



**Gem and Jewellery Research
and
Training Institute**

Annual Report

2017

Gem and Jewellery Research and Training Institute

“RuwanSevena”

No:73/5/A

Weliwita.

2018.12.05

Hon. Minister of Mahaweli Development and Environment

Minister of Mahaweli Development and Environment

SobadamPiyase,

No416/B/1,

RobetGunewardena Mw

Battaramulla.

Dear Sir

Annual Report – 2017

In terms of sub section 14 (2) of the Finance Act No.38 of 1971, I submit the following documents.

1. The Administration Report of the Gem and Jewellery Research and Training Institute for the year 2017
2. Income and Expenditure Statement for the year ended 31st December 2017, Balance sheet as at 31st December 2017 and Cash Flow Statement for the year ended 31st December 2017
3. Report of the Auditor General for the year 2017

Yours Faithfully,



Nawarathna Bandara Alahakoon

Chairman

Gem and Jewellery Research and Training Institute

VISION MISSION & GOALS



VISION

“ To the Regional Center of Excellence in Research and Training in the Gem and Jewellery Industry while facilitating the Growth and Development of the Industry in Sri Lanka”

MISSION

“ To enhance the Competitive capability of Sri Lanka Gem & Jewellery Industry by providing high Quality Research & Training Services leading to Exploration of Gem Deposits, Technological Innovation, Skill and Competency Development and Quality Improvement for the satisfaction of our Stakeholders ”

GOALS

“ Harness the Gem Resource of Sri Lanka through sustainable methodologies, introduce innovative methods, and train new set of tradesmen for the industry to up life the country's economy ”

2. Brief profile of the Directors and Senior Management

2.1 The profile of the Board of Directors, of the Institute during the year 2017 was as follows.

01	Mr. Nawarathna Bandara Alahakoon	From 2015.02.24 To Since Today board of chairman
02	Mrs. K.D.R. Olga	From 2015.03.18 To Since To Day member of the board of director
03	Mr. D.M.D.O.K. Dissanayaka	From 2015.02.20 To 2017.06.05 member of the board of director
04	Mr. M.P.N.M. Wickramasingha	From 2015.06.25 To 2017.03.30 member of the board of director
05	Mr. M.A.S.P.K. Malawiarachchi	From 2016.11.01 To 2017-10-27 member of the board of director
06	Mr. W.M.A.P.B. Wanninayaka	From 2017.04.20 To 2017-07-27 member of the board of director
07	Mr. Nimal Bopage (Attorney-at-Law)	Since 2017-09-28 to today member of the board of director
08	Mr. M.L. Gammampila	Since 2017-09-28 to today member of the board of director
09	Mr. Jayarathna Disanayaka	Since 2017-11-07 to today member of the board of director

2.2 Senior Management

01. Dr. Prasan Francis - Director General of the Institute
(B.Sc, Special (Geo.,SL) M.Sc in (Gem.,SL) M.Sc (Petro.,Canada), Ph.D. (Gem.,SL) Dip.Mkt(UK), G.G. (GIA,USA), A.J.P. (GIA,USA), MGA(SL))
02. Mr. Gamlath - Director (Training and Development)
M.Sc (Gem), B.Sc (SP), (Physics) FGA (Cert) FG, MGA (SL)

3. **Review by the Chairman outlining the Opportunities and Constraints faced in the year under review.**

3.1 Opportunities

• **Increase in the demand for Research and Training.**

The demand for the services of the institution is being increased. The cause for this increment is the high demand for the skilled labour of this field. Another reason to increase this demand is the steps which have been taken to upgrade the quality of the service provided by the Institute of Gem & Jewellery. There is no any other institution which provide training services relevant to all the aspects of this field. In the same way there is no any service provider fulfilling the research necessities of rapidly developed North East areas.

• **Unfulfilled needs.**

We can still see the unfulfilled needs which have been failed to completed by the service providers in this field. These include Gem ore exploration, recognizing primary gem deposits, innovating and processing a technology to extract primary gem deposits and training for designing and computer aided designing.

• **Technological advancements**

There is an opportunity to invent and introduce new machines to excavate of gem deposits and enhance the colour of gems.

• **Growth of the Institute.**

There is a necessity to develop this institute as to Gem and Jewelry University of Asia Pacific region to provide service to the customers from around the world.

• **Other Facilities.**

This is a pioneer institute for providing service for this field by establishing Geuda Heat Treatment Centers in the other localities and facilitating to carry out researches.

• **Joint Programms for industry Development**

There are opportunities to work co-operation with various development projects of other government institutions such as National Gem and Jewellery Authority and lead in to eco-friendly methods for gem industry with environmental authorities.

• **Publicity.**

The programs should be launched to enlighten the public on the service provided by the institution. Awareness progamms, papers and leaflets, audio visual presentations on gem & jewellery can be used.

3.2. Constraints

- **Infrastructure facilities**

The machines, equipments and modern facilities have not been developed sufficiently in the training centers. The steps should be taken to develop the knowledge and skills necessary for the development of the industry through providing such instruments to these training centers. Outsmart machines should be introduced for gem lapidary, gem cutting unit and jewellery manufacture training center. Furthermore a unit to determine the standard of metals should be established and associated courses should be introduced. As diamond cutting is a special part of this industry a training unit should be introduced and steps should be taken for the betterment of that industry.

- **Physical Resources.**

A lack of necessary vehicles and equipments to carry out the works of the researches and training section of the institute can be seen.

- **Laborer mentality of the workers / poor attitudes**

Since recent past the employees are bearing negative attitudes.

- **Duplication of work by sister organizations**

e.g. Our trainings, Lapidary service etc.

- **Human Resources.**

It is a known fact that the number of academic staff members in the institute is not sufficient to meet the existing demand for educational programmes in the industry. This matter of staff has born with the backgrounds on unavailability of relevant training programmes locally, lack of academically sound personnel in the field are some highlighted reasons. The end result of the situation is not beneficial for the future of the industry, and will be a cause to reduce the demand for trainings. Therefore, the staff of the institute is required to be given training programmes offered by locally as well as internationally available institutions.

- **Financial Resources**

Sufficient fund contribution to carry out the works of the institute in a spreaded level is not granted by the treasury. The financial provisions needed to recruit the essential staff have not been granted by the treasury.

- **Emerging private sector training institutes.**

The interference of private sector for education and training of gem and jewellery industry has been developed.

- **Lack of incentives to certain sections of the industry.**

e.g. Service cutting section

4. Directors Report

4.1 Objective

The Gem and Jewellery Research and Training Institute was established by the gazette notification No 882 of 28 July 1995 in terms of section 25 (1) of the National Gem and Jewellery authority Act No 50 of 1993 enacted for the purpose of the development of Gem and Jewellery industry.

Major objective of the institute is the regulation, improvements and development of the Gem and Jewellery industry by providing the necessary training and research facilities.

4.2 Powers of the Institute

Powers of the institute assigned thereto by the gazette notification No. 882 of 28 July 1995 are as follows.

- (i). To conduct surveys regarding gem minerals and gem deposits in Sri Lanka and to carry out research relating to the followings.
 - i. The location of Gem Deposits
 - ii. Their Identification
 - iii. Methods of enhancing the value of gem stones.
 - iv. Matters related to other fields concerning the institute.

- (ii). To provide technical and other advices regarding the digging of gem pits, Lapidary, Manufacture of Jewellery and methods of treatment of gem stones for the developing of the Gem and Jewellery industry including the production of machinery required for the industry.

- (iii) To provide training facilities in the following fields.
 - i. Gem Cutting, Polishing and Identification
 - ii. Jewellery Manufacturing
 - iii. Gemmology including Diamond
 - iv. Jewellery Designing
 - v. Colour Enhancement of Gem Stones by Heat Treatment.
 - vi. Other matters relating to the Gem & Jewellery industry.

4.3 Activities and Efficiency

4.3.1

Measures that are crucial for prompting the gem and jewellery training activities in the country were effectively implemented. Accordingly, it was possible to maintain increment in youth attraction to follow gem and jewellery courses introduced by the institute.

4.4 Progress of the Training Activities - 2017

As a dynamic semi government institute our aspiration is to address national requirement related to gem & jewellery industry by providing quality training according to the national competency standards.

In this year our institute was able to conduct many training programs with covering vast range of subject areas relevant to gem & jewellery and recorded an ever highest student intake compare to last decade.

The offered programs were highly appreciated by the industry, since our students have gained theoretical and advanced practical knowledge which necessary to work with latest technological applications than traditional concepts.

Outline of the activities are as follows;

As a result of our combined effort, three novel training centers were established in this year and altogether 12 centers successfully functioned. These centers were operated in the areas such as Ratnapura, Colombo, Kandy, Galle, Bingiriya, Polonnaruwa, Jaffna, Moragahakanda, Awissawella, Aththanagalla, Sooriyawewa and Nivithigala.

1. To overcome severe skilled labor shortage still facing by the gem and jewellery industry, a specially projected training program was introduced with the collaboration of National Gem and Jewellery Authority (NGJA) and Gem and Jewellery Association of Sri Lanka (GJASL) to train jobless youth for the gem cutting and polishing industry.

Another Skill Development Training project was also implemented with funds drawn by treasury for the purpose of training members of low income families.. This project has been implemented through the centers in Colombo, Ratnapura, Kandy, Galle, Bingiriya, Moragahakanda and Polonnaruwa.

2. The institute initiated a project to offer a diploma program. Jewellery Design and Manufacturing Technology as per National Vocational Qualifications (NVQ) Level 5 standards stipulated by Tertiary and Vocational Education Commission (TVEC). Gem Cutting and Polishing training programme was accredited to the NVQ Level 4 standards. These programs enable students to receive internationally recognized NVQ certificates if followed our courses.
3. Institute has many training workshops and laboratories which are used to give trainings for students. These were continuously upgraded introducing with latest art – of- technology applications used by the industry today.

➤ Progress of the student intake 2017

Target Trainees in Year 2017			= 1505
#	Course Type	Target	Total Intake
01	By Course Fee charged training programs	445	608
02	By the Training Projects conducted by GJRTI,NGJA & GJA	500	320
03	By Gem Designing Training Programs	500	257
04	By Short/Tailor Made training programs	60	15
Total		1505	1200

Student intake in the year 2017 to the courses

#	Training Programme	No of Student
01	Gemmology	69
02	Basic Gemmology	113
03	Geuda Heat Treatment	111
04	Gem Cuttong& Polishing	381
05	Colour Grading & Marketing	87
06	Gem Carving	4
07	Jewellery Designing	95
08	Jewellery Manufacturing	116
09	Costume Jewellery Manufacturing	104
10	Stone Setting	47
11	CAD	22
12	Rough Gem Identification	20
13	Short Course In Basic Lapidary Techniques	21
14	Short Course in Gemmology	5
15	Special Foreign Trainings	5
Grand Total		1200

Records of student progress achieved in last consecutive 6 years.

	Training Programme	Year & Student Pass out						
		2011	2012	2013	2014	2015	2016	2017
01	Gemmology	13	30	43	105	134	97	69
02	Basic Gemmology	-	-	-	-	-	31	113
04	Geuda heat treatment	25	51	64	84	96	96	111
05	Gem cutting and polishing	43	61	76	109	190	213	381
06	Gem colour grading and marketing	72	48	118	175	157	73	87
07	Gem Carving	-	-	-	-	-	12	4
08	Jewellery Designing	30	16	44	18	37	30	95
09	Jewellery Manufacturing	21	37	40	49	42	63	116
10	Costume Jewellery Marking	-	-	21	-	18	48	104
11	Jewellery Stone Setting	8	-	9	-	-	26	47
12	CAD	-	-	-	-	-	20	22
13	Rough Gem Identification	-	-	-	-	-	27	20
14	Short Course In Basic Lapidary Techniques	-	-	-	-	-	21	21
15	Short Course in Gemmology	-	-	-	-	-	-	5
16	Special Foreign Trainings	-	-	-	-	-	-	5
Total		212	243	415	540	674	757	1200

Local Trainings

Training Institute		Name of the training programme	Date	Participants
Skills Development Fund Limited (SDFL)	1	Workshop on "Public procurement"	2017-02-27 to 2017-02-28	1.Mrs. U.A.D.D. Rupasinghe (MA) 2.Mrs.H.L.S.U. Madanayake (MA)
	2	Workshop on "Control of office equipment"	2017-05-25 to 2017-05-26	1.Ms. S.K. Vithanage (MA) 2.Mrs.H.L.S.U. Madanayake (MA) 3.Mr. J.P.K. Sandeep (MA)
	3	Workshop on "Personal file management"	2017-06-19 to 2017-06-20	1.Ms. P.A.K.N. Perera (MA)
	4	Workshop on "How to reduce audit quarries of the government institute"	2017-09-21 to 2017-09-22	1.Mrs. H.A.N. Priyadarshani (IA) 2.Ms. P.K. Wickramaarachchi (MA)
National Science and Technology Commission	5	Workshop on "Work-Life balance for scientists: key to success"	4/27/2017	1.Ms. SamudraWijewardane (RO) 2.Mr. W.G.C.N. Wewegedara (RO)
National Library & Documentation Board	6	Workshop on "Utilize Information Technology in Special Libraries of Departments"	11/28/2017	1.Ms. K.J.M. De Silva (MA)

Overseas Training Programmes in 2017

	Name of the training Programme	Country	Date	Participants
1	Effective Competency Development Programme	Malaysia	2017-12-02 to 2017-12-06	Mr. S.L.J. Muhandiram (Assistant Director - Finance)
2	Workshop on Gem and Jewellery Techniques organized by National Gem & Jewellery Authority	Thailand	2017-02-21 to 2017-02-24	Mr. B.G.R.W. Gamlath (Director - Training and Development)
3	Mineral Processing Techniques	South Africa	2017-05-15 to 2017-08-04	I.K.M.S.C.K. Illangasinghe (Research Officer)
4	Knowledge exchanging programme in Gem and Jewellery Industry	Myanmar	2017-11-04 to 2017-11-10	Mr. NawarathnaBandra (Chairman) Mr. Prashan Francis (Director General) Mr. R.M.N.P.K. Jayasinghe (Senior Research Officer/Head (Research))

(A) Progress of Research Projects -

Research No.01

Exploration and Assessment of Gem Deposits in Sri Lanka (EAGSDL)

1.1 Medagamadivisional Secretariat (Monaragala district, Uva province)

Medagama DSD is located in the Moneragala district. It is 245.14 sq.km in area and consists of 35 Grama Niladhari Divisions. When consider the progress of the project, final map was submitted to the Board at end of the year 2017. According to all fields, laboratory and other investigations, three secondary gem fields were identified in Medagama area namely Gala oya gem field, Medagama gem field and Alana gem field. There is no any significant primary gem deposits were found as shown in Figure 1. Furthermore, these areas do not have any previous records of gem mining. Since most of the land is used for paddy cultivation, the streams are dammed with small concrete barriers creating an artificial cascade system for the river/ stream flow in order to obtain water for their agricultural purposes. These barriers work as silt traps and hinder the transportation of sediments down the slope. This could be another cause for the lack of gem bearing sediments in the area.

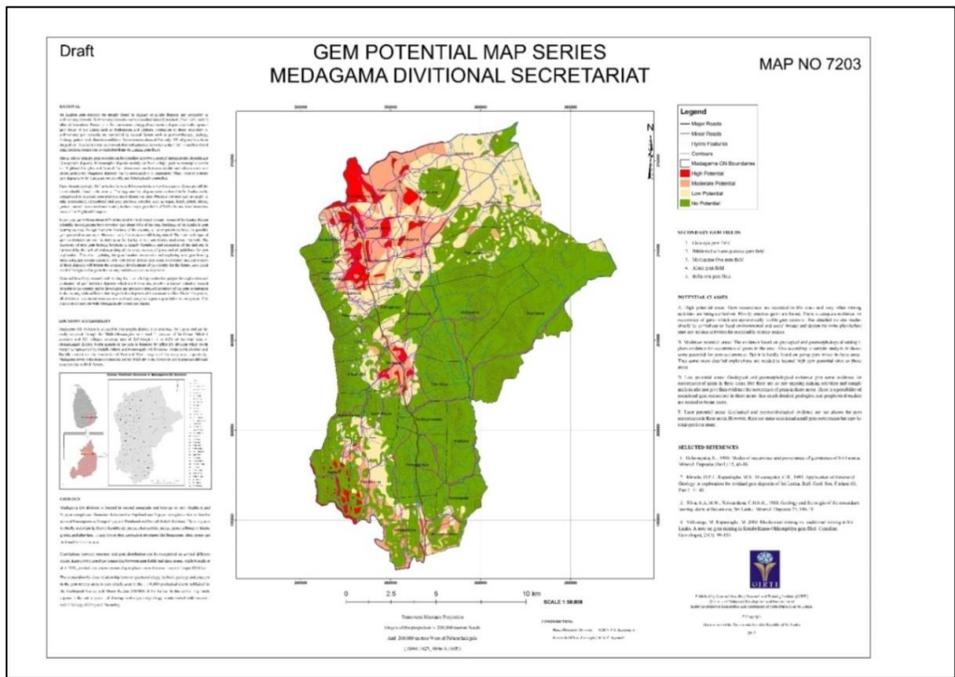


Figure 1: Gem Potential map for the Medagama Divisional Secretariat.

Detailed technical report of Medagama DSD is to be submitted to the Board at end of the March 2018.

1.2 Bibile Divisional Secretariat Division (Monaragala district, Uva province)

Bibile is located on the boundary between Highland and Vijayan complexes. The source of Bibile gems is the Dorapode mountain range which lies adjacent to Lunugala at the eastern rim of the central massif. Corundum and other gem crystals had been originated here. Then these deposits have been weathered, eroded and transported by the Gala oya (Gala oya) drainage system and deposited on the Vijayan plains.

According to field and laboratory studies, the Gala oya gem field is created by the erosion, transportation and deposition of the said primary gem deposits at Dorapode on the flood plains of the river. This can be classified as alluvial type secondary gem deposits. Ibbannaoya, Mudiyalakandura, Kotagamaoya and Mallehewaoya are the major agents that transport and supply sediments to the Gala oya gem field. Badullagammana, Mudiyala, Kotagama, Hewelwala-Unagolla, Yalkumbura, Herathgedara are the localities with high gem potentiality.

The Bibile gem potential map is completed and tabled for the reviews of the board of directors, GJRTI and the report of the study is at the final stage and undergoing certain revisions.

However, according to the conclusions of the research, Bibile division holds only a moderate potentiality for gem occurrence despite its large land area and blue sapphires, yellow sapphires, the geuda forms of the above two corundum varieties (ottu, milky geuda, kowangupushparaga, mostly), tourmaline, spinel, zircon are among prominent gem species encountered. These are flawed most often.

1.3 Thanamalwila, Sevanagala & Katharagama Divisional Secretariat Division (Monaragala district, Uva province)

The field investigations of the Thanamalwila DSD is completed. Apart from that two students of Uva Wellassa university were trained to carry out field investigations of the Kataragama and Siyanmbalanduwa DSDs. The gem potential map preparation and sample analysis of the Thanamalwila division is under progress.

1.4 Haputale Divisional Secretariat Division (Badulla district, Uva province)

Literature surveying, base map preparation, preliminary and detailed field investigations are completed so far. Also, auger sampling is completed and analysis of samples at the laboratory is under progress. Coming into conclusions on the gem potentiality of area is possible only after the completion of laboratory studies and then only a draft of gem potential map could be producible. The report compilation has been started.

The rivers of Mathetillaoya, Haputalaoya and Welioya were targeted during the field investigations. In that regard, Ellagama, Aluthwela, Pitarathmale, Horadorowwa,

Kitulgahawaka, Bombuhinna, Welanhinna, Helakadurugamuwa, Kahagolla and Madawalakapolla areas were examined and sampled.

A special attention was paid to the Menikkanda and Wewa localities in Ranjallawa area which exhibit the characteristics of a primary deposit.

When consider the lithological background of Haputale, charnockite, khondalite, quartzite, quartzofeldspathic gneiss occur predominantly. Also, shear zones, fault z planes are plentiful there while haputale is located at the neighbourhood of an escarpment and all these indicate a high degree of tectonic activities in the geologic past.

Though this structural and lithological set up promotes the occurrence of gem deposits into some extent but however the general observation was the area holds a moderate potentiality due to certain factors unfavourable for gem occurrence. Due to urbanization and tea plantations, the access to gem deposits in hapuatle is limited considerably and it is noteworthy that this limits the amount of extractable deposits.

1.5 Bandarawela Divisional Secretariat Division (Badulla district, Uva province)

Bandarawela DSD is located in the Badulla district. It is 71 sq.km in area and consists of 36 Grama Niladhari Divisions. When consider the progress of the project base map preparation and field exploration is completed. Auger samples collected are under laboratory studies. Demarcation of gem potential areas by GIS analysis is ongoing. Detailed technical report and final map is to be submitted to the Board at end of the June 2018.

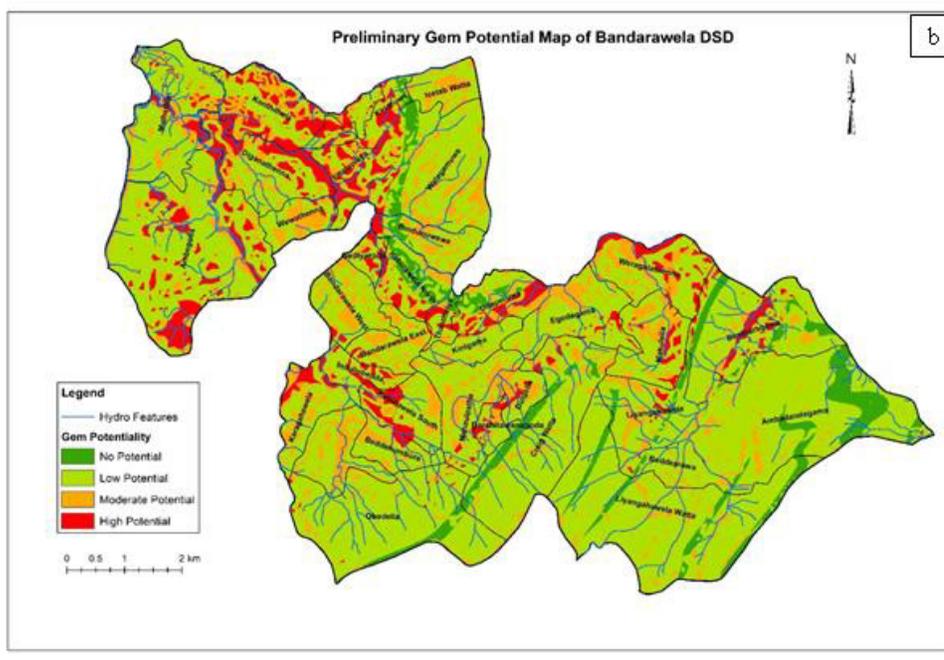


Figure 2: Prepared preliminary gem potential map for the Bandarawela DSD.

Research No.02

Development of Treatment Methods to Enhance the color and clarity of low quality Gems stone of Sri Lanka - 1000

2.1 Thermal enhancement of inferior quality corundum variety called "KiriKottara" , "RathuKottara" and Zircon

During the mining, in most of the Sri Lankan deposits, we find inferior quality corundum variety called "Kottara". Miners generally discard these materials because they consider it has no value at all. The only value of this material is that they could be used as an abrasive material since its hardness reaches 9 in Mohr Scale. Therefore, it is important to develop a novel method to enhance the colour and clarity of these materials up to some extent. Here comprehensive study has been conducted on applicability toward the commercial purposes. The heat treatment of low gem quality zircon and Kirikottara was carried out under this project.

During that translucent green zircon was converted into transparent green zircon and the chemical analysis of the treated zircon is in progress.

Samples of inferior quality Whitish corundum (KiriKottara) and Reddish corundum (RathuKottara) were collected and pre-cleaned. Then Oven dried samples were used for Heat Treatment.

Three temperature conditions were used as 1850°C - 1950°C, 1750°C - 1850°C and 1650°C- 1750°C for a one hour of holding time.

Blue colour was observed in the selected KiriKottara sample at three Temperature ranges, however the Optimum Temperature range was 1850°C-1920°C under reducing condition for one hour of soaking period. Although reddish brown colour of Rathukottara samples were changed into pink colour during the heat treatment, most part of the stone got chalk like (death) property.

Therefore, only the KiriKottara sample show value added product after heat treatment under above mentioned conditions although their clarity remains unchanged. These treated stones are ideal for silver jewellery intended for middle income consumers.

As future activities it is expected to do Physical and chemical characterization of treated and untreated samples of Whitish corundum and Find out Value addition method for Reddish inferior quality corundum.

2.2 Development of a novel value addition method for low quality MoonStone

Moonstone belongs to the family of minerals called Feldspar group mineral. In Sri Lanka, Moonstone has been found mostly in the regions of MeetiyaGoda and Matale. Common chemical formula of Moonstone is $(\text{Na,K})\text{AlSi}_3\text{O}_8$.

In this project, we have revealed a novel method to add value to moonstone. Deposition of nano-film onto stone yielded blue appearance to the gem without sacrificing its intrinsic optical sheen endowed by nature. Such a value addition to moonstones has not previously been reported. This color development method by epitaxial growth is the by far the most felicitous method to add a value to moonstones. Our novel technique gives long lasting blue tint without sacrificing its intrinsic sheen.

Moonstone is alumino silicate mineral whose surface is chemically resistant to coordinate to dye molecules. The presence of Al as is in $(\text{Na,K})\text{AlSi}_3\text{O}_8$ can be considered as a disguised boon for activating the surface to coordinate the 3-d metal ions. On the other hand, the presence of Al in moonstone render a modest index of hardness. Ability of modulating of the surface is critical for coordinating the dye molecules onto it. Dye precursor molecules can be incorporated in 3-D in all directions and form a coordination polymer as is seen in moonstone itself. It had been displayed a jewelry set which was made out of these colored moonstone in "2017 Jewels" exhibition.

Careful control of the temperature, duration, precursor concentrations and reaction condition permit us to make color gradations in semi-precious gems according to artisan's discretion. Further, the technique invented here is scalable, eco-friendly and cost-effective. In future this will help to add coffers to our economy.

2.3 Value Addition of Zircon and Kottara

Heat treatment experiments were carried out for low quality zircon and kottara. As a result translucent dark green zircon was transferred to transparent light green zircon. Chemical analysis and interpretation works are being carried out.

2.4 Establishing of Heat Treatment Condition for low gem quality black Zircon

- The results clearly indicate that; gemmy green color zircon was obtained by heat treatment in reducing atmospheric at $900\text{ }^{\circ}\text{C}$.
- Result further demonstrated that the green color is formed due to aggregate effects U^{4+} ion and defects or color center in zircon after recrystallized by heat treatment.
- Finally, this underutilize gem material shows a high potential to be used as valuable green color gemmy zircon.
- A manuscript has prepared based on these newel findings to submit for a SCI Journal.

2.5 Optimization of Geuda Heat Treatment Methods

Following findings were obtained based on preliminary study,

- Transparency of the stone is mainly controlled by maximum temperature and its time
- Cooling time and reducing condition of the cooling time directly effect on blue coloration of geuda.
- Feeding of reducing gases (H_2 and N_2) is optimized the blue coloration process in heat treatment of geuda.
- Air tit closing of all holes in LAKMINI furnace is more important.

2.6 People perception and knowledge on gem treatment in Ratnapura area

A questioner survey was carried out using randomly selected 100 people engaged gem trade in the Ratnapuraarea.Following findings obtained based on this study.

- More respondents (77%) not involved any value addition activity and they directly only involved selling of gemstones.
- However, 81% of respondents were well known on geuda heat treatment.
- 60% of respondents shown spinal is the low gem quality stone in the market.

2.7Heat Treatment of Madagascar Low Gem Quality Sapphire

Major findings of this project summarized as follows.

- Blue tint of ruby is removed by heat treatment in oxidizing condition 1200-1250^oC
- Dark blue color is formed heat treated at 1850 ^oC in reducing atmospheric condition of green geuda Madagascar sapphires.
- Fe content of the Madagascar sapphires is comparatively high with Sri Lankan sapphire.
- Hydroxyl is content in unheated Madagascar sapphires.

3.1 Preparation of the far infrared emitting polymer composite using tourmaline powder.

Tourmaline is a naturally-occurring semi-precious borosilicate mineral with complex and variable compositions. Also it's generates a weak electrical charge. This electrical charge enables tourmaline to produce far infrared photon energy, negative ions, and alpha waves.

This character of tourmaline combine to provide many benefits to our health, such as prevention of cholesterol build up, purification of the blood, an improvement in blood circulation, stimulation of the autonomic nerves, calming of overly-excited sympathetic nerves, stress relief, stimulation of cell metabolism, and enhancement of the immune system, So that tourmaline/ polymer composite has especially been a representative examples for the crystal therapy applications.

As a preliminarily approach, When the tourmaline/polymer composite preparation tourmaline content was changed viz. 5, 10, 15, and 20% (wt.) and the particle sizes was varied according 50, 110, 125 and 200 mesh sizes. Properties of the composite matrix were checked by using microscopic images. The results clearly state that the perfect polymer composite matrix was achieved with < 125 μm tourmaline powder and the optimum tourmaline weight percentage in the composite is the 20%. The far infrared emitting capacity was measured using ice cube test according to the result tourmaline embedded natural rubber thin film emitted the far infrared radiation. The dissolving rate of the ice cube which kept on the tourmaline /NR composite thin film was high. As an outcome of the current study inner sole for shoe and the slipper has been designed and a patent application was submitted (LK/P/1/19677).

3.2 Investigation of naturally occurring minerals as novel adsorbents and their applicability toward waste water treatment.

Heavy metal pollution has become one of the serious environmental problems of worldwide concern. Toxic heavy metals are considered as metal ions derived from p, d- and f blocks. They are not necessarily metals with high atomic number. Bioaccumulation and biomagnification lead to deleterious side effects that could later exacerbate into an incurable state. Especially, the exposure to heavy metals can cause for adverse health effects such as kidney diseases, cancers, mental and nervous system disorders. It has been proposed that kidney disease of unknown etiology has some connection to the consumption of contaminated water with heavy metal ions.

So various water treatment methods have been introduced to overcome the aforementioned problem. Such water treatment methods include chemical oxidation, membrane separation, electrochemical treatment, microbial degradation, reverse osmosis, bioaccumulation and filtration. However most of these techniques have several disadvantages. Therefore, identification and development of an effective sorbent for simultaneous removal of toxic heavy metal from water sources has gained a wide attention among scientific community.

In this research, study about the applicability of low quality gem stones such as tourmaline, topaz, hessonite garnet and mineral mica as sorbent materials. As a preliminary approach, adsorption affinities of tourmaline powder (<63 μ m) to synthetic solutions of As^{3+}/AsO_4^{3-} , Cd^{2+} , Cr^{3+} and Pb^{2+} were investigated by batch experiments. The removal percentage of As, Cd, Cr and Pb at 2 hours contact time, varies as 20%, 19%, 21% and 36% accordingly. Similarly at pH of 4 the removal percentage of As, Cd, Cr and Pb varies as 24%, 20%, 37% and 41% respectively. The results clearly state that the tourmaline can absorb considerable amount of toxic heavy metals irrespective of the pH level in which adsorption studies were conducted. Similarly, the adsorptions of Cd^{2+} and Pb^{2+} on to those mineral crystals in the size range of 850 μ m - 4 mm were also investigated. It further confirmed that mineral could hold heavy metal ions to in its structure. This concerted effort made through our collaborators paved a way to design a filter cartridge. Such filter cartridge offers repeated uses, after the adsorbents materials saturated once were backwashed. A patent was applied for this new discovery 2017 (Patent No: LK/P/1/19644).

3.3 Study of tourmaline particle effect on bacterial growth

- Five (5) pathogen bacteria were used for this study
- The results shown that, well-diffused method for this study was not suitable.
- Therefore, broth solution method will be performed in year 2018.

Research No..04

Establishment and Implementation of cartographic unit.

This project was initiated under the ongoing project of Exploration and Assessment of Gem Deposits in Sri Lanka (EAGSDL). The main objective of this project is to publish standard gem potential map layout and index. The map is still processing at the Survey department of Sri Lanka and several discussions were made with them for the finalized the prepared map layout. Final layout and detail report will be submitted end of the April 2018.

Research No.0 5.

Heat Treatment of Mannu tourmaline

- Mannu tourmaline of Sri Lanka heat treated in different temperature in oxidizing condition. The results clearly showing that, heat treatment in 850 °C in long time period is slightly effect on color of tourmaline.
- FTIR results shows there is no structural changes in heat treatment process.
- Trace element composition results shown that, Fe is most abundant trace element in the sample.
- In addition to that, inclusion changes during the heat treatment process was studied

Research No..06

Development of a simple geochemical method to delineate fertile terrains and barren areas with respect to gems and to prepare a database.

The basis of this project is geochemistry. It is expected mining processes which are random, non-eco friendly and causing financial losses most often could be minimized using the data developed by this research. River basin maps are prepared by now and 7 samples from kelani river (getahethioya/seetawaka ganga) and 21 samples from kaluganga(Ratnapura) have been taken. The samples from kalu ganga were prepared and sent to the National building research organization for testing the COD, inorganic and organic matter amount, water soluble sulphate amount, water soluble chloride amount and pH value. Also the samples are under microscopic analysis after sieve analysis.

Research No.07

Development of Mapping Methodology using GIS & Remote Sensing techniques.

Madagama, Bibila and Bandarawela DS divisions were selected for the study and they are situated at Monaragala and Badulla district respectively. Initial model was developed for the Madagama DSD and prepared model was applied for the other areas. Several publications were done under this project. Final report of developed model was submitted to the Head of the Research division.

ResearchNo.08**The progress summary of Introduction of most effective efficient color and clarity Enhancement methods for semi-precious gem minerals found in gem gravel beds in Sri Lanka**

Under this project gem treatment methods such as Heat treatment, diffusion and Dying method have tested using inferior quality Zircon, Moonstone, Garnet and Spinel. The observed results as follows,

Sample	Method	Color Change	Clarity enhancement
Moonstone	800°C/ Reducing	White to transparent	Yes
Garnet	800°C/ Reducing	No color change	No
Zircon (Brown colour)	1100°C	Brown to blue color	Yes
Zircon (Green colour)	1000°C	Dark green to light green	Yes
Zircon (Purplish color)	(500-700) °C/ Oxidation	Purplish to orangy red color	Yes
Zircon (Purplish color)	(500-600) °C/ Reducing	Purplish to yellow color	Yes
Zircon (Light green color)	(950-1035) °C / Reducing	Light green to light blue color	Yes
Spinel (Dark purple)	(500 -1000) °C	No color change	No
Moonstone	Cu diffusion	No color change	No
Moonstone	Dying (crystal violet)	Transparent to pink color	Yes
Moonstone	Dying (safranin)	Transparent to purple color	Yes

(B) Workshops

Two workshops organized and conducted for gem trade people.

1. Kahawatta
2. Avissawella

(C) (Publications)

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- Value Addition of Sri Lankan Gemstones

Authors - Mr. R.M.N.P.K. Jayasinghe, Ms. M.S.C.K. Jayamali,
Ms.S.Wijewardane, Mr. G.G.M.S. Wickremesinghe, Ms.
R.M.S. Dharmasiri

Reviewed by - Dr. Prashan Francis



2.0 Publication

The research papers below were presented at the conference for publishing the researches on mineral resources which was held parallel to the **Sri Lanka NEXT 2017 - A blue-green era** programme.

- Wewegedara W.G.C.N., Jayasinghe R.M.N.P.K., **Assessment of Gem Occurrences in Moneragala Divisional Secretariat Division, Moneragala District**, Research Symposium Proceedings, Mineral Resources of Sri Lanka, Prospects and Challenges, 2017.

- W.G.C.N. Wewegedara, N.P.W.D.S.D. Rodrigo, A.U. Wijenayake, Prashan Francis, **Thermal Enhancement of Inferior Quality Corundum Variety Called 'KiriKottara'**, Research Symposium Proceedings, Mineral Resources of Sri Lanka, Prospects and Challenges, 2017.

1. **M.K.C. Jayamali**, W.M.M.P.E. Bandara, J. Gunatilaka, P. Francis, R.M.N.P.K. Jayasinghe and R.M.S. Dharmasiri, 'Gem potential mapping based on Geographical Information Systems (GIS): A case study from Medagama, Moneragala district, Sri Lanka'. Journal of Geological Society of Sri Lanka Vol. 18 (2017).

2. එම් මැණික් කර්මාන්තය හා ජයමාලි.සී.කේ.බැඳුණු පතල්කරුවන්ගේ ජීවිකාව 4 ,හෙළමිණි වරුණ ,වන කලාපය2017)අප්‍රේල් ,(මැණික් හා ස්වර්ණාභරණ පර්යේෂණ හා අභ්‍යාස ආයතනය.

3. **Jayamali M.K.C.**, Karunasena M.G.N.R., JagathGunatilake.,Bandara W.M.M.P.E and Ying-Hsin Wu, GIS and numerical simulation based model for prediction of vulnerability on mountain tsunami at Meeriyabedda, Sri Lanka. Journal of Geological Society of Sri Lanka (GSSL). Vol. 18-Issue 2 (2017), 01-10.

.03 (Patent Licensing)

- Francis, D.P.L.,Kandanapitiye, M.S., Diyabalanage, R.S., Rajapaksha, C.M., Perera, R.C., "Water filter capable of trapping heavy metal ions" LK/P/1/19644, Dec 07, 2017.
- Francis, D.P.L.,Kandanapitiye, M.S., Manthirratna, M.A.N.C., "Therapeutic shoe/slipper insole made of tourmaline interbedded latex" LK/P/1/19677, Dec 21, 2017.

(D)Geotechnical Investigations

Under the agreement made with CECB, the geotechnical investigation works started in first quarter of year 2017. Geotechnical investigation works and standard penetration test was initiated at the site of Electricity board close to the Fort city. During that project preparation of engineering logs, field cure handling, performance of laboratory tests and preparation of geotechnical investigation report was done.

(E)Training Activities

- Geuda heat treatment course was conducted in Ratnapura regional centre.
- Two individual heat treatment courses were conducted to a Sri Lankan and to a Pakistani student.

**Audited Financial Statment
Financial Information for last 05 years**

	2013	2014	2015	2016	2017
Operating Revenue					
Treasury Grants	32,113	43,357	47,081.0	58,627.0	62,440.0
Other Contributions	13,020	13,862.9	26,447.4	33,522.7	38,742.2
Course Fees	3,949	6,941	6,408.5	9,445.4	8318.48
Income From Services	15	-	-	50.3	20.0
Income From Geological Services	-	-	-		
Total Operating Revenue	49,097	64,161	79,936.9	101,645.4	109,520.73
Other Revenue	38	303	625.8		1,849.25
Interest	406	309	248.2	342.6	506.20
Other Income	54	-	49.5	837.0	29.96
Total Revenue	49,595	64,773	80,860.4	102,825	111,906.1
Less: Expenses					
(a)Personnel and Administration	37,260	44,558	57,081.4	68,467.8	77,363.0
(b)Depreciation and General	13,452	17,572	31,260.6	27,769.4	35,854.2
Total Expenses	50,712	62,130	88,342	96,237.2	113,217.2
Surplus/(Deficit)	(1,117)	2,643	7,481.6	6,587.8	1311.1

STATEMENT OF FINANCIAL PERFORMANCE FOR THE YEAR ENDED 31ST DECEMBER -2017

	2017(Rs.'000)		2016(Rs.'000)	
Operating Income				
Recurrent Grants - Treasury		62,440.0		58,627.0
Other Income				
Income from Training Courses		8,318.48		9,445.4
Geuda Heat Treatment Service Charges		20.0		50.3
Geological Research services				
Interest Income		506.20		342.6
Sundry Income		1,849.25		837.0
Total Income		73,133.93		69,302.2
Less: Operating Expenses				
Personnel Emoluments		43,542.46		35,477.3
Traveling		425.92		316.7
Supplies and Consumable Items		2,531.44		2,983.4
Maintenance Expenses		4,176.38		4,054.7
Contractual Services		21,684.43		18,428.8
Training Programme Expenses		3,236.28		6,345.8
Other Operating Expenses		1,740.12		825.2
Total Operating Expenses		77,337.03		68,431.9
Surplus / (Deficit) From Operating Activities		(4,203.09)		870.3
Less: Finance Cost		(26.05)		(35.9)
Grants- Capital Expenditure Portion	26,836.48		26,131.5	
Other Receipts				
	26,836.48		26,131.5	
Less: Depreciation and Amortization Expenses	(23,948.43)	2,888.05	(20,378.2)	5,753.3
Other Capital Investment Grants				
Less: Capital Investment Expenditure	11,905.77		7,391.2	
Improvements of Capital Assets	(11,005.26)		(6,064.9)	
Net Expenditure on Other Capital Investment	(900.51)		(1,326.3)	
Total Non-Operating Revenue		2,862.01		5,717.5
Add: Gain on Sales of Assets		29.96		
Net Surplus (Deficit) Before Extra-Ordinary Items		(1,311.1)		6,587.8
Extra Ordinary Items				
Net Surplus / (deficit) for the period		(1,311.1)		6,587.8
Add:				
Net Surplus / (Deficit) from previous years	(41,976.6)		(70,086.70)	
Less: Prior year Adj.		6,054.5		21,522.3
Net Surplus / (Deficit) C/F		(37,233.24)		(41,976.6)

GEM AND JEWELLERY RESEARCH AND TRAINING INSTITUTE
STATEMENT OF FINANCIAL POSITION AS AT 31ST DECEMBER – 2017

Description	2017 (Rs.'000)		2016 (Rs.'000)	
ASSETS				
Non Current Assets				
<u>Property, Plant & Equipment</u>				
Contribution (LT)	122084		124,814	
Gratuity Fund	1436	123,520	502	125,315
Current Assets				
Stock & Consumables	1368		2313	
Less: Provision for Write Off				
	1368		2313	
Books for Sale			2	
Loan and Advances	2067		2631	
Deposits (Gratuity)	4547		4095	
Deposits	710		2810	
Poverty Alleviation Project	6654			
Trade & Other receivables	4078		2088	
Prepayments	780		496	
Bank & Cash Equivalents	205	20,410	839	15,274
Total Assets		143,930		140,589
Payable	235		408	
Accrued Expenses	2656		2147	
Payable Gratuity Fund to c/a		2,892		2,555
Non CurrentLiabilities				
Control Account - NGJA			3179	
Grants-Other Institutions	232		232	
Provisions for Gratuity	11,135		10110	
Staff Security Deposit			10	
NSF	3932	15,298		13,531
		18,190		16,086
Net Assets/Equity		125,740		124,503
Contributed Capital	50,000		50,000	
Reserves	186			
Other Contribution	850		850	
Staff Circulating Fund (Loan)	1121		978	
Differed Income –Capital Grants (a)	110,815		114,652	
Accumulated Fund	(37,233)		(41,977)	
Total Net Assets/Equity		125,740		124,503

GEM AND JEWELLERY RESEARCH AND TRAINING INSTITUTE

STATEMENT OF CASH FLOW FOR THE YEAR ENDED 31ST DECEMBER – 2017

Rs.(000)

	2017	2016
Cash Flows From Operating Activities		
Surplus/(Deficit) from Operating Activities	(1311.1)	6,587.80
Non Cash Movements		
Depreciation	23,948.40	20,378.20
Interest	(506.2)	
Write-off Capital Expenses	11,905.80	7,391.18
Differed Capital Provision	(38,742.30)	(33,522.70)
Prior Year Adjustment	6,054.50	6,926.00
Increase/Decrease Payables	336.70	(2,381.70)
Increase in other Non current Liabilities	1,767.50	667.6
Profit from sale of Property Plant & Equipment	(30)	
Lease Rental	(473.5)	
Adjustment of Fixed Reserves	(11.4)	
Increase in Other Current Assets	(5,770.2)	(4,922.6)
Net Cash Flow from Operating Activities	(2,831.8)	1,123.70
Cash Flow from Investment Activities		
Purchase of Property Plant and Equipment	(20,734.3)	(77,485.40)
Decrease of Gratuity Fund	(933.8)	(249.7)
Increase of Staff Circulating Fund	143.2	96
Increase of Reserves	186.5	(4500)
Other Capital Nature Expenses	(11905.8)	(7,391.2)
Proceeds from sale of Property Plant and Equipment	30	
Net Cash Flow from Investment Activities	(33,214.20)	(89,530.30)
Cash Flow from Financing Activities		
Capital grant	34,906.0	59,548.5
Interest Income	506.2	
Net Cash Flow from Financing Activities	35,412.20	59,548.5
Net Increase /(Decrease) in Cash and Cash Equivalents (a)+(b)+(c)	(634)	(28,858)
Cash and Cash Equivalents at Beginning of period	839	29,697
Cash and Cash Equivalents at End of Period	205	839



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தேசிய கணக்காய்வு அலுவலகம்
NATIONAL AUDIT OFFICE



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திகதி }
Date }

15 October 2018

The Chairman,
Gem and Jewellery Research and Training Institute

Report of the Auditor General on the Financial Statements of the Gem and Jewellery Research and Training Institute for the year ended 31 December 2017 in terms of the Section 14(2)(c) of the Finance Act, No: 38 of 1971.

The audit of financial statements of the Gem and Jewellery Research and Training Institute for the year ended 31 December 2017 comprising the Statement of Financial Position as at 31 December 2017 and the Statement of Financial Performance, Statement of Changes in Equity, Cash Flow Statement for the year then ended and a summary of significant accounting policies and other explanatory information, was carried out under my direction in pursuance of provision in Article 154(1) of the Constitution of the Democratic Socialist Republic of Sri Lanka read in conjunction with Section 13(1) of the Finance Act, No: 38 of 1971 and Section 32(3) of the National Gem and Jewellery Authority Act No: 50 of 1993. My comments and observations which I consider should be published with the Annual Report of the Authority in terms of Section 14(2)(c) of the Finance Act appear in this report.

1.2 Management's Responsibility for the Financial Statements

Management is responsible for the preparation and fair presentation of these financial statements in accordance with Sri Lanka Public Sector Accounting Standards and for such internal control as the management determines is necessary to enable the preparation of financial statements that are free from material misstatements, whether due to fraud or error.

1.3 Auditor's Responsibility

My responsibility is to express an opinion on these financial statements based on my audit. I conducted my audit in accordance with Sri Lanka Auditing Standards,



consistent with International Auditing Standards of Supreme Audit Institutions (ISSAI 1000 – 1810). Those Standards require that I comply with ethical requirements and plan and perform the audit to obtain reasonable assurance about whether the financial statements are free from material misstatements.

An audit involves performance procedures to obtain audit evidence about the amounts and disclosures in the financial statements. The procedures selected depend on the auditor's judgement, including the assessment of risks of material misstatements of the financial statements whether due to fraud or error. In making those risk assessments, the auditor considers internal control relevant to the Entity's preparation and fair presentation of the financial statements in order to design audit procedures, but not for the purpose of expressing an opinion on the effectiveness of the Entity's internal control. An audit also includes evaluating the appropriateness of accounting policies used and the reasonableness of accounting estimates made by management as well as evaluating the overall presentation of financial statements. Sub - sections (3) and (4) of Section 13 of the Finance Act, No. 38 of 1971 give discretionary powers to the Auditor General to determine the scope and extent of the Audit.

I believe that audit evidence I have obtained is sufficient and appropriate to provide a basis for my audit opinion.

1.4 Basis for Qualified Opinion

My opinion is qualified based on the matters described in paragraph 2.2 of this report.

2. Financial Statements

2.1 Qualified Opinion

In my opinion, except for the effects of the matters described in paragraph 2.2 of the report, the financial statements give a true and fair view of the financial position of the Gem and Jewellery Research and Training Institute as at 31



December 2017 and its financial performance and cash flows for the year then ended in accordance with Sri Lanka Public Sector Accounting Standards.

2.2 Comments on Financial Statements

2.2.1 Sri Lanka Public Sector Accounting Standards

The following observations are made.

(a) Sri Lanka Public Sector Accounting Standard 01

In terms of Section 119 of the standard, the prior year adjustments amounting to Rs. 6,054,415 had been stated as the adjustment related to the period instead of being adjusted to the balance brought forward from the preceding year in the statement of changes in equity.

(b) Sri Lanka Public Sector Accounting Standard 02

- (i) An amount of Rs. 473,480 of lease amount that written off in respect of a land that should be added to the cash flows arisen through operating activities had been stated by deducting from the Cash Flow Statement.
- (ii) The previous year adjustments that adjusted in the comprehensive part in the Statement of Financial Performance of Rs. 6,054,475 and the revaluation surplus that adjusted to the Statement of Changes in Equity of Rs. 186,456 had not been adjusted to the Cash Flow Statement.
- (iii) Instead of stating an amount of Rs. 4,115,848 received from National Science Foundation during the year under review and an amount of Rs. 184,149 spent for the experiments from that money under the financing activities in the Cash Flow Statement separately, the



balance amount of Rs. 3,931,699 had been stated under working capital movements.

- (iv) Adjustments of Rs. 4,214,000 that done through journal entries for 03 balances stated under the Non Current Assets in the Statement of Financial Position had been stated under working capital movements instead of adjusting into the operating profit in the Cash Flow Statement.

(c) Sri Lanka Public Sector Accounting Standard 03

Although the cost of gems that used for the training courses of Rs. 519,800 that identified as expenditures in previous years had been identified as assets from the year under review, this change in the accounting policies had not been disclosed in the financial statements as per Paragraph 34 of the Standard.

(d) Sri Lanka Public Sector Accounting Standard 07

As useful life time had not been reviewed annually in respect of non-current assets, the assets costing Rs. 45,198,453 had been fully depreciated but are being further used. Accordingly, the estimated error arisen had not been rectified as per Sri Lanka Public Sector Accounting Standard 03.

2.2.2 Accounting Deficiencies

The following observations are made.

- (a) Depreciation for the year under review of Non Current Assets had been understated by Rs. 1,045,231.
- (b) Gems valued at Rs. 18,608 that received as donations during the year under review and consumable items valued at Rs. 237,590 had not been taken into the financial statements.



- (c) The building rent of Rs. 248,388 and the fixed deposit interest income of Rs. 8,851 in related to the year under review had been taken excessively to the financial statements.
- (d) Refundable security deposit of Rs. 10,000 that taken from officers had been taken into the financial statements as an income related to the year under review without accounting under refundable deposits.

2.2.3 Unexplained Differences

Even though the sum that should be reimbursed from the National Gem and Jewellery Authority from the operating expenditure of the Gem designs and Training of Technical Officers Project was Rs. 5,936,817 according to the documents of Gem and Jewellery Research and Training Institute, there was an unexplained difference of Rs. 717,662 as that amount was Rs. 6,654,479 according to the financial statements.

2.2.4 Lack of Evidence for Audit

Payment vouchers and confirmation documents related to Rs. 841,241 that spent in respect of going abroad of 05 officers had not been presented to the audit.

2.3 Accounts Receivable and Payable

Following observations are made.

- (i) The loan balances amounting to Rs. 123,497 recoverable from the employees who resigned from the service on 30 June 2017 had not been recovered even by the year under review.
- (ii) The deposits refundable amounting to Rs. 24,000 received from 12 students who were completed the courses had not been refunded despite 04 years elapsed.



- (iii) Although an amount of Rs. 6,654,479 had been stated in the financial statements as receivables from National Gem and Jewellery Authority, balances payable to this Entity according to the financial statements had not been stated.

2.4 Non-compliance with Laws, Rules, Regulations and Management Decisions

The following non-compliances with laws, Rules, Regulations and Management Decisions were observed.

Reference to Laws, Rules and Regulations	Non-compliance
(a) Financial Regulations of the Democratic Socialist Republic of Sri Lanka	
(i) Financial Regulation 104 and 105	Action had not been taken in respect of 02 vehicle accidents as per Financial Regulations
(ii) Financial Regulation 396	Action had not been taken as per Financial Regulations in respect of 31 cheques valued at Rs. 216,325 that not presented to pay though issued and elapsed 06 months having as per bank reconciliation as at 31 December 2017.
(b) Treasury Circular No. 842 on 19 December 1978	A Fixed Asset Register had not been maintained as per Circular.



- (c) Section 6.5.1 of Public Financial statements along with draft annual Enterprises Circular No. report had not been presented to the Auditor PED/12 on 02 June 2003 General.

2.5 Transactions not supported by appropriate authority

Consumable items amounted to Rs. 817,033 had been written off from inventory book during the year under review without obtaining approval of Board of Directors. Further, action had not been even taken in this regard as per Financial Regulations 101 to 109 and 760.

3. Financial Review

3.1 Financial Results

According to the financial statements presented, the financial result of the Entity for the year under review had been a deficit of Rs. 1,311,124 and as the corresponding a surplus of Rs. 6,587,711 for the preceding year; the financial results for the year under review as compared with the preceding year indicated a deterioration of Rs. 7,898,835. Although the treasury grant for the recurrent expenditure had been increased by Rs. 3,813,000 compared to the previous year, an increase of employee remuneration by Rs. 8,065,113 and payments for obtaining services by Rs. 3,255,677 had been the reasons for the decline in the financial result.

When analyzing the financial result for the year under review with 04 proceeding years, though it had been reported the surplus in 2014 and there were deficits in 2013, 2015 and 2017. However, after adjusting employee remunerations and depreciation for non- current assets to the financial result, the contribution of Rs. 26,882,287 in the Entity in year 2013 had been continuously increased upto Rs. 66,179,762 by the end of the year under review.



4. Operating Review

4.1 Performance

4.1.1 Planning

Following observations are made.

- (a) Following observations are made in respect of the Corporate Plan prepared by the Entity for the period of 2017-2021.
 - (i) Plans of next 05 years for the fulfillment of each objective that set when establishing the Entity had not been stated separately.
 - (ii) Appropriate methods had not been decided to fulfill objectives by evaluating properly the strengths and weaknesses of the Entity, opportunities and threats of the Entity's environment that identified when preparing plans.
 - (iii) The responsibilities of achieving targets that should be achieved timely related to each objective had not been distributed upto operational level on a rational basis.
- (b) An Action Plan for the entire Entity based on the Corporate Plan had not been prepared and functional plans had been prepared only for Human resource and Administration, Research and Training divisions only. The course income of the training division had not been included to the plans.
- (c) Although Action plans had been prepared for the functions that should be done by spending Rs. 37,200,000 under 04 main activities by the training division, the performance in respect of it could not been confirmed to the audit as the performance reports had not been prepared by stating financial and physical performance under those activities.



4.1.2 Implementation and Review

The following observations are made.

- (a) Following observations are made in respect of Project of exploitation and evaluation of gem deposits in Sri Lanka.
- (i) Action had not been taken to plan and implement so as to achieve the expected performance of the project. Because of this, although the project should be implemented in 46 Divisional Secretariats in 18 Districts within the period of 2009-2011, the gem deposits had been explored only in 09 Divisional Secretariats in Monaragala District during the period upto 2017. However, Rs. 21,973,348 had been spent for the project upto the year 2017.
 - (ii) The Gem Potential Map in the Katharagama Divisional Secretariat had been preparing further and although the gem potential maps and final reports for 06 Divisional Secretariats had been prepared, they were not prepared in a standard method. Therefore, the preparation of maps according to the standard method had been commenced during the year 2017/2018 with the help of Survey Department.
 - (iii) Although the Department of Management Services had given approval on 14 July 2009 to fill the approved cadre of 26 in the project from the officers in National Gem and Jewellery Authority and Gem and Jewellery Research and Training Institute, pay 50 per cent allowance in addition to the salary for that, recruit on contract basis from externally only for the post of advisor, only 12 employees of Gem and Jewellery Research and Training Institute and external advisor had been assigned to the project.
 - (iv) The project had been implemented without Senior Geologist, Geologist, Drilling Operator, Research Assistant, Laboratory Assistant and Information System Assistant that stated in the proposal as essential to implement the project.



- (v) An allowance of 20 per cent from the salary for the project functions for the employees such as Accountant, Human Resource Manager and Accounts Clerk that not included in the project proposal and an allowance of 50 per cent of salary for planner and 03 labourers had been paid without Treasury approval.
- (vi) It had been scheduled to obtain Rs. 48 million from the income generated from the Entity and Rs. 76.5 million from the General Treasury for the period of 2017/2021 as per cabinet approval on 22 November 2016 for this project that executed on the cost of Rs. 300.65 million under 3 stages from 2017 to 2031. The balance amount of Rs. 176.15 million had been targeted to settle from the 25 per cent from the income received from auctioning the gem lands that identified in the survey by National gem and Jewellery Authority and the income received from selling gem potential maps. However, action had not been taken to enter into agreements with National Gem and Jewellery Authority for that.
- (b) Following facts were observed in respect of the performance of the research division in the year under review.
- (i) Although Rs. 13,250,000 for 08 main activities had been allocated according to the Action Plan, Rs. 7,225,000 had not been spent. There, 02 activities that allocated Rs. 300,000 had not been implemented and financial performance of 06 activities was lesser than 38 per cent.
- (ii) Although Rs. 400,000 had been allocated as per Action Plan by planning to hold promotional and awareness programmes in 04 areas, without implementing those tasks, Rs. 1,386,300 had been spent for unplanned activities such as holding exhibitions, printing a book, holding training programmes for high tech equipment and publishing paper articles.



- (iii) The physical performance had not been stated in the performance reports in the human resource and administration and research divisions.
- (c) Following observations were observed in respect of the performance of conducting training courses.
- (i) Study calendar and proper plan had not been prepared for the training courses.
- (ii) 201 out of the total number of students of 1,200 enrolled for the courses during the year under review had been left the courses. Only a course had been conducted in the Bingiriya Training Centre and the training center had been closed as 10 out of 12 students enrolled for that had been left the course.
- (iii) Batticalo and Trincomalee training centres that scheduled to be commenced during the year had not been commenced during the year.
- (iv) 133 students had been enrolled for 02 courses that were not in the Action Plan.
- (d) Following fact was observed in related to the fulfillment of the objectives of establishing the Entity.

Among the objectives of establishing the Entity, the contribution of the Entity for the extraction of identified gem deposits for the development of the country through surveys and researches on gem, provision of advices including the production of machineries for the development of the industry and development of the industry by promoting value addition methods and findings was at a minimum level.



4.2 Management Activities

The following observations are made.

- (a) Even though a public service of fee-levying heat treatment of Gevuda had been commenced, income received from that was Rs. 20,000 only due to the service was not promoted.
- (b) Legal action had not been taken to recover the amount of Rs. 1,495,745 that was to be recovered further in respect of the fraud involving gold and silver valued at Rs. 2,395,749 committed by an officer of the Entity in the year 2007.
- (c) A sum of Rs. 2,151,320 that paid to the employees of the Entity as salary increments and allowances related to the year from 2009 to 2014 by increasing had not been done a recovery as such until March 2016. It had been decided to recover from the monthly installments between Rs. 50 to Rs. 1,942 until the date of retirement of the relevant employee as per the decision of the Chairman of the Entity on 29 March 2016 in contrary to the Financial Regulation 119. The amount to be recovered further as such even by the end of the year under review was Rs. 1,925,086. As an employee whose an amount of Rs. 619,646 should be recovered had been released to another Entity, such money had not been recovered from that date onwards.

4.3 Underutilization of Funds

Although an amount of Rs. 4,115,848 had been received from the National Science Foundation for the researches related to Geuda heating on 27 April 2017, any activity related to that had not been done and, only Rs. 184,149 had been spent for employee expenses by the end of the year.



4.4 Idle and Underutilized Assets

Following observations are made.

- (a) The high temperature electric oven purchased at a cost of Rs. 10,977,344 in the year 2013 for researches relating to heat treatments of Gevuda, had been in the Rathnapura regional office without using for any task from that date even upto the audited date of 31 July 2018.
- (b) An amount of Rs. 1,064,622 had been spent on insurance until the year 2016 for the earth drilling machine purchased at a cost of Rs. 12,309,013 in the year 2007. However, that machine had been remained idle for more than 02 years as it could not be used for the functions of the Entity.
- (c) A cab that was purchase at Rs. 5,974,375 in the year 2009 had been remained idle as it was not economical to use by repairing.

4.5 Staff Administration

Following observations are made.

- (a) 47 that is 35 per cent, out of 135 of approved cadre of the Entity as at 31 December 2017 had been vacant and action had not been taken to recruit for the post of Director (Research) that vacant for 08 years until the audited date of 31 July 2018.
- (b) An Officer had been recruited on contract basis from 01 January 2016 for the post of the Director General of the Institute.
- (c) The Board of Directors approval had not been taken by preparing comprehensive marking scheme for interviews for posts earlier. Therefore, it had been opportunity for the interview board to act as their own wish. The transparency in the process of giving interview marks when recruiting for the

posts such as Assistant Director (Human Resource), Assistant Director (Gem Science), Training Officer (Jewellery Designing) had been challenged.

(d) A driver in the Institute had been released to the Marine University from the year 2015 without a proper approval.

5. Sustainable Development

5.1 Achievement of Sustainable Development Goals

As per Circular No: NP/SP/SDG/17 dated on 14 August 2017 issued by the Secretary of Ministry of National Policies and Defense and United Nations Sustainable Development Agenda for the year 2030, as the Gem and Jewellery Research and Training Institute had not been aware of that, it had not been identified the sustainable development goals related to those functions, the targets and the indicators for evaluating the achievement of such targets.

6. Accountability and Good Governance

6.1 Internal Audit

Following observations are made.

- (a) Although the Internal Audit Officer and Audit Assistant had been approved for the Internal Audit division, only the Internal Audit Officer had been deployed.
- (b) Although the Internal Audit Programme should be approved by the Board of Directors before beginning the year as per Management Audit Department Circular No. DMA/2009(1) on 09 June 2009, the Internal Audit Programme of the year under review had been approved on 30 May 2017. The examinations related to 07 out of 20 audit tasks that scheduled by that programme had not been done.



6.2 Procurement and Contract Process

6.2.1 Procurements

Following observations are made.

- (a) The Procurement Plan had not been prepared comprehensively by the Entity and a Procurement Time table had not been prepared even as per procurement Guideline 4.2.2. As well, the Procurement Plan had not been prepared or updated in compliance with the Budget.
- (b) Although the Procurement Plans of Rs. 40.1 million had been prepared for the purchase of capital goods, only purchased was Rs. 20.4 million that was 50.8 per cent of goods. Here, Out of the procurements in Training and Research divisions that should be given priority, it had been implemented during the year only 53 per cent and 35 per cent respectively and the library books that scheduled to be purchased by spending Rs. 500,000 had not been purchased.
- (c) Although it had been allocated Rs. 2.3 million for the purchase of computers and software, the purchase of Rs. 3.7 million had been done exceeding that amount by 62 per cent.

6.3 Budgetary Controls

As the variances ranging from 15 per cent to 373 per cent were between the budgeted and actual income and expenditure, it was observed that that the budget had not been utilized as an instrument of effective management control.



6.4 Tabling of Annual Reports

Annual reports in the year 2015 and 2016 had not been tabled in the Parliament even by the audited date of July 2018.

7. Systems and Controls

Deficiencies in systems and controls observed during the course of audit were brought to the notice of the Chairman of the Entity from time to time. Special attention is needed in respect of the following areas of control.

Areas of Systems and Controls	Observations
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(a) Accounting	(i) Addition of expenditure items that should be stated separately and 03 interest income accounts had been stated in one account. (ii) Accrued expenses had not been accounted by identifying.
(b) Procurement Activities	(i) The Procurement Plan had not been prepared comprehensively and in compliance with the Budget. (ii) Action had not done as per Plan and the procurements had been planned without need analysis. (iii) Action had not been taken to check post qualifications before purchasing and offering contract.



- (c) Maintenance of Documents and Custody (i) The files had not been maintained properly by the employees and the responsibilities of them had not assigned to the employees properly.
- (ii) The files including the details related to the foreign travels of officers and payment details had not been maintained separately.
- (d) Holding Examinations Examinations had been conducted without proper plan, a procedure for giving certificates of courses to the students had not been prepared and the responsible parties had not been appointed as exam invidualators.
- (e) Utilization of Vehicles Officers who used vehicles had signed in the running charts, the drivers had not signed by stating the fuel adjustment and the distance travelled.
- (f) Performance Reports The performance reports had not been reviewed timely by the Board of Directors.

Sgd./ H.M. GAMINI WIJESINGHE
Auditor General

H.M. Gamini Wijesinghe
Auditor General