

## Chapter III: Creation of Infrastructure

The Detailed Project Report (DPR) of MoE (erstwhile MHRD) provided that the new IITs would be residential institutes of an area about 500 to 600 *acres* each. The campus of each of these IITs would house the academic area and residential area for students, faculty and staff. The campus of the IITs would also contain facilities like guest house, health care (at the level of primary health clinic), small shopping centre along with banks, sports facilities, postal facilities, elementary and secondary schools for the children of faculty, staff and married students. The IITs were also to be fully equipped with laboratory equipment and computing equipment for the students to facilitate the learning process in line with the courses offered.

All the eight IITs commenced their activities from temporary/transit campuses before shifting to permanent campuses. The permanent campuses were to be developed in phased manner.

### 3.1 Audit Methodology and Sample selection

Under this audit area, Audit examined creation of infrastructure by eight IITs during the five-year period 2014-19 pertaining to (i) land allocation/availability (ii) planning by way of phasing the construction activities by respective IITs (iii) execution of phase-wise construction activities and (iv) supply and installation of equipment.

Audit assessed whether the activities mentioned at (ii) to (iv) above were carried out economically, efficiently and effectively.

A sample was drawn for audit examination from the total works/procurement contracts executed during the period 2014-19 by each IIT. The total sample drawn from the population of all works/procurement contracts executed by eight IITs during the period 2014-19 was as shown in *Table 3.1*:

**Table 3.1: showing works executed, sampling method and sample selected**

No. of IITs	Total works executed during 2014-19	Sample Method	Sample size
8	307 (Infrastructure projects/works)	Simple Random Sampling without Replacement (SRSWOR) method	136
	9925 (Procurement of Equipment and Services)		437

Audit observations relating to creation of infrastructure are discussed below.

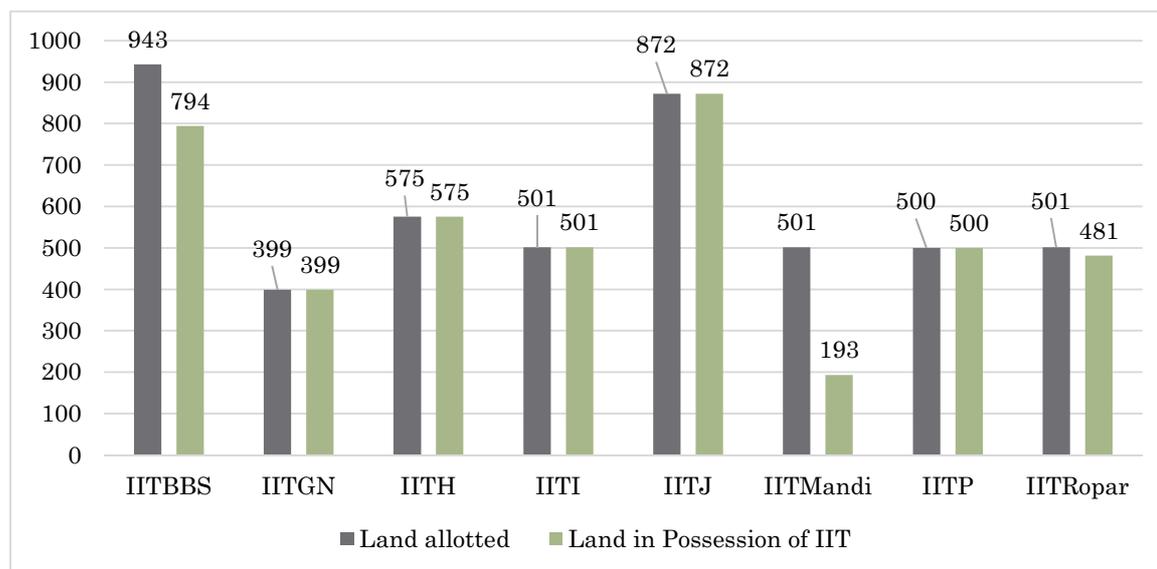
### 3.2 Availability of Land

Government of India (GoI) requested (2006) the respective state governments to identify and allot 500-600 *acres* of land (preferably land in possession of the government) free of cost, to each of the eight IITs, with necessary social and physical infrastructure like electricity, water, rail and road connectivity. The DPR also considered availability of 500-600 *acres* while planning for infrastructure development.

From the data furnished by the IITs, Audit observed that the allotment and transfer of land by the state governments commenced during 2008-2012. As of November 2020, allotment and transfer of land was completed in four IITs (IITH, IITI, IITJ and IITP) while in four other IITs (IITBBS, IITGN, IIT Mandi and IIT Ropar), large land portions were pending possession as shown in *Chart 3.1*:

**Chart 3.1: showing land availability in IITs**

(Area in acres)



In IITGN, although 399 acres of land had been allotted to the Institute, 150 acres of land was in unsuitable condition. Hence, 165 acres of land compensating the unusable land was sought from the state government. The reasons for shortfall in allotment/possession of land are discussed IIT-wise at Paras 3.4.1(a), 3.4.2(a), 3.4.6(a) and 3.4.8(a) below.

### 3.3 Master Plans and construction activities

Each IIT developed their own Master Plan which was approved by respective BoG/BWC. These Master Plans include detailed infrastructure requirements and allocated land for various academic and non-academic purposes like housing, transportation, infrastructure etc. and their development in phased manner. The major construction works in all the eight IITs were undertaken in Phase-I and Phase-II during 2012-19. The IITs have also executed other works like construction of compound wall, shifting of power stations, construction of roads etc. To execute these works, the IITs adopted two modes of execution i.e., (i) execution of works directly by the IITs by engaging contractors and (ii) entrusting the work to public works agencies like Central Public Works Department (CPWD), National Building Constructions Corporation (India) (NBCC) Ltd. etc., on deposit basis.

### 3.3.1 Phase-I and II: Overall Delays in Construction

Phase-I and Phase-II development in all the IITs comprised works as shown in *Table 3.2*:

**Table 3.2: Details of phase-wise works**

<b>Phase-I</b>	construction of academic buildings, student hostels, residential accommodation for faculty and staff, laboratories in proportion to student/faculty/staff population.
<b>Phase-II</b>	construction of additional academic buildings, student hostels, faculty housing, staff housing, laboratories, Incubation Parks, Technology Research parks, guest houses, sports facilities etc. in proportion to the student/faculty/staff population as per the Master Plan.

Regarding phase wise construction works, audit observed the following:

- (i) While construction activities under Phase-I were initiated in all the IITs during 2012, buildings under Phase-I were complete only in two IITs (IITBBS and IITJ), while they were incomplete in remaining six IITs as of March 2019.
- (ii) Phase-II works were initiated during the period 2014-19 in five IITs (IITBBS, IITH, IITI, IITJ and IITP). Audit observed delays in execution of Phase-II building works in two IITs, namely IITBBS and IITI. Phase-II works were yet to be initiated in rest of the three IITs (IITGN, IIT Mandi and IIT Ropar).

Some of the facilities that were delayed in these IITs were academic buildings including research facilities, hostels, health centres and sports facilities. As such, envisaged campus development remained incomplete in IITs, despite a lapse of seven years since initiation of construction activities as shown in *Table 3.3*:

**Table 3.3: Completion of buildings under Phase-I and Phase-II as of March 2019**

Name of the IIT	Phase-I Buildings		Phase-II Buildings	
	Planned	Completed	Planned	Completed
<b>IITBBS</b>	13	13	26	0
<b>IITGN</b>	7	3	Not initiated	Not initiated
<b>IITH</b>	8	6	10	0
<b>IITI</b>	13	12	11	0
<b>IITJ</b>	19	19	32	7
<b>IIT Mandi</b>	107	70	Not initiated	Not initiated
<b>IITP</b>	18	15	16	0
<b>IIT Ropar</b>	33	14	Not initiated	Not initiated
<b>Grand Total</b>	<b>218</b>	<b>152</b>	<b>95</b>	<b>7</b>

### 3.3.2 Delays observed in sampled works

The test-check of the constructions works was conducted on the sample selected as detailed at Paragraph No. 3.1. It was observed that in respect of the sampled works, the completion under Phase-I, Phase-II and other works were delayed in all the eight IITs as shown in *Table 3.4*:

**Table 3.4: Delay in execution of sampled Phase-I, Phase-II and other works to the end of 31 March 2019**

Name of the IIT	Phase-I		Phase-II		Other works	
	No. of works delayed	Delay range (in months)	No. of works delayed	Delay range (in months)	No. of works delayed	Delay range (in months)
IITBBS	7	1-20	2	1-5	Nil	Nil
IITGN	16	1-37	Construction not started		Nil	Nil
IITH	1	52	In Progress		10	2-56
IITI	4	5-37	4	1-14	Nil	Nil
IITJ	1	17	In Progress		5	2-6
IIT Mandi	8	2-41	Construction not started		3	3-36
IITP	3	15-22	Construction started but not part of sample		8	2-18
IIT Ropar	9	4-39	Construction not started		1	18
<b>Total</b>	<b>49</b>	<b>1-52</b>	<b>6</b>	<b>1-14</b>	<b>27</b>	<b>2-56</b>

The delays were significantly high in respect of five IITs, viz., IITH (upto 56 months), IIT Mandi (up to 41 months), IIT Ropar (upto 39 months), IITGN and IITI (upto 37 months).

The reasons for delays *inter alia* included excessive time taken in finalization of designs, obtaining regulatory clearances, statutory approvals, default on part of contractors, shortage of labour and remoteness of area etc. These are discussed IIT-wise in the subsequent paragraphs.

Delays which occurred in execution of phased works impacted, among other things, the effective performance of these IITs as it resulted in low student intake, delays in installation of equipment and inadequate residential accommodation.

These delays also resulted in overall cost overrun of ₹8,252 crore for all the eight IITs [refer Paragraph No. 4.1.1(a)], while the works concerned remained incomplete at the end of the targeted timelines. Due to these incomplete works, the IITs faced constraints in expanding their envisaged student intake and enrolment (refer Paragraph 5.1.2)

### **3.4 IIT-wise significant audit findings in infrastructure development**

#### **3.4.1 IIT Bhubaneswar**

IITBBS commenced its activities under the mentorship of IIT Kharagpur at the latter's campus with effect from 2008. The scheduled date of shifting was July 2015 and the permanent campus of IIT Bhubaneswar (located at Arugul) started its academic operations from the academic session 2015-16 onwards.

##### **a) Availability of land**

Government of Odisha allotted (2009-10) 943.27 acres to IITBBS and accordingly the master plan of the Institute was prepared for development of infrastructure projects in phased manner. The allotted land included 305.11 acres of forest land. Out of the forest

land, 148.91 acres was not handed over<sup>5</sup> to the IIT till date (November 2020). As such, the reduction in availability of allotted land would prove to be a limiting factor in future expansions.

MoE replied (September 2021) that the conversion of forest land was pending at state government level and was under pursuance by the IIT. MoE did not specify if they had taken any steps to resolve this issue. The fact remains that the Master Plan, on the basis of which infrastructure was to be developed, was prepared taking into account around 900 acres of land. As such, the lack of requisite land hampered complete development of the IIT.

#### **b) Execution of works**

Phase-I works (11 works) in IITBBS were executed by CPWD. Out of these, only four works (faculty housing and administrative building) were completed as per schedule. The remaining seven works (lab complex, schools of electrical sciences, mechanical sciences, infrastructure, basic sciences, boys' hostel and compound wall) scheduled to be completed by October 2013 to March 2016 were however, completed by October 2014 to May 2016. Thus, the delay ranged between one and twenty months (as of 31 March 2019).

Phase-II works were executed by NBCC. Out of three works, two works (boys' hostel and package works) which were scheduled to be completed by October 2018/February 2019 were not completed by March 2019. The delay in completion ranged between one month and five months (as of 31 March 2019). Further, third work of Sewage Treatment Plant was under progress as of March 2019 (Scheduled completion by November 2019).

MoE replied (September 2021) that the delay in completion of Phase-I/II works was attributable to CPWD and NBCC. The main reasons were shortage in deployment of manpower and mistakes in the designs. IITBBS has been constantly monitoring the pace of execution by these PMCs. MoE also stated that two works have already been rescinded and penalty of ₹38.45 crore<sup>6</sup> has already been realised from defaulting contractors due to constant persuasion by IITBBS.

However, the fact remained that despite penalty being charged on the executing agencies, the development of permanent campus has been delayed significantly, thereby affecting the availability of intended infrastructure facilities during the delayed periods.

#### **c) Faulty execution of fire safety works**

National Building Code, 2005 (NBC)<sup>7</sup> provides that while taking up construction of building projects, the design should include statutory fire-fighting strategies.

In IITBBS, a consultant (Consulting Engineering Service (CES) India Pvt. Ltd.) was engaged (May 2010) to provide Project Development and Project Management Services for various buildings like hostels, staff quarters, guest houses etc., under Phase-I. It was observed that designs which were non-compliant with the fire safety norms of NBC 2005

<sup>5</sup> Handing over of land means transfer of possession of land. In case of emergency, the possession of land in advance is permitted by the State Government pending formal approval of alienation process.

<sup>6</sup> ₹12.08 crore-CPWD and ₹26.37 crore-NBCC

<sup>7</sup> Published by Bureau of Indian Standards (BIS)

were adopted for construction and buildings were built, thereby exposing the occupants to fire hazards. As a result, certain portions of six<sup>8</sup> buildings already constructed had to be dismantled (June 2015) at a cost of ₹32 lakh. Later, IITBBS estimated that an additional ₹2.18 crore would have to be incurred for installing firefighting systems to meet the requirements of NBC 2005.

This showed lapse of monitoring on the part of the BWC in ensuring that the buildings were appropriately designed meeting fire safety norms. Due to this lapse, IITBBS suffered a financial loss of ₹32 lakh.

MoE replied (September 2021) that the committee formed for finalising the remaining claims of CES, has recommended the recovery of ₹32.08 lakh from CES. Besides, the IIT has decided not to release ₹92.55 lakh to this consultancy agency due to such deficiencies.

The reply is not acceptable as it does not address the disruption caused to the scheduled activities of teaching and residence to the students/faculty and staff members.

### 3.4.2 IIT Gandhinagar

IITGN commenced its activities during August 2008 from a temporary campus at Vishwakarma Government Engineering College, Chandkheda under the mentorship of IIT Bombay. It later shifted to its permanent campus at Palaj, Gandhinagar during July 2015 to March 2016.

#### (a) Availability of land

The Government of Gujarat allotted (September 2010) 399 *acres* of land. Out of this, 150 *acres* was in ravines and prone to flooding and erosion. In lieu of this 150 *acres*, a request was made by IITGN for 165 *acres* of alternate land, which was not acceded by the state government. Thus, only 249 *acres* suitable for construction was available with IITGN as of November 2020. As such, the extent of land allotted by the Gujarat government (50 *per cent*) did not meet the required 500-600 *acres* of land to be made available to IIT as per the DPR. IITGN itself stated that the shortage in land availability is detrimental to future expansion of the campus.

MoE replied (September 2021) that despite regular follow-up at various levels by the IIT to get the extra land allotted, the state government had not allotted additional land. In July 2016, state government had written to MoE that there was no need for additional transfer of land to IITGN. Thereafter, the IIT has been regularly following up with MoE to pursue the case with state government. However, MoE did not take up the issue of insufficient land to IITGN by the state government.

Hence, lack of the required land was a major constraint for the IIT in providing the requisite facilities to its students.

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<sup>8</sup> Hostel with capacity for 800 boys, hostel with capacity for 200 girls, staff quarters, guest house, shopping complex and community centre

### **(b) Execution of works in Phase-I**

Twenty-six works under Phase-I were initiated by IITGN<sup>9</sup>. Out of these works, 14 were completed (academic buildings, faculty/staff housing, boundary wall, electrical connections, hostels etc.) and two works (Institute's guest house and Director's residence, amphitheater and sport facilities) were under progress. It was seen that in respect of these 16 works executed, there was a delay ranging between one month and thirty seven months as of 31 March 2019. The balance ten works (water pipeline connection, HT connection and other allied activities) were completed within scheduled time.

MoE's reply (September 2021) stated that all three major works of housing, hostel and academic buildings in Phase-I were started from June/August 2013 and the entire process of shifting from old campus to new campus was completed in March 2016. Municipal facilities (sewer lines, water supply, electricity etc.) were not readily available and all these arrangements were made by the IIT. Due to the gamut of activities in the period from taking over the land up to occupying the buildings after completing all bulk services, the Phase-I works may not be treated as delayed.

The reply is to be viewed against the fact that in respect of the major works that were executed by CPWD namely academic buildings, faculty and staff housing, CPWD attributed the delays to late receipt of drawings, inconsistencies in architectural and structural drawings, post execution revisions, frequent changes etc. This showed poor initiative and laxity on part of the IITGN in ensuring the required pace and timeliness of campus development.

### **(c) Tendering and awarding of works**

Rules 163 to 176 of GFR 2005 stipulate the process of identification, shortlisting and selection of consultants and outsourcing of services. CVC Circular No 23/7/07 dated 5 July 2007 also *inter alia* states that a tendering process or public auction is a basic requirement for the award of contract by any government agency.

Audit scrutiny showed that architectural consultancy services for five works<sup>10</sup> which included the construction of academic buildings, sports complex etc., in Phase-I was awarded on nomination basis at a consultancy fee of ₹7.64 crore, without following the said provisions of GFR. Further, it was also seen that the Owner's Architect and later a company owned by the Owner's Architect were also appointed on a nomination basis. A civil engineer from the company owned by the Owner's Architect was also appointed on a nomination basis.

Ministry replied (September 2021) that the works were awarded to architectural consultants by extending the scope of their services in accordance with the terms and conditions on valid reasons, based on their performance in the existing contract.

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<sup>9</sup> Out of 26 Phase-I works, eight major works were entrusted to CPWD, one to PWD and balance works were carried out by the IIT itself.

<sup>10</sup> (i) Bedroom and Studio Apartments, (ii) Academic buildings, (iii) Permanent Boundary wall and Entrance Gates, (iv) Central Arcade, Sports complex and Sports Ground, (v) Open Air Theatre, Car Parking and River Promenade

The reply is not acceptable, as IITGN did not follow the GFR while awarding the contracts to architectural consultants on nomination basis. Selection of architectural consultants through direct negotiations would not provide the benefits of competition in relation to quality and cost while also leading to lack of transparency in selection. MoE, accepted that IITs should follow the GFR for all matters related to engaging of consultants on nomination basis.

**(d) Blocking up of funds for Research Park**

Department of Science and Technology (DST), GoI approved (September 2016) Grant-in-Aid of ₹90 crore to IITGN for construction of a Research Park and released ₹40 crore and ₹16.10 crore in September 2016 and March 2019 respectively. Audit observed that although the funds were received by IITGN in September 2016, IIT released an advance of ₹29.60 crore to CPWD (as per the MoU) only in June 2018 for the construction of the Research Park. As such, there was a delay of 22 months on part of IIT in releasing the funds to CPWD which delayed the construction of Research Park.

MoE replied (September 2021) that the initial time taken is normal for the selection of architectural consultant, development of RFP, tendering process, award of work contract etc., for such a large value and new innovative project.

The reply is not acceptable as the funds were lying idle for 22 months with IITGN. The delay also deprived the students and faculty of the timely benefits of the envisaged Research Park which was not yet completed (September 2021).

**3.4.3 IIT Hyderabad**

IIT Hyderabad commenced its activities from a temporary campus at the Ordnance factory estate, Yeddumailaram, during 2008 under the mentorship of IIT Madras. Later, the Government of Andhra Pradesh (erstwhile) handed over 575.04 acres of land during 2008-12 at Kandi village, Sangareddy district, Telangana for permanent campus. As per the data made available to audit, the first academic building was completed in June 2016 and other buildings, namely hostels, dining, staff housing etc. were completed during February 2017 to April 2019.

**(a) Execution of works: Delay in Phase-I construction**

All the works under Phase-I were taken up as a single contract (construction of permanent campus) during the year 2012 and were scheduled for completion by November 2014.

A building-wise analysis revealed that there were delays ranging between two to five years in completion of the buildings like Chemical Engineering block, Mechanical Engineering block, Civil Engineering block, hostel blocks and residential housing. Only 31 per cent of agreement value amounting to ₹222.74 crore was spent within the agreement period of 24 months and none of the buildings was completed within the original agreement period of 24 months. As a result, the planned campus facilities as mentioned above could not be offered timely to student/staff and other residents.

MoE replied (September 2021) that the delay in construction in Phase-I was attributable to reasons like initial land disputes, shifting of service lines, frequent strikes over Telangana/Seemandhra agitations, serious hindrances in movement of labour and material, general elections, delay in release of funds by GoI in 2015-16, demonetization, implementation of GST and natural calamities which were beyond the control of any stakeholder. The IIT also replied (August 2021) that an amount of ₹4.94 crore was recovered from the contractor towards levy of compensation for delay.

The fact remained that the delay in construction resulted in depriving the students and faculty of the benefits of full-fledged infrastructure. Audit observed that at least three batches of students starting from 2014 completed their graduation without availing the complete benefit of the new campus like new academic buildings/laboratories and permanent hostel facilities.

**(b) Inordinate delay in taking up of Phase-II**

Phase-II works were estimated to cost ₹1,776.50 crore. Out of this, Japan International Co-operation Agency (JICA) sanctioned a loan of ₹1,501.72 crore to GoI during January 2014. The remaining ₹274.77 crore was funded by GoI and the release of funds started from 2013-14. The project period was four years from 2013-14 to 2016-17. Phase-II works included, among other works, construction of Laboratory complexes under Technology Incubation Park (TIP) and Technology Research Park (TRP). TIP and TRP were intended to provide space for start-ups.

It was observed in audit that the work pertaining to Phase-II was however awarded during March 2019, i.e., after five years from the date of loan agreement and scheduled to be completed by March 2022 (36 months from March 2019). As a result of the delay, the intended objective of advancement of academic and research activities in the Campus could not be achieved till date. This reflected inaction on the part of BWC/BoG in monitoring fund release and taking up of the construction activities in timely manner.

MoE replied (September 2021) that the work was delayed due to want of sanctions from the respective authorities, approval of designs, preparation and inviting of tenders and awarding of works to the contractor of this magnitude of project besides understanding and fulfilling the requirements of JICA guidelines and instructions.

The reply is not acceptable as reasons attributed in the reply were not justified for an inordinate delay of five years in awarding the contract (2019) after having signed the loan agreement with JICA for Phase-II infrastructure works in January 2014.

**(c) Construction of STPs after occupancy of buildings due to delay in tendering and avoidable expenditure of ₹56.62 lakh**

Two Sewage Treatment Plants (STPs) were proposed (September 2014) by BWC in the campus to meet sewage treatment requirements of hostels and academic buildings. IITH intended to re-use the treated effluent for Heating, Ventilation and Air-conditioning (HVAC), toilet flushing and horticulture in the permanent campus. The cost was estimated at ₹17 crore for civil works of both STPs (₹10 crore) and Electro-Mechanical (EM) works for first STP (₹ seven crore).

Audit observed that although the BWC was aware that STPs were to be built before occupancy of the buildings, it could not decide upon the appropriate technology for their operation. As such, the work relating to STPs was not considered during the tendering (August 2012) for Phase-I works. It was further observed that the STP works (Civil works) were entrusted in September 2014 during the execution of Phase-I works, to Phase-I contractor only. The contract was awarded as an additional item of work instead of putting this work to tender. This was in violation of GFR whereby IIT lost the opportunity of competitive prices. Moreover, the EM works of STP were separately awarded in March 2018 and completed in June 2019. Meanwhile, as the buildings were occupied during 2015, IIT planned for temporary sewage disposal by way of septic tanks, dispersion channels, soak pits etc. at an expenditure of ₹56.62 lakh (2015-18).

MoE replied (September 2021) that the work was executed in year 2018 as an extra/additional item with the ongoing contractor with their quoted agreement rates of the year 2012. It was completed along with Phase-I construction works and that there was no delay in construction of STP.

The reply is not acceptable since the STPs being prerequisite for occupation of the building, should have been completed before the buildings were occupied and in the absence of the STP, IITH had to make alternative arrangements for sewage disposal involving an avoidable cost of ₹56.62 lakh. Further, the civil works of STPs should have been tendered as required under GFR.

#### **(d) Instances of undue benefit to Consultants**

##### **(i) Avoidable financial burden - ₹12.86 crore**

IITH appointed (September 2011) a consultancy firm (M/s Tata Consulting Engineers Ltd.) as Project Management Consultant (PMC) for providing consultancy services, prior to awarding of Phase-I construction works. The consultancy fee for PMC was fixed at 1.81 *per cent* of the cost of construction works and the consultant was engaged for 36 months. The contract also provided for the payment of additional compensation for monitoring the progress of work even beyond the contractual period.

The contract for the construction project (Phase-I works) was awarded in November 2012 at a contract value of ₹643.97 crore and was to be completed within 24 months thereafter. Accordingly, the fee payable to PMC worked out to ₹11.66 crore (1.81 *per cent* of ₹643.97 crore) at the end of 36 months.

It was observed that the contract work of construction project (Phase-I) could not be completed within the stipulated period of 24 months (i.e., by November 2014) and was inordinately delayed by five years before completion in April 2019. As the consultancy fee for PMC was fixed at 1.81 *per cent* of the cost of construction works (₹643.97 crore), the consultant was paid ₹8.54 crore (09/2011 till 03/2019) for the completed portion of the work. Additionally, the PMC was paid on monthly basis, a total ₹12.86 crore<sup>11</sup> from 2015-16 to 2018-19 for delayed period beyond 42 months<sup>12</sup>. As such, the consultant got two parallel payments (from 03/2016 till 03/2019) i.e., the original consultancy fee

<sup>11</sup> ₹3.89 crore (2015-16), ₹2.75 crore (2016-17), ₹3.52 crore (2017-18) and ₹2.70 crore (2018-19)

<sup>12</sup> Monthly payment for the extended period would commence from the 43<sup>rd</sup> month from the date of appointment.

(@1.81 per cent of ₹637.97 crore) as well as monthly compensation from the 43<sup>rd</sup> month for the same consultancy services without providing any additional service. This led to avoidable payment on account of the additional compensation paid to the consultant.

MoE replied (September 2021) that delays had been thoroughly examined by PMC as well as BWC and accordingly justified delay had been worked out and that the contract was granted Extension of Time with the approval of competent authorities.

The reply is not acceptable since the contract was deficient as it provided dual payment for the same consultancy services during the extended period of the contract. This provided undue advantage to the consultant amounting to ₹12.86 crore (March 2019).

## (ii) Indefinite time frame in contract

A contract was entered (March 2011) for providing consultancy services (design) for 'Architectural, Structural, Mechanical, Electrical and Plumbing (MEP) and Educational Technologies for the Computer Science and Engineering (CSE) Department'. The consultancy fee was fixed at five per cent of the 'accepted bid value'<sup>13</sup> of the proposed building, irrespective of completion cost. Provision for stage-wise<sup>14</sup> payments in ten installments was made in the agreement, based on the progress of the work and the final payment was to be made when the consultant submitted the 'As-Built drawings'<sup>15</sup>. As such, the contract had no completion date and the consultant was to be paid as and when the milestones mentioned in the contract were completed. A consultancy fee amounting to ₹42.02<sup>16</sup> lakh was paid (March 2011 to December 2012) for the work done up to Stage 6<sup>17</sup>.

It was observed that the actual construction work of the CSE department, was taken up only in July 2019 i.e., after a delay of eight years, at an awarded cost of ₹47.38 crore. IITH recalculated the six stage-wise payments previously made to the Consultant as the earlier payments were made based on the estimated cost and not the accepted bid value<sup>18</sup>. Hence, the payment to the consultant was revised to ₹70.36 lakh<sup>19</sup> (September 2019) based on the 'accepted bid value' of the work done till December 2012. Resultantly, an additional fee amounting to ₹28.34 lakh (₹70.36 lakh - ₹42.02 lakh) was paid in September 2019. As such, delay of eight years in awarding the contract for the construction imposed an additional liability on the IIT, due to a natural escalation in costs over time.

MoE replied (September 2021) that the fees were payable on percentage basis of the value of the work irrespective of the duration of consultancy. The IIT had taken note of the audit observation and would henceforth implement the same in upcoming architectural agreements.

<sup>13</sup> Awarded value of the contract for the construction of the building

<sup>14</sup> Schedule of payment as per the agreement is at stage (1<sup>st</sup> stage) 5% on Signing the contract, (2<sup>nd</sup> stage) 10% on approval of conceptual designs, (3<sup>rd</sup> stage) 10% on approval of the modified conceptual designs and drawings, (4<sup>th</sup> stage) 10% on approval of drawing by statutory bodies, (5<sup>th</sup> Stage) 20% on approval by the Institute "Good for construction" drawings, (6<sup>th</sup> stage) 10% on approval of the Institute, schedule of items with specifications, detailed estimate and tender documents, (7<sup>th</sup> stage) 10% on award of construction contract, (8<sup>th</sup> stage) 10% on 50% construction of completion of construction work, (9<sup>th</sup> stage) 5% on completion all construction works, (10<sup>th</sup> stage) 10% on submission of As-Built drawings

<sup>15</sup> Design of the building

<sup>16</sup> Based on the 'estimated cost' of ₹28.30 crore

<sup>17</sup> Pre- award

<sup>18</sup> ₹47.38 crore

<sup>19</sup> The consultancy fee was reduced by IIT (April 2014) from 5.0 per cent to 4.5 per cent of the 'accepted bid value'

The reply is to be viewed against the fact that the contract was deficient as it was an open-ended contract and not constricted within a specific timeframe which imposed an indefinite liability on IIT Hyderabad.

**(e) Non - accessibility of facilities to persons with disabilities**

Ministry of Social Justice and Empowerment launched 'Accessible India Campaign' to ensure persons with disabilities have access on equal basis with others, to physical environment, to transportation, to information and communications technologies and system and to other facilities and services opened or provided to the public.

Audit observed that the toilet block for male and female users of the workshop building in Heavy Labs-3 was planned and built (2019) without provision of access for physically challenged students and other users.

MoE replied (September 2021) that the said requirement would be factored in all future constructions by providing entrance ramps and grab bars to extend access to the physically challenged students immediately.

**(f) Construction of Foot-over-Bridge (FoB)**

The permanent campus is located along National Highway 65 (NH65) connecting Andhra Pradesh, Telangana, Karnataka and Maharashtra. The main entry to the IITH Campus abuts the NH65 carrying the traffic of Hyderabad, proceeding to other districts of Telangana and Maharashtra and *vice versa*.

The BWC accorded (September 2017) approval for construction of FoB in a convenient location near the main entry of IITH to ensure safety of students, faculty, staff and other users of IIT campus. However, as on date (October 2020), the FoB has not been constructed, thus endangering the safety of IITH students, faculty and other stakeholders.

IITH in its reply (November 2020) stated that National Highways Authority of India (NHAI) had stipulated certain clauses including bearing the expenditure and had asked the IITH to acquire the land on the counter side of IITH for this purpose. NHAI also indicated that the FoB was to be transferred to NHAI once it was built. IIT being a central government organisation was not permitted to acquire land for such a purpose from GoI funds. Therefore, those clauses had hindered the IITH from undertaking any further steps in this direction.

Pursuance of this matter by MoE with NHAI/MoRTH could have addressed this issue. However, MoE did not take up this matter with NHAI/MoRTH (September 2021).

**3.4.4 IIT Indore**

IITI commenced its activities from a temporary campus at Institute of Engineering and Technology of Devi Ahilyabai University from academic year 2009-10 under mentorship of IIT Bombay. Later, the Government of Madhya Pradesh allotted a total land of 501.42 acres during 2012 at Indore, Madhya Pradesh. It started functioning from new campus from February 2016.

**(a) Execution of works**

Out of 20 sampled works, four works pertain to Phase-I which were examined in Audit. All the four works were executed by IITI and were scheduled to be completed between January 2015 and September 2016. Out of the four works, three works (workshop building, hub building and campus infrastructure works) were completed between June 2015 and August 2017 with delays ranging between five and nineteen months. One work (construction of permanent campus at Simrol) costing ₹307.95 crore, which was scheduled to be completed by February 2016, was yet to be completed, running into delay of 37 months as of March 2019.

Out of 16 Phase-II works examined, seven works were scheduled to be completed prior to 31 March 2019 while the other nine works were due for completion only after March 2019. Out of these works, two works (faculty housing and football ground) remained in progress as of March 2019 with delays ranging between four and seven months, while two works (footpath and ancillary works) were completed with delay of one to 14 months.

MoE stated (September 2021) that due to non-performance of the contractor, the contract for Phase-I was rescinded and BoG has taken a decision to impose liquidated damages of ₹30.61 crore for contractor's responsibility towards delay. No specific reply for the delay in Phase-II was provided by Ministry. However, it was stated that almost all the works are completed before the extended time of 31 March 2021.

The reply is to be seen in the light of the fact that Phase-I works were allotted to a new contractor in August 2021 with a timeline of six months to complete the work. Thus, students were deprived of the intended benefits of the campus even after lapse of more than five years since scheduled completion of permanent campus in February 2016.

**(b) Non completion of Indoor Sports Centre**

Indoor Sports Centre (ISC) was to be constructed under the work 'Construction of Permanent Campus Phase-IA(a) Part A' which was awarded (June 2014) to M/s Simplex Infrastructure Limited (SIL). It was scheduled to be completed by February 2016; however, this was not completed even till March 2019.

Audit observed that against the tendered amount of ₹12.63 crore, financial progress of only ₹7.20 crore (56 *per cent*) was achieved till March 2019 i.e., even after a delay of more than 57 months against the scheduled period of 20 months for completion.

MoE replied (September 2021) that due to non-performance, the contract was rescinded in June 2020 and balance work was awarded in August 2021 for completion of balance works at the risk cost of the contractor.

The reply may be seen in light of the fact that the indoor sports center could not be constructed even till November 2020, despite a lapse of six years.

**(c) Assets created and not put to use**

(i) Heating, Ventilation and Air-conditioning (HVAC) facilities were to be established under the work 'Construction of Permanent Campus Phase-IA (a) Part A'. The work was allotted to M/s Simplex Infrastructure Limited (SIL) (June 2014) at a cost of ₹15.18 crore.

Audit observed that even after a delay of more than four years from the scheduled date of completion (February 2016), the HVAC work was not completed by the contractor. This was due to inadequate deployment of resources and procurement of materials which resulted in idling of HVAC equipment worth ₹7.63 crore and depriving the IIT of its intended benefits.

MoE replied (September 2021) that due to non-performance, the contract with the contractor was rescinded in June 2020 and balance work was awarded in August 2021 for completion of balance works at the risk cost of the contractor.

The fact remained that equipment worth ₹7.63 crore was lying idle even after a lapse of more than three years and the planned services could not be delivered.

(ii) As per Rule 21 of GFR 2017, every officer incurring or authorizing expenditure from public moneys should be guided by high standards of financial propriety.

A football ground was to be constructed (July 2018) on the south side of the sports complex in IIT campus. The site of football ground was changed<sup>20</sup> (January 2019) to the north side of sports complex despite the fact that the north side of the campus was full of black cotton soil and located in a low-lying area. IIT ignored the possibility of water logging and work was awarded to contractors in July 2018 and May 2019. Further, the contract was closed in September 2018 and July 2019. An amount of ₹92.15 lakh was paid to the contractors.

It was observed that after closure of the contracts, the football field was uneven and there were bushes all over the football ground. Thus, the football ground was not in a ready condition even after incurring expenditure of ₹92.15 lakh<sup>21</sup>.

MoE replied (September 2021) that the location was decided taking into consideration its vicinity and convenience. The filling and development work was executed to prevent water logging since it was necessary for developing the football ground as well as athletic track as per the orientation shown in the master plan. Balance work of development of football ground has been awarded to CPWD in February 2021 and CPWD has initiated the work of hiring of consultants for this purpose.

Fact remained that the football ground could not be put to use despite incurring expenditure of ₹92.15 lakh.

<sup>20</sup> For developing an athletic track

<sup>21</sup> ₹17.57 lakh paid to M/s NH Brothers + ₹74.58 lakh paid to M/s Jibbu Constructions

### 3.4.5 IIT Jodhpur

IITJ commenced its activities with the mentorship of IIT Kanpur from a temporary campus at Muganiram Bangar Memorial (MBM) Engineering College, Jodhpur from 2009-10 onwards. The Government of Rajasthan allotted a total land of 872 acres at Karwad, in Jodhpur in 2011 for development of permanent campus. IITJ completely shifted its academic and research operations to its permanent campus by March 2018.

#### (a) Execution of works

In IITJ, entire Phase-I work was entrusted to CPWD. The work of development of the permanent campus costing ₹285.85 crore was scheduled to be completed by March 2017. It was however, seen that the work was completed by August 2018, with a delay of 17 months.

MoE replied (September 2021) that works were delayed due to variations in plinth area, additional works and structures, new items and use of new technology.

The fact remains that the envisioned facilities could not be provided timely to students and staff of the IITJ.

#### (b) Assets created not put to intended use

A joint physical verification revealed that a swimming pool (Jal Building) constructed up to plinth level under Phase-II was abandoned after incurring expenditure of ₹1.85 crore. Construction work taken up in October 2017 was stopped in September 2018 in compliance with the guidelines issued (July 2018) by MoE stating that the grants were not to be used for development of certain infrastructure such as swimming pools.

As per the reply received (September 2021) through MoE, IITJ replied that the plan of swimming pool was not being abandoned and whenever the IIT mobilises the fund from other sources, the incomplete work of swimming pool can be completed.

The reply of IIT may be read in the light of the fact that Ministry's guidelines (July 2018) *inter-alia* stated that the IIT could mobilise the funds (for categories of works in negative list) from other sources. However, IIT did not pursue the issue with the Ministry for ratification of expenditure made prior to the issue of guidelines (2018). IITJ could not also arrange for funds for completing the work of swimming pool which rendered the entire expenditure of ₹1.85 crore unfruitful as of November 2020.

#### (c) Non-construction of Underpass

To ensure safety of students crossing from one part of the Institute to another, IITJ planned (February 2011) to connect its western and eastern parts by an underpass to National Highway (NH 65). The work of preparation of General Architectural Drawing (GAD), Design and cost estimates was given (January 2016) to Public Works Department (PWD) NH, Jodhpur as deposit work for ₹0.18 crore. Audit observed that even after passage of three years, the construction of underpass could not be started.

MoE replied (September 2021) that that DPR, GAD, estimates and feasibility reports have been obtained in October 2019 and that demand for construction work was not raised by PWD till date.

The fact remained that construction of underpass would have eased the safe passage between two separate parts of the campus and non-construction of same resulted in constantly jeopardizing the safety of students and other users.

### 3.4.6 IIT Mandi

IIT Mandi commenced its activities from temporary campus in IIT Roorkee in 2009-10 and later shifted to another transit campus in Government College at Mandi from 2010-11. IIT Mandi shifted to its permanent campus at Kamand, Mandi in October 2012 and shifting process was completed by April 2015.

#### (a) Availability of land

Government of Himachal Pradesh allotted 501 *acres* of land to IIT Mandi. Out of this, 308 *acres* was forest land for which approval was pending from Ministry of Environment, Forest and Climate Change, GoI. Out of the remaining 193 *acres*, 19 *acres* was disputed and *sub judice*. Thus, the IIT had only 173 *acres* (35 *per cent* of the allotted land) for infrastructure development. Further, the IIT had to incur an expenditure of ₹3.02 crore<sup>22</sup> towards shifting of power stations and lines and diversion of roads passing through the campus.

MoE replied (September 2021) that necessary permission for transfer of forest land was accorded in February 2021 by Hon'ble Supreme Court and accordingly the State Government issued orders (March 2021) for transfer of 308 *acres* land to IIT.

However, the fact remained that only 35 *per cent* of the allotted land was available for campus development even after 10 years of its establishment.

#### (b) Execution of works

Major construction works under Phase-I were entrusted to CPWD and NBCC. Audit examined 14 construction works taken up by IIT Mandi during 2014-19 under Phase-I. Of these, 11 works were scheduled to be completed by March 2019. However, six out of these 11 works (like academic buildings, laboratory building, recreation centre etc.) which were scheduled to be completed between October 2012 and August 2017 were completed between October 2013 and February 2018 with a delay ranging between two months and 26 months. Two major construction works, (i) 'construction of Phase-I North' viz., academic buildings, guest house, gymnasium, hospital and auditorium buildings and (ii) 'different buildings' viz., 22 hostel blocks, 28 faculty housing buildings, dining and club house, were entrusted to NBCC/ CPWD. The construction of these buildings was scheduled to be completed by May 2018 and October 2015 respectively. However, the construction of these buildings was yet to be completed (March 2019) and delays of 10 months and 41 months respectively were observed.

<sup>22</sup> ₹2.20 crore for shifting of power lines/stations and ₹0.82 crore for diversion of a road.

In one specific case, it was observed that the construction of academic and residential complex (52 buildings) was entrusted to CPWD which in turn awarded the work to a contractor for a tender value of ₹179.48 crore with a stipulation to complete the work by October 2015. Audit observed that the project was delayed by five years with nine out of 52 buildings remaining incomplete as of November 2020.

MoE replied (September 2021) that the slow progress/delay in completion of works by the executing agencies was attributable to remote location with extreme weather conditions, non/short availability of labour, non-availability of material and trained workers in local market etc. In respect of the specific case of delay, it was replied that out of 52 buildings awarded (2013-14) by CPWD to M/s SIL (original contractor), 42 buildings were withdrawn and have been awarded to eight different contractors by CPWD and 10 buildings were left with M/s SIL. All the buildings, except one (B11), have been completed.

The fact remained that the development of campus was delayed by five years, depriving the students and other users of the benefits of the full-fledged infrastructure.

### **(c) Non accessibility of facilities to persons with disabilities**

Ministry of Social Justice and Empowerment launched 'Accessible India Campaign' to ensure persons with disabilities have access on equal basis with others, to physical environment, to transportation, to information and communications technologies and system and to other facilities and services opened or provided to the public.

Audit observed that out of the 80 completed buildings, facilities of ramps and toilets for wheelchairs was constructed only in 32 buildings and Braille symbols and auditory signals in elevators or lifts was provided only in eight buildings.

The IIT replied (September 2021) ramps have been provided in all the buildings. The toilet facilities for wheelchairs were not available in four academic buildings and three hostel buildings. Moreover, process of Braille symbols and auditory signals has been initiated. MoE replied (September 2021) that efforts would be made to provide these facilities in other buildings as per availability of fund.

The fact remains that non-provision of easy accessibility of facilities to persons with disabilities caused inconvenience to these users.

### **3.4.7 IIT Patna**

IITP commenced its activities, under the mentorship of IIT Guwahati, from a temporary campus at Navin Government Polytechnic in Patna in the year 2008-09. Later, the Government of Bihar allotted a total land of 500.45 acres during 2011 at Bihta, Patna. IITP shifted to its new campus in July 2015.

#### **(a) Execution of works**

Audit examined all three Phase-I works (entrusted to CPWD, NBCC and EIL) executed during 2014-19. These three works included academic buildings, hostels, faculty housing, hospital, school and workshops. The works were scheduled to be completed between June 2014 and December 2017. Delays were observed in completion of two works, namely

academic building and residential complex, ranging between 18 months and 22 months (as of March 2019). The third work which included hostels, staff quarters etc. and scheduled for completion by December 2017 was still in progress with the delay of 15 months (as of March 2019).

MoE replied (September 2021) that the works awarded to NBCC were delayed due to complete stoppage of works due to agitation by local people for land compensation, change in layout of internal brick work partition in all buildings. The reasons for delays in works entrusted to EIL were yet to be received from the contractor and hence 10 *per cent* amount was being withheld as per instructions of BWC.

The fact remains that delays in construction led to delay in availability of infrastructure to the students/staff.

### 3.4.8 IIT Ropar

IIT Ropar commenced its activities, under the mentorship of IIT Delhi, from the premises of former Government Women Polytechnic, Rupnagar. Later, the Government of Punjab allotted (2009) 501 *acres* of land for development of the permanent campus. The IIT started shifting its activities to the permanent campus from July 2018. Complete shifting to the permanent campus was not achieved as of March 2019.

#### (a) Availability of land

501 *acres* of land was allotted to IIT out of which 20 *acres* of land was under dispute/litigation. In August 2019, the campus got flooded. A portion of the boundary wall and some equipment/furniture were damaged and IIT Ropar suffered a loss of ₹3.46 crore due to the damage caused by the floods. Further, expenditure would have to be borne by IIT Ropar for replacement of the damaged items.

IIT Ropar while accepting the audit observation, stated (November 2020) that the issue of works related to protection of the IIT from such incidents has been taken up with state government. MoE did not provide any specific reply in this regard.

#### (b) Execution of works

Out of the 12 works examined, 11 works pertained to Phase-I construction. All the 11 works were entrusted to CPWD. Nine out of these 11 works, consisting of administrative, academic, residential and hostel blocks etc., scheduled to be completed between April 2017 to April 2019 were completed with a delay ranging between 4 months and 39 months.

MoE replied (September 2021) that apart from delayed finalization of drawings and change in scope of works, additions to the drawings were also one of the reasons for delayed completion of Phase-I works.

The fact remained that the campus could not be fully utilised by the students due to delay in its completion.

#### (c) Tendering and awarding of works

For Phase-IA, the contract for architectural consultancy was awarded to M/s Sikka Associates (SA) and an agreement was entered into with this firm. Accordingly, it was

agreed to pay 1.80 per cent of the project cost of the buildings and services, as per the tendered cost or actual cost, whichever would be less, for the works designed by the consultant. IIT also awarded (November 2015) the consultancy contract to SA for Phase-IB on same terms and conditions, on a nomination basis, without calling for fresh tenders. This was in violation of the selection process as envisaged in Rules 163 to 176 of GFR 2005.

MoE replied (September 2021) that both works are sub-divisions of the one original project. The work was distributed in three phases only to facilitate the execution of work properly because a lot of changes had to be made in the designs of the project at every stage.

The reply of the IIT is not tenable as Phase-IB works was not part of Phase-IA works and a separate approval was obtained from BWC for Phase-IB works. Hence, the procedures laid in GFR 2005 were required to be followed.

### 3.5 Procurement of equipment

Each IIT has its own procurement policy/manual detailing therein the purchase procedures, guidelines and proper delegation of powers. An examination of the process of procurement of equipment and services by IITs over the period 2014-19 was conducted for selected sampled cases. The impact of delays in procurement, installation and idling of equipment on the intended objectives (administrative, academic and/or research projects) was studied and analysed. Similarly, the process exercised by these IITs in procuring services and adherence to the terms and conditions as stipulated in the agreements were also examined.

#### 3.5.1 Supply of equipment

Time schedules are important part of any contract and the suppliers must deliver the goods within the scheduled date mentioned in the Purchase Order (PO).

During analysis of the data and connected records pertaining to procurement of equipment (selected sample), Audit observed that in 106 out of the 340 sampled cases, there were delays in supply of equipment (including high value equipment<sup>23</sup>) ranging between 31-536 days<sup>24</sup> as detailed in *Table 3.5*:

**Table 3.5: Details of delays in supply of equipment**

Name of the IIT	No. of equipment procured *	No. of cases of where delay in supply is more than one month	Range in delay in supply (in days)
IITBBS	33	11	32-293
IITGN	36	7	43-244
IITH	45	12	31-187
IITI	39	10	32-184
IITJ	40	10	33-455
IIT Mandi	41	12	32-322

<sup>23</sup> IITBBS (₹1.87 crore), IITGN (₹6.22 crore), IITH (₹4.97 crore), IITI (₹1.26 crore), IITJ (₹4.15 crore), IIT Mandi (₹7.65 crore), IITP (₹17.49 crore) and IIT Ropar (₹7.14 crore)

<sup>24</sup> Cases where the delays were marginal i.e. less than 30 days were excluded

Name of the IIT	No. of equipment procured *	No. of cases of where delay in supply is more than one month	Range in delay in supply (in days)
IITP	50	32	41-530
IIT Ropar	56	12	33-536
<b>Grand Total</b>	<b>340</b>	<b>106</b>	<b>31-536</b>

\*Data in respect of date of supply was not furnished by seven IITs in 34 cases<sup>25</sup>

These substantial delays in supply of the equipment delayed subsequent stages of installation and utilization. As a result, the faculty and students could not get the facility of these resources which defeated the intended purpose of their procurement. The IIT-wise specific cases of delays in supply and resultant delays in installation/commissioning of equipment have been discussed in subsequent paragraphs.

### 3.5.2 Commissioning/Installation of equipment

Audit observed that there were delays in installation of equipment after the delivery of the equipment in three IITs.

#### 3.5.2.1 IIT Bhubaneswar

##### (i) Delay in construction of laboratory led to delay in installation of equipment

IITBBS issued a PO (March 2015) for procurement of 'Sliding surface and screw cutting all geared head lathe' with accessories (one medium and one heavy duty) for use in the central workshop of the School of Mechanical Sciences. The delivery was to be done within eight months (by November 2015). It was seen that the delivery date was extended to December 2015 for the medium duty machine and January 2016 for the heavy-duty machine. Audit observed that both these machines were delivered in January/March 2016. Further, Audit observed that the installation of the machines was done in July/June 2017 after a lapse of more than 19/15 months from the date of scheduled delivery, though the equipment was procured on an urgent basis. Examination of records showed that the delays were on account of non-availability of site and uneven floor for fixing the machine.

MoE replied (September 2021) that the delay was due to non-completion of workshop building and non-handing over of the site by CPWD in time.

Thus, the delay in the delivery of the equipment coupled with the delay in installation resulted in non-achievement of the objective of its procurement. As the procurement was done on urgent basis, the delay also reflects ineffective monitoring, control and co-ordination of the procurement process by the IITBBS.

##### (ii) Non installation of equipment

A PO was placed (31 March 2015) for procurement of equipment (two Linear Actuators) to cater to the laboratory and research requirements of UG/PG students at the School of Infrastructure.

<sup>25</sup> IITGN (5 cases), IITH (8 cases), IITI (1 case), IITJ (7 cases), IITP (9 cases) and IIT Ropar (4 cases)

Audit observed that the equipment was installed (17 October 2017) after one and half years from the date of delivery (21 April 2016) due to non-readiness of site and non-availability of certain accessories necessary for installation and functioning of the equipment.

MoE replied (September 2021) that the requirement of accessories was incidental and not known prior to unpacking of equipment.

The delay in installation of equipment due to failure in making proper assessment of the required accessories and ensuring their timely availability resulted in the lab/research requirements of students not being met, thus affecting the quality of their learning.

### 3.5.2.2 IIT Hyderabad

Delays in installation of equipment was observed in five cases namely ‘High Sensitive Vibrating Sample Magnetometer’ (in Physics department), ‘High Resolution Electron Microscope & X-ray diffraction System’ (in Material Sciences and Metallurgical Engineering Dept.), ‘Rotary Cyclic Triaxial Apparatus’ (in Civil Engineering Department) and ‘Signal Generator with Accessories’ (in Electrical Engineering department) intended for research and laboratory activities. The delay in commissioning/utilization of equipment ranged from 90 to 475 days.

MoE replied (September 2021) that the delays were nominal in most of the cases and in case of X-ray diffraction system the delay was due to shifting of the campus.

The fact however remained that the delays impacted the availability of the intended facility/resources to the students as well as faculty and IITH failed to provide the benefits of these training aids to its students.

### 3.5.2.3 IIT Indore

During scrutiny of records of procurement of equipment, Audit noticed that there were delays ranging from 3 to 125 weeks in installation of 19 items of equipment in five Departments as shown in *Table 3.6*. As a result, students enrolled in courses where they had to use the labs could not derive full benefit.

**Table 3.6: Departments and equipment where installation was delayed**

Name of the Department	Name of the equipment
Bio Science & Bio engineering	Inverted Microscope, Image quant LAS 400, Bench Top High speed cell sorter and high-speed Flow cytometer
Mechanical Engineering	Metallic belt deposition unit
Civil Engineering	Universal Testing Machine, Hydrology System, Freeze Thaw cabinet, Server (Master node IU and Compute node) and Fatigue Testing Machine
Metallurgy Engineering & Material Science	High Temperature furnace, Vacuum Diffusion Bonding Unit, inverted optical Microscope, LAMBDA 750 UV Infrared

Name of the Department	Name of the equipment
	Spectrophotometer, High Temperature Wear Testing Machine, Solar Cell Simulator, Contact Angle Measurement system, Vacuum Arc Melting Cum Suction Casting Unit and Master Nodes
Chemistry Department	Research Spectrometer

MoE replied (September 2021) that due to delay in site readiness and construction work and non-availability of space, there was delay in installation of equipment. It further stated that the IIT issued an advisory to all user departments to ensure site readiness.

Thus, the delay in installation for substantial periods deprived the students and faculty of the intended benefits of the procurement. It also reflected ineffective monitoring by IITs in terms of ensuring the availability of pre-requisites on time.

### 3.5.3 Shortfall in Laboratory facilities

Laboratories are a crucial part of an engineering institute as they provide means for testing theories and gain hands-on knowledge of various concepts. Ministry in its DPR envisaged that the IITs would need laboratory equipment as well as computer equipment and that the list of such equipment will be based on the academic curriculum of the IIT as well as research programme to be developed by the faculty of the IIT. It was expected that all laboratories and buildings would be fully developed over a period of eight years.

Audit observed shortfalls in the availability of laboratory facilities in respect of four IITs as detailed in *Table 3.7*:

**Table 3.7: Shortfall in laboratory facilities in IITs**

IIT	Audit findings
IITGN	Shortage in minimum required equipment was observed in respect of six laboratories in Electrical Engineering (EE Lab 1 and Lab 2), MSE (Interface Lab), Mechanical Engineering (Energy Systems/Research Lab) and Chemistry Department (Organic and Chemical Biological Lab and Inorganic Lab).  While accepting the fact, IITGN replied (September 2021) that it has subsequently overcome the shortfalls in availability of equipment and presently there is no shortage of equipment.
IITH	Audit noticed from the data furnished (in respect of seven out of fourteen Departments) that there was a significant increase of about 64 <i>per cent</i> in laboratories' catering capacity from 2014-15 (898 students) to 2018-19 (1472 students). However, a shortfall of 15 <i>per cent</i> in laboratories' catering capacity (261 students) still existed to the end of AY 2018-19.  In response, IITH replied (November 2020) that the space that was available in three different academic blocks was shared with all the departments depending on their size and more space will be made available to the departments (individual blocks), once the second phase is completed.
IITJ	Only eight labs were available against requirement of 12 labs in Chemistry Department and 137 equipment were found short against requirement of 424 equipment in 22 laboratories in the IITJ.

IIT	Audit findings
	IITJ replied (September 2021) that the IIT managed the situation by keeping a smaller batch of students, putting extra time slots, running several shifts during a day etc. The reply is not acceptable, since it could be seen from the reply that the students were put to inconvenience by requiring to avail these lab facilities during extra hours.
IITP	Audit observed that there were shortfalls in availability of equipment in 33 out of 65 laboratories across 10 Departments. IITP replied (September 2021) that inadequate allocation of grants by the Ministry hindered the growth of laboratories across all departments.

Thus, laboratory infrastructure created in the IITs was not sufficiently equipped to cater to the needs of the students even after lapse of 10 years from their setting up.

MoE did not respond specifically to this issue (September 2021) regarding shortfall in laboratory facilities.