Committee** - Formulation of standards for weights, measures, weighing and measuring equipment intended to be used in transactions or for industrial production or for protection.

**PGD 27 - Mountaineering and Adventure Sports Sectional Committee** - Standardization in the field of mountaineering, skiing, adventure sports and recreational equipment.

**PGD 28 - Arms and Ammunition for Civilian Use Sectional Committee** - Preparation of standards for fire arms and ammunition for civilian use besides sporting arms and ammunition.

**PGD 32 - Cutting Tools Sectional Committee** - Standardization in the field of twist drills, reamers, countersink and counterbore, drills, screwing taps, dies and other threading tools, milling cutters and milling machine arbors and accessories, saw and saw blades, gear cutting tools, broaches and their holding devices, single point tools, carbide tips, indexable (Throwaway) inserts, tool shanks, tool blanks and hard metal burrs.

**PGD 33 - Transmission Devices Sectional Committee** - (a) Formulation of standards on terminology for conveyor, elevator and transmission belts; pulleys and belt drives of various sizes and shapes particularly grooved pulleys and V- flat pulleys and belts; (b) Formulation of standards for gears, transmission chains; shaft ends and axle heights; splines and serrations; clutches and couplings and keys & keyways.

**PGD 34 - Hand Tools Sectional Committee** - Standardization in the field of pliers, nippers, wrenches, files, non-spark safety tools and other assembly tools; (b) Standardization in the field of earth working, metal working tools and wood working hand tools and manually portable forest machinery.

**PGD 35 - Machine Tools, Machine Tool Elements and Holding Devices Sectional Committee** - Standardization in the field of machine tools, basic machine tool elements, jigs and fixtures, modular units, evaluation of all machine tools for the working of metal, wood and plastics.

**PGD 36 - Fluid Power Systems Sectional Committee** – (a) Standardization in the field of terminology, classifications, symbols, fluid logic, and fluid properties, contamination control, components marking systems and identification codes, sealing devices and their related parameters; hydraulic components and their testing, maintenance and installations; pneumatic components and their testing, installation and maintenance; (b) Standardization in the field of ports, fittings, tubes and tube,

hoses & hose assemblies and their testing.

**PGD 37 - General Engineering and Fasteners Standards Sectional Committee -** Formulation of standards on (i) Basic mechanical engineering subjects for general applicability such as fasteners of all types (bolts, nuts, rivets, pins, nails, washers etc.), knurls, relief grooves, countersunks and counterbores, and (ii) Screw threads including basic profiles, pitch-diameter combination, terminology, technical requirement and tolerances but excluding screw thread gauges.

**PGD 38 - Metal Containers Sectional Committee -** Standardization in the field of metal containers.

**PGD 39 - Optics and Photonics Sectional Committee -** Standardization of terminology, requirements, interfaces and test methods in the field of optics and photonics. This includes complete systems, devices, instruments (excluding medico – optical instruments like ophthalmological and endoscope related), optical and photonic components, auxiliary devices and accessories, as well as materials.

**PGD 40 - Conveyor Belts Sectional Committee -** Formulation of standards on terminology, dimensional, testing and other specifications for belts used in conveyors, elevators of various sizes and shapes.

**PGD 41 - Sports Goods Sectional Committee –** Formulation of standards for terminology; safety requirements, methods of sampling and test; specifications for sports goods and related products and activities including Gymnasium equipment and physical fitness equipment, excluding amusement rides, mountaineering and adventure sports.

Broadly speaking, the standards formulated by Production & General Engineering Division Council can be clubbed under five sectors/fields, namely (i) Core Manufacturing like Machine tools, bearings, forming tools, hand tools, etc; (ii) Mechanical Design, Industry Automation, Robotics, Ergonomics, etc; (iii) Engineering Metrology, Meteorological Instruments, Horology; (iv) Transmission Systems; and (v) Miscellaneous subjects like Educational Equipment, Mountaineering Equipment, Metal Containers, Arms & Ammunitions, Optics & Photonics, Sports goods, etc.

A summary of the works done and work planned by PGD under these sectors/fields is given below:

#### **1. Core Manufacturing:**

- a) **Machine Tools:** The standards provides the machine tool industry, both manufacturers and users, with up-to-date standards for testing machine tools, for dimensions of components, for safety of machine tools, for noise

measurements, for definitions, etc. New areas, under which fresh standards will be made are safety parameters for metal cutting and woodworking machine tools, numerical compensation of machine tools, determination of measuring performance of machine tools, evaluation of spindle vibration, environmental issues for machine tools, new materials for non-sparking tools, gardening tools and earth working hand tools, etc.

- b) **Bearings:** For manufacturing machinery to work efficiently and effectively, the role of bearing is very important. Already standards on Rolling Bearings, Plain Bearings, and components have been developed. New standards are being conceptualised for linear motion bearings highlighting dimensions, load carrying capacity, vocabulary, with improved filtering of oil circulating systems. Further, the standardized methods for calculating bearing load carrying capacities will be adapted to all these improvements.
  
- c) In internal combustion engines, the demand for energy saving has caused the reduction of bearing width whereas the combustion pressure has reduced emission and improved power output. Hence, the specific bearing load or the load per unit projected bearing area has increased. This has caused the operation of plain bearings in mixed lubrication regime and this condition it is much more severe than that of traditional hydrodynamic lubrication. This has induced the development of new bearing materials, surface structure and treatment. Earlier, Lead was preferred as bearing material component but now it may not be used in road vehicles as is declared hazardous. The substitute materials for lead have been developed or are now under development. Also, the environment and resource issues have caused the change of bearing manufacturing process (plating, for example) or the introduction of recycling. Accordingly, the sectional committee is updating itself with the new technological developments taking place and is in the process of development of standards accordingly.
  
- d) **Metal Forming Machines:** Metal forming is a fabrication process that creates structural parts and components out of metal sheets or tubing. A basic metal forming process will bend or deform a metal workpiece to a desired geometric shape. It is very important for industry to follow standardized norms to prevent wastages and accidents in the forming process. Safety standards on presses have already been developed. New subjects under which standards are being formulated are Hydraulic Cutter and Spreaders with Pump and Accessories that are essential equipment for replacement of old rescue & operational equipment required for smooth safety of Aircraft & Passengers at Airports. Further, standards are also being developed for Hand-held non-electric power tools, Rotary tool for threaded fasteners, Hydraulic impulse tools, Hand-held portable power tools, Tapered polygonal interface with flat contact surface, Indexable inserts for cutting tools, Hollow taper interface with flange contact surface, etc.

- e) **Abrasives:** Already standards have been formulated for bonded abrasives products, grinding compounds, grinding wheels, abrasives micro-grains, etc. New standards are planned for flame saw, wire saw and gang saw, safety requirements for coated abrasive products, cylindrical sleeves, Abrasive belts, Abrasive rolls, Back-up pads for vulcanized fibre discs, etc

## **2. Mechanical Design, Industry Automation, Robotics, Ergonomics:**

- a) Already many standards on Industrial Automation Systems & Integration, Industrial Robots and Robotic Devices have been developed. Now, the emphasis has shifted on “smart manufacturing” by the industry. Accordingly, standards are being developed for Unified reference model for smart manufacturing, General requirements for cyber-physically controlled smart machine tool systems (CPSMT), Mass customization value chain management, Digital Twin Framework for manufacturing, Mechanical Lottery Machines, Product data representation and exchange, and data quality. Future plans are to develop standards for Enterprise modelling, integration services, and system architectures, Integration of robotic systems and their physical interfaces, Enterprise (domain)-control (domain) integration, Manufacturing software and its environment, Modeling of manufacturing technology, Industrial data quality, Industrial data quality management systems, 3D Visualization for industrial purposes, Oil and Gas process data, etc.
- b) Under Industrial Robots, some areas in which standards are planned are Services provided by service robots - Safety management systems requirements, Test methods for Walking RACA Robot, Exoskeleton robots (lumber support robots), AMR Autonomous Mobile Robot for AGV Guided Vehicle, etc.
- c) Under Ergonomics, new areas in which standards are planned are Ergonomic Principles related to Mental Workload - General Issues, Design principles, etc. Further, request has been received from Department of Empowerment of Persons with Disabilities, Ministry of Social Justice Empowerment to formulate standards for persons with disability for accessible design in transport, ICT, consumer products, workplace, operations, etc and accordingly the work has been initiated.

## **3. Engineering Metrology, Meteorological Instruments, Horology:**

- a) Under Engineering Metrology, standards on dial gauges, v-blocks, screw gauges, Angle gauges, etc have already been formulated. New areas for focus are Geometrical product specifications (GPS) - Tests for coordinate measuring systems (CMS), Laser trackers for measuring point-to-point distances, Articulated arm coordinate measurement machines (CMM), etc



- b) Under Meteorological Instruments, standards have already been formulated for basic instruments used for measurement of weather parameters. New standards are planned for Tripping Bucket Rain Gauges (Automated), Forward scatteroscope, Transmissometer and few independent visibility sensors, Specification for Wind Socks, etc
- c) In Horology, standards on wrist watch, clocks, their components have already been formulated. New standards are planned for PVD Ion Coating on Watch Cases and Accessories, Specification for Dial and Dial Feet, etc. Further, in future, some emerging areas for focus will be for development of standards on smartwatches, Radio-controlled clocks, etc

#### **4. Transmission Systems:**

Many standards on various types of gears, transmission chains, belt & pulley drives, clutch couplings, etc have already been formulated. Areas under which new standards under development are Cylindrical involute gears and gear pairs, Wind turbines - Design requirements for wind turbine gearboxes, straight cylindrical involute splines, Driving and driven machines, Thin parallel keys and their corresponding keyways, Tangential keys and keyways, Woodruff keys and keyways, Straight cylindrical involute splines, etc.

#### **5. Miscellaneous Subjects:**

**a) Mountaineering Equipment:** Under Mountaineering equipment, new standards are being developed as per International standards developed by UIAA and European Union on Belay Lanyard for items like Pulleys for mountaineering, Energy absorbing systems, Braking devices, Load sharing devices, Avalanche rescue shovels and probes, Crash pads, Harnesses, etc. Further, standards on Code of practices for “Safety in Mountaineering” and “Training in Mountaineering” is also under proposal. Under Winter sport, standards for improving the performance & safety of the ski and snow boarding equipment are the focus areas. Under Sports Climbing, future standardization efforts are concentrated on Artificial Climbing structures, Climbing shoes, Structures and framework for bouldering and speed climbing equipment as well as arenas.

**b) Metal Containers:** With the advantages of light-proof (opaque), rigid, stable and stackable properties, metal packaging is quite suitable for foodstuff and chemical goods for storage and transport. More than 90% metal cans are used for packaging of food and beverage products. New Standards under development in this stream relate to stainless steel feeding bottles for infants, lacquer coating for open top cans, Aluminium container for packaged drinking

water, etc. Further, some emerging areas for future are cans of Irregular Shapes, Caps, closures and ends.

**c) Optics & Photonics:** Optics and photonics, as self-consistent fields and cross-sectional technologies, play a very significant role in our lives. It is expected that the photon will be the basis for a technical revolution in this century like the electron was the one for the 20th century. Optics and photonics are "enabling technologies" which will influence a wide field of applications such as information technology, telecommunications, defense and security, lighting and energy, healthcare and life sciences, as well as industrial production and automation and will contribute towards the welfare of humanity. Some emerging areas under this stream are Nanotechnology enabled photonic devices, Interchangeability and interface definitions for optical systems, Optics for use outside the visible spectrum, Holographic optical elements, Optical glasses with especially high refractive index or with abnormal dispersion, Infrared Optical Material, etc.

**d) Sports Goods:** Standards on sports goods used in cricket, Gymnastic equipment, boxing, carom, table tennis, basket-ball, chess, football, etc. were formulated long time back and most of these standards are under review/revision. The sectional committee was earlier in the jurisdiction of Petroleum, Coal and Related Products Division Council (PCDC) & has been transferred to PGDC in Sep 2021. It is expected that some of these standards may come under Mandatory Certification. Hence, work for review/revision of the standards of all the sports goods is going on urgent basis by the sectional committee.

### **BENEFITS EXPECTED FROM THE WORK OF DIVISION COUNCIL:**

This Division Council deals with many priority subjects starting from (i) Tools & Fasteners; (ii) Design Drawing & Metrology; (iii) Horology; (iv) Transmission Systems; (v) Mechanical Systems; (vi) Industrial Automation & many other subjects such as Consumer Products; Mountaineering Equipment; Arms & Ammunitions; Educational Instruments; Metal Containers; Sports Goods, etc. Indian Standards will help in development of such industries by providing quality requirements, test methods, code of practices, etc. Further the manufacturers can achieve United Nations Sustainable Development Goals (SDGs) by adhering to the Indian Standards. The standards also assist in improvement of quality-control activities in manufacturing sectors. The results from the testing, using the relevant standards, give the requisite details of compliance to standards, to all the stakeholders including common consumers.

Many of the products under this Divisional Council play a major role in the economy and timely preparation or revision of such standards is very much required. Further these standards of Production and General Engineering also play a pivotal role in

addressing relevant safety, health, social or environmental concerns to the industry and benefit the economy. Many new technologies will help in modernization of the industry and in increasing the efficiency of production.

Harmonization of our standards, particularly in test methods, will help in using the latest requirements. This will also help in testing the product as per the latest standards irrespective of the place of manufacture and thus help in checking quality of imported materials. Further, participation in the relevant International standardization work enhances the chances of taking care of the national interest.

### **STAKEHOLDER REPRESENTATION:**

The Production and General Engineering Divisional Council and its Sectional Committees are well represented by relevant stakeholders and are balanced Committees. They include manufacturers, consumers, scientific and technical organizations, academic and research institutions, government, and regulatory bodies, etc. The composition of each sectional committee is reviewed every three years by the Division Council based on their participation in the work of the committee. The recommendations of the sectional committees on co-options and withdrawals are also considered and approved by the Division Council.

Regular participation of stakeholders is yet to be attained. Lack of participation may be due to lack of knowledge about the standardization activity, lack of availability of time, broad scope of the Committees, etc. The organizations are to be followed up on regular basis in order to ensure their active participation. Acknowledging active participating organizations in the meetings, recognition certificate for members providing the drafts, regular stakeholder engagement may improve participation of members in the meetings.

### **OBJECTIVES OF THE STRATEGIES:**

The objectives of Strategic Road Map along-with the strategies that can be followed for achieving the objectives are given below:

1. To provide a national framework for development of standards which are in line with market needs, are reliable, are market driven and are easily implementable:
  - The Sectional Committees under PGDC would be guided to prioritize the work considering the National priorities as well socio-economic and environmental issues,
  - A core group (Panel) under Division Council may guide the Sectional Committees for selection of new / emerging subjects, and
  - A survey/ Questionnaire may be circulated to the Committee members to ascertain the new subjects on regular basis.

2. To examine/review the existing standards for their relevance to market needs and practicability and work for their up-dation/revision:
  - Members would be encouraged to fill review proforma and provide a draft revision along with relevant inputs in the form of Action Research Project (ARP),
  - Member /Member Secretaries would be encouraged to reach out to stakeholders and help each other in identifying right person through known contacts, while reviewing the standards,
  - Member Secretary/Members may visit manufacturing unit to create more clarity on the process as well as market needs,
  - A strategy group may be created in each Sectional Committee which can explore new areas for standardization,
  - Timelines for each step may be specified and closely monitored.
3. To address safeguards with respect to protection of environment, health, and safety of consumers as per WTO guidelines:
  - Strategy groups may be encouraged to highlight the priority based on effect on environment, health and safety for overall benefit of consumers of a product/subject,
  - Committee may review standards on the basis of existing regulations and revise standards accordingly,
  - Committee may refer other country / International standards for assessing the relevant safeguards available,
4. To assess and encourage the active participation of all member organizations (stakeholders) in the standardization activity and to regularly review the composition of Committees so that the committees remain active always:
  - Review composition and look into alternate organizations, so as to maintain balance in the Committee,
  - Appreciate/ acknowledge the members who are contributing actively to the Committee work,
  - Regular review of Composition and removal of non-participating/inactive members.
5. To promote participation of experts in international standardization in the areas to protect the interest of Indian industry:
  - Contributions of the members in the ISO committee can also be encouraged to motivate members to contribute actively,
  - Encourage members to send comments on documents from early stages by providing them all the reference material/standards.

### **IMPLEMENTATION OF THE STRATEGIC ROAD MAP:**

The strategic road map of PGDC is proposed to be implemented in the next five years and the progress to be monitored periodically in terms of measurable parameters identifiable against each item. Keeping in view the above broad objectives, it is

necessary to give emphasis on its implementation strategy to work out plans, programs, projects, etc. with clearly defined tasks, resources, and time targets for arriving at the desired benefits. The Road Map would form the basis for the Sectional Committees to frame their individual Standardization Plans/Strategic Road Maps.

For monitoring the implementation of the strategic roadmap, the following steps can be taken:

- (i) Ensure that each sectional committee its own strategic road map in each of its meeting and update it regularly;
- (ii) Creating alert groups in each Sectional Committee, with a group of active members to verify the market for identifying new subjects, assessing the market needs and inform the upcoming areas for standardization, etc;
- (iii) Evaluation of new subjects received for their formulation;
- (iv) Continuous monitoring of the work progress of the Committee and timeline monitoring by the member secretaries; and
- (v) Review of the work by Division Council in every meeting.

#### **REVIEW OF PLAN:**

The Strategic Road Map of the Division Council must be formally agreed upon by the Council and then reviewed periodically, committee-wise in every meeting. The plan will be reviewed from time to time to evaluate the progress as well to formulate new strategies, whenever required and with the approval of the Council.