Terms of Reference

Research Project
on
Preparation of Test Method for Vertical Fatigue Testing of Suspension Fork for Bicycles

Technical Committee	Bicycles Sectional Committee (TED 16)
Division Council	Transport Engineering Division Council
Duration	3 months

1. Title of the Project: Preparation of Test Method for Vertical Fatigue Testing of Suspension Fork for Bicycles.

2. Background:

2.1 Suspension fork is the front fork incorporating controlled, axial flexibility to reduce the transmission of road shocks to the rider.

2.2 The relevant existing Indian Standards are as given below:

IS 2061:1995	Bicycles – Front Forks – Specification
IS 10613:2023	Cycles - Safety and Performance Requirements for Bicycles

2.3 The Indian standards can be downloaded freely from the link given below:

https://www.services.bis.gov.in:8071/php/BIS/PublishStandards/published

2.4 These standards cover the following requirements of Suspension Fork:

a. Tyre clearance Test
b. Tensile Test
c. Static Bending Test
d. Rearward Impact Test
e. Bending Fatigue Test

2.5 Most of the road shocks that are absorbed by suspension fork are in vertical direction. To improve the endurance & life of the suspension fork, it is essential to ascertain the ability of the suspension fork to effectively absorb the shocks in the vertical direction. However, there is no defined test method to do the same.

2.6 It is in this context that there is a need for in-depth, incisive study for vertical fatigue test of suspension fork.

3. Objective

The objective of research and development project is to collect data, information, and evidence from primary and secondary sources in respect of vertical fatigue test of suspension fork for bicycles.

4. Scope:

4.1 A thorough literature review on vertical fatigue test of suspension fork, which will include existing international standards if any, research papers published on the subject, any study conducted by industry bodies/ associations or any other literature which includes study of parameters covered in current Indian Standards, tests specified and their test methods.

4.2 To collect data on scale wise (Large, Medium, Small, and Micro) manufacturing base of suspension forks and laboratories through government sources (website, reports) or industry associations.

4.3 Based on findings of **4.2**, identification of manufacturing base of the suspension forks in the country and visits to different manufacturers facilities based on agreed sampling plan at **5.1**.

4.4 Based on findings of **4.2**, identification of testing laboratories, especially NABL accredited, and testing facilities in the country and visits to different laboratories based on agreed sampling plan at **5.1**.

4.5 Collect and gather the following data on requirements for vertical fatigue testing of suspension fork:

- Test method being followed.
- Test equipment required.
- Calculation Methodologies
- Sampling plans

5. Sampling Plan

5.1 Based on the identification of manufacturing and testing base, a sampling plan is required to be agreed upon for visits to different stakeholders and for collection and testing of samples during the visit.

5.2 In case the manufacturing and testing infrastructure in the country is sufficiently available under large, medium and small scale, the proposer needs to submit a sampling plan to BIS for approval.

6. Research Methodology

6.1 Carry out thorough literature review as specified in **4.1** to **4.2**.

6.2 After the literature review, there will be discussion with BIS to approve the sampling plan so that visits can be undertaken.

6.3 Collect information from stakeholders through discussion, structured questionnaire as specified in **4.2** for the vertical fatigue test of suspension fork.

6.4 Visit to manufacturers facilities to witness the manufacturing process and to collect the samples for testing. A focused discussion on raw materials being used, manufacturing process, in-process quality checks and testing facilities for different parameters and test methods should be done with quality personnel.

6.5 Visit to testing laboratories, especially NABL accredited, to get the samples tested. Discussion should also be done with quality personnel on testing of different parameters, their testing methods and equipment being used for testing.

6.6 Collect data and feedback from different users through circulation of questionnaire.

7. Deliverables

An analytical report, in soft and hard copy, covering all aspects mentioned in the scope shall be submitted. Details of visits to manufacturers, laboratories, discussions with quality control personnel, questionnaire with exporters/ importers, feedback from users, research findings, data collected, comparative analysis and bibliography of the literature covered shall be appended to the report.

8. Timeline and Method of Progress Review:

A stage wise indicative timeline plan is provided below:

a) Project timeline – 3 months from the date of award of project

b) Primary source interaction time frame covering the review of the literatures – By the end of 30 days.

c) Secondary source interaction covering the discussion with industry associations, and R&D Organizations, thereof – By the end of 45 days

d) Visits to manufacturers and laboratories and testing of collected samples – By end of 75 days.

e) Final report covering all the aspects of the ToR – By end of 90 days.

9. Support BIS will Provide:

9.1 BIS will provide access to latest editions of Indian and International Standards.

9.2 BIS will provide information regarding the licencees and recognized laboratories available.