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21135

Consultant Stanislaw RABYMIRSKI
Roadstop 7/11 Anzhe, USOD/ME

DRAFT

UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION

PROJECT DOCUMENT

Project of the Government of the People's Republic of China

Title: Improvement of Safety for Automotive Products
Project Site: Beijing
Host Country
Implementing
Agency: Ministry of Machinery Industry (MMI)
Executing
Agency: United Nations Industrial Development Organization
Estimated
starting date: January, 1996

UNIDO financing: 2.55 million US\$
Third-party cost
sharing: 2.45 million US\$
Govt. inputs: 6.50 million US\$ (equivalent in local currency)
Local institu-
tions inputs: 8.00 million US\$ (equivalent in local currency)

Brief description: This project document is based on proposal No. 4-4 in the Priority Programme for China's Agenda 21 prepared by the State Planning Commission and the State Science Technology Commission. It addresses areas 12A, 12B, 12C, 12D, 12E and 13B of China's Agenda 21 and is related to programme areas 18A and 18C.

The project aims to improve the safety performances of vehicles manufactured in China. This will be accomplished by upgrading testing technologies both for the vehicle as a whole and for selected components, passive as well as active ones, thus laying foundations for improving safety performance of vehicles in general and of selected vehicle components in particular.

A. CONTEXT

1. Description of (sub)sector

The first vehicle manufacturing plant in China was established in 1956. The sector developed relatively slow in the subsequent 20 years and concentrated mainly on the production of medium duty trucks and buses. Most of the production was concentrated in only few centres, in particular in First Auto Works in Changchun, Jilin province and Second Auto Works in Shiyan, Hubei province. The technology base for the sector was founded mainly on foreign designs of the 1940s and little progress was made in the above-mentioned period by way of R & D and technical upgrading.

The situation, however, started to change in the early 1980s when it was recognized that the motorization should have an important role in the development of the national economy and the country as a whole. Since then, access to foreign technology has been sought. A number of joint ventures with leading foreign vehicle makers, including Volkswagen, Peugeot, Daihatsu, Audi, Citroen, General Motors and others, have been established and are ongoing. As a result, the vehicle production has been rapidly growing (Table 1). The annual production in 1994 was 1,338,000 units, of which around 58% were trucks, 23% busses and 19% cars. In addition, 5.1 million motorcycles (which are not classified in China as motor vehicles) left the assembly lines. It is important to note that the rapid growth in the production of cars has started only since 1990. In the meantime, the production output has increased from 42,000 units in 1990 to 247,000 in 1994 i.e at an annual rate of more than 50%. The detailed breakdown of the current motor vehicle production output is shown in Table 2.

Table 1: Motor vehicle output and population (1986-1994)

Year	Output	Population
1980	222,000	-
1985	443,000	-
1986	372,000	3,574,000
1987	473,000	4,123,000
1988	647,000	4,644,000
1989	587,000	5,113,000
1990	509,000	5,514,000
1991	708,000	6,110,000
1992	1,062,000	6,913,000
1993	1,297,000	8,176,500
1994	1,338,000	-

Table 2: Breakdown of motor vehicle production output in 1994

Vehicle category	Output
Heavy duty truck	36,300
Medium duty truck	316,800
Light duty truck	316,900
Mini truck	105,200
Subtotal	775,200
Large bus	3,300
Medium bus	17,200
Light bus	198,900
Mini bus	96,300
Subtotal	315,700
Car	247,600
Total	1,338,500

The motor vehicle population demonstrates a rapid growth at an average (growth) rate of more than 12% (Table 1). From 3,574,000 vehicles in 1986, the total vehicle population in China increased to reach 8,176,000 units in 1993. Most of the vehicles (about 75% of the total on the average) are made domestically. As regards motorcycles, their growth rate is also very spectacular. Their population increased from about 3.6 million units in 1989 to over 8.5 million in 1993. Besides motor vehicles, there are quite a lot of farm-use tractors running on road for transport purposes. Table 3 lists the breakdown of vehicle population in 1993.

Table 3: Breakdown of vehicle population by category in 1993

Vehicle category	Number
Passenger vehicles	2,859,792
- large sized	411,769
- small sized	2,448,023
Trucks	4,832,724
- large sized	3,007,592
- small sized	1,825,132
Other motor vehicles	483,319

Motor vehicles subtotal	8,175,835
Tractors	5,646,770
Motorcycles	8,587,874
Others	905,941
All vehicles total	23,316,420

2. Host country strategy

It is projected that the demand for all types of vehicles will be growing rapidly in China in years to come. It will result from both the increased private use of passenger vehicles and the growth in road transport volume. The strategy of the Government is to meet this growing demand in the first place by the domestic production increase. To ensure this, the national policy for automotive industry has been formulated. It is foreseen that a firm foundation for the development of this industry will be laid by the year 2000. In that year, the total output of vehicles should meet 90% of the market demand. In some segments, e.g. for motorcycles, the output should basically exceed the demand and a certain amount will be exported. In the period 2000 - 2010, the automotive industry will be turned into a pillar of the national economy.

China's annual demand for motor vehicles is expected to reach 2.5 million units by the year 2000, of which trucks will be more than 0.9 million. The total number of motor vehicles in operation will reach 18 million, of which trucks will account for more than 50%. The forecast is for the vehicle population to grow to about 40 million in 2010. The demand for trucks will jump to 1.4 million with an average increase rate of 4.5% each year between 2001 and 2010 and the total number in service will increase to 15 million. Heavy duty trucks will account for 10% of the total trucks by 2000 and rise to 15 -20% by 2010. In the next 20 years, the annual automotive production output in China will reach 6 million, and the number of motor vehicles in operation will increase to 50 million. The projection for motorcycles is not available, however, given their current production output, it may be expected that China will soon rank first in the world in the two-wheelers population.

The rapid growth in motor vehicle population and their use in China has already brought with it several increased problems, such as the increased pollution* and increased number of traffic accidents

* The problem of motor vehicle related pollution is not addressed by/in this project and thus no mention of it is made throughout the whole document. A separate project has been prepared for this problem.

resulting in fatalities and injuries. The negative consequences of such growth are issues which are getting more and more attention by policy makers in China, as the experience of other countries have shown what a serious impact they can have on the quality of life unless addressed at an early stage of development. As compared with the motor vehicle population size, the number of accidents and, in particular, the fatality rate, are extremely high in China. There were 242,000 road traffic accidents in China in 1993. The number of injured was 142,000 and the number of fatalities 63,508. In terms of fatalities per 10,000 units of motor vehicles (including motorcycles), the rate for China is 38. As for other countries, USA stands at 2.36 persons, Japan at 2.41, West Germany at 2.30 and France at 3.96 (data for the year 1990 or 1991; number of fatalities within 30 days from the date of accident concerned).

It is quite clear that a further rapid growth in motor vehicle population and their use will dramatically deteriorate the already very serious situation in the area of road traffic safety, with consequent economic and social losses. With this in mind, China intends to take up comprehensive measures aiming at the improvement in road traffic safety. Generally speaking, three factors - the human, road and vehicle - cause traffic accidents. China has done a lot of work in connection with human and road factors. Now, the emphasis is being put on vehicle safety performances which, as shown investigations, dramatically lag behind those in leading countries, e.g. passenger injuries caused by the quality of internal fittings in China are 6-10 times higher than those in the USA and Japan.

The national strategy for automotive industry provides for that in order to address the emerging problems, the state assumes supervision and management over safety of automotive products. The first element of this strategy is to set requirements for safety performances of vehicles and their components in the form of standards and regulations, and the system for the implementation and enforcement of the compliance. The internationally accepted type approval programmes will be implemented. Products that are not certified for compliance with relevant requirements must not be sold, imported or used. In order to enforce the requirements, research, testing and inspection institutions for automotive products able to assume the responsibilities for the formulation of required standards/ regulations, conducting of the certification and inspection are set up and strengthened. However, these institutions face a number of difficulties such as the shortage of experts in the field, and shortage of equipment and instruments for carrying out tests. in particular collision tests.

In order to bring their products into the compliance with requirements, the auto industry companies are supported to set up their own research and development institutes and to form their independent ability for product development by absorbing and assimilating the latest foreign technology. This is the second

element of the strategy. The automotive industry should upgrade the technical level of their products. It refers in the first place to self-developed ones which should achieve the international level in the 1990s. One of the most important and urgent objectives is to improve safety performances, both active and passive, of vehicles under production.

3. Prior and ongoing assistance

Under Government execution, the project CPR/91/383 - Motor Emission Control and Passive Component Safety - is being currently implemented. It is scheduled to be completed in October 1995. The project funds are provided by UNDP and the Government of China as cost-sharing contribution. UNIDO is cooperating agency under TSS2 arrangement providing technical advice which includes participation in the tripartite review meetings. The implementing governmental agency is China Automotive Technology and Research Centre (CATARC). In its safety related segment, an objective of the project is to assist CATARC in establishing/ strengthening its capacity to carry out safety tests on passive components. For this purpose, a test laboratory has been already established. It is able to undertake the following static and crash simulation dynamic tests: for safety belts, seats, head-rests and energy absorbing performance of steering system. It has made it possible for CATARC to provide technical services to manufacturers of those products, provide technical training in the field to manufacturers and research organizations and start research work on crash testing technologies. Furthermore, the safety performances of selected belts, seats, headrests and steering systems will be improved to enable them to satisfy national and international standards and regulations. A programme for conducting full-scale vehicle crash tests will be also prepared. The necessary equipment will be provided with Government funds, and the UNDP funds will provide expert advice on test technologies as well as substantial amounts of training in renowned test centres abroad.

Loans from the World Bank provided financial support for the establishment of State Key Laboratory for Automotive Safety and Energy Conservation at Tsinghua University which is actively involved in works on both active and passive safety (see Annex 1).

This project will take advantage of facilities established and experience gained under the above mentioned ones.

4. Institutional framework for the (sub)sector

The Chinese automotive industry has undergone important institutional and structural changes in recent years. In past, all the Chinese motor vehicle manufacturers were grouped in one corporation, initially China Motor Industry Corporation (CMIC) later restructured into China National Automotive Industry Corporation (CNAIC), to which the responsibility for the production

and development of the total sector was delegated. At present, the sector is split into several corporations/groups/companies. The Ministry of Machinery Industry (MMI) has an overall national responsibility for the automotive industry sector. The total number of vehicle manufacturers exceeds 120. The largest of them, in terms of production volume, is Dongfeng Motor Co. (former Second Automotive Works), which in 1994 had a production of about 180,000 vehicles, including 155,00 medium duty trucks, 10,000 heavy duty trucks and nearly 15,000 cars. The heavy duty trucks use a Cummins (USA) diesel engine based on a license agreement, whereas all other parts are produced domestically. For the passenger cars, the frame, the transmission and the engine are produced under joint venture arrangement with Citroen. The medium duty trucks, the main product of the corporation, are an improved version of the vehicles introduced into production in the late 1950s in Second Automotive Works.

Other big manufacturers include: First Automotive Works Group Co. (178,000 units in 1994), Shanghai VW Corp. Ltd. (115,000 Santana cars), Nanjing Automotive Works, Beijing Jeep Co., Tianjin Mini Vehicle Plant, Beijing Light Vehicle Co. Ltd, Tianjin Automobile Plant. The above mentioned 8 manufacturers account for about 60% of the total vehicle production in terms of volume and much more in terms of value in China.

The number of parts, components and engine manufacturers exceeds 2,000 at present.

As regards motor vehicle safety, Ministry of Machinery Industry (MMI) has the overall responsibility for the control of safety performances of motor vehicle under production at present and the compliance of new domestically manufactured vehicles and components with the relevant safety standards. It is assisted by research and test centres, in particular China Automotive Technology and Research Centre (CATARC), which carry out the testing and inspecting of automotive products, examination of the quality assurance system and supervision of product quality, as well as the formulation of the safety standards. State Administration of Import and Export Commodity Inspection (SACI) is responsible for checking imported vehicles for compliance with the standards. The compliance test can be conducted in test laboratories of foreign manufacturers or by Chinese laboratories authorized by SACI (one of such laboratories is located at China Automotive Technology and Research Centre, and uses facilities established under the above mentioned CPR/91/383 project). Ministry of Public Security (MPS) is in charge of the initial (preregistration), annual periodical and road side motor vehicle inspections which should also include checks with regard to safety. Vehicles which have failed to meet the requirements of the standards in force must not be allowed to be used. The Ministry of Public Security through its Traffic Management Bureau collects statistics on accidents.

B. PROJECT JUSTIFICATION

1. Problems to be addressed; the present situation

As a direct follow-up to its commitment at the Rio Conference, June 1992, the Chinese Government has drawn up a programme covering the country's overall development into the 21st century. The programme, Agenda 21 White Paper, concentrates on solving the pressing problems in the areas of population, natural resources, environment and development, and specifically calls for China to control industrial pollution by the year 2000, to ensure a better environment for the 1.3 billion population expected by then.

China's Agenda 21 which gives priority to the introduction of modern science and technology to improve productivity and economic growth, while at the same time ensuring a more efficient use of natural resources as well as increased protection of the national and global environment, will be implemented as an important part in the plan for the ninth five-year period (1996-2000) and until the year 2010.

In the course of elaborating the approach towards implementation of China's Agenda 21, sixty-two project proposals had been identified as addressing urgent priority issues and were selected for close review during a High-Level Round Table Conference on Agenda 21, Beijing, 7-8 July 1994 with the purpose to secure external assistance both financial and technical for their implementation. Various UN agencies, including UNDP and UNIDO, as well as representatives of foreign governments, international financial institutions, NGOs, private companies and more than 200 senior government officials participated.

This project on automotive safety is amongst the priority projects selected for cooperation between China and UNIDO and is based on programme areas 12A, 12B, 12C, 12D, 12E and 13B of China's Agenda 21, and related to programme areas 18A and 18C. The government of China has requested UNIDO to provide assistance in:

- the establishment of a full-scale vehicle crash (collision) laboratory;
- the establishment of a full capacity, both in terms of personnel and equipment, to carry out R&D works on the application of anti-blocking systems (ABS) for both hydraulic brake system and air brake system, and the development of ABS for selected vehicle types.

Regarding the automotive safety, China is at the initial stage of its control. For many years, this problem was not given enough attention. Because of lack of testing technologies, and due to the low technical level of manufacturers, safety requirements were in practice not enforced. There were, for instance, no mandatory

standards for passenger protection in vehicles. Because of this, few improvements could be made in the technical level of vehicles made in China. There was also no way to carry out all the relevant tests for imported vehicles. The situation has started to improve since the beginning of the 1990s.

As regards passive safety, two kinds of tests, static and dynamic, are carried out for testing components and accessories. The dynamic test can be either full-scale vehicle crash testing for the comprehensive evaluation of the safety performance of the complete vehicle or simulation crash testing. A simulation crash testing laboratory has been established at China Automotive Technology and Research Centre (CATARC) within the framework of the above mentioned UNDP/Government cost-sharing co-financed project DG/CPR/91/383. A simulation crash test stand has been also set up in Automobile Research Institute (State Key Laboratory of Automobile Safety and Energy Conservation) at Tsinghua University. Under the same project static testing facilities for headrests, seat belts and seats have been installed. A number of dummies have been obtained from the USA and the Netherlands. The detailed list of available equipment/ facilities is given in Annex 1. The establishment of these facilities has been made it possible to formulate and enforce the relevant requirements.

The following mandatory passive safety standards have been already put into force:

- for seat system (set with reference to Directive 74/408/EEC);
- for safety belt assembly (reference to ECE Regulation 16);
- for safety belt anchorages (reference to ECE Regulation 14);
- for head restraints (reference to Directive 78/932/EEC, ECE Regulation 25 and Motor Vehicle Safety Regulation of Japan No. 24-4);
- for door locks and door hinges (reference to Directive 70/387/EEC);
- for lateral and underrun protective devices (reference to Directive 70/221/EEC).

Tests of many passive safety components/accessories pursuant to the above standards have been already made and recommendations for the improvement in the safety performances to enable them to satisfy the requirements worked out. The list of tested items includes:

- 70 safety belt types, e.g. manufactured by Tianjin Yizong Safety Belt Factory, Beijing TaiDu Automotive Safety Components Company, No. 602 Research Institute;
- safety belt anchorages of 10 vehicles, e.g. manufactured by Tianjin Mini-car Factory, Tianjin Huali Automobile Factory, Quinchuan Mechanical Works;
- 20 seats, e.g. manufactured by ChengDu Blue Sky Seat Factory, FAW-VW Seat Factory, Xingtai Seat Factory, Changzhou Seat Factory;
- door locks, more than 15 products among others produced by

Zhejiang WanMall Automotive Door Locks Factory.

The following passive safety standards have been formulated or are in the process of formulation, and will enter into force in the near future:

- for protection of the driver against the steering mechanism in the event of impact (reference to Directive 74/297/EEC);
- for safety glass (reference to ECE Regulation 43);
- for internal and external protrusions (reference to Directive 76/532/EEC and 74/483/EEC).

A considerable progress has been also made in the area of active safety where 9 mandatory standards have already entered into force and some 30 have been formulated or are in the process of formulation, and are expected to be put into force by 1997. The list of these standards includes, among others, standards for:

- steering system,
- braking system,
- tyres,
- several kinds of lamps.

In view of the rapid growth in the vehicle population and their use, measures already taken up are not considered to be sufficient to improve the safety of vehicle occupants and pedestrians to the desirable level. They are also not sufficient to ensure that vehicles manufactured in China as well as parts and accessories reach foreign standards and regulations concerning safety. This will affect the development of exports and will become a major constraint to penetration into international markets. The assimilation and introduction of the latest technologies, e.g. improved impact-absorbing performance of the passenger motor vehicle as a whole, including the construction of vehicle body, airbags, improved safety belts, anti-blocking systems, improved steering columns etc., is crucial to solve all the above problems as is the rapid improvement in domestic research, design and product development capabilities.

China's authorities concerned, particularly Ministry of Machinery Industry (MMI) as well as the country's car manufacturers recognize that a full-scale crash laboratory is required in order to be in a position to cope with the rapidly increasing complexity of traffic and vehicle technology and to gain additional/required knowledge about automotive passive safety. Experience to gain through such a facility, will also facilitate the country's efforts to carry out a more comprehensive development and application of main auto safety technologies.

Full-scale collision tests are the most basic and efficient method to comprehensively assess vehicle's crash safety performances as they are most similar to the real traffic accidents. They are also a basis of sled simulation tests and computer simulation research. Although they are more expensive and time consuming, they can not

be replaced. Full-scale collision tests are regarded as absolutely necessary means in the development process of modern, high performance, high reliability and low price vehicles. Experience of several countries, e.g. Japan, the USA and European Union has proved that improvements in safety performances introduced as a result of collision tests considerably contribute to the reduction of traffic accident fatalities and injuries expressed, for instance, as the injury or death rate per 10,000 vehicles in operation. A preliminary programme for conducting full-scale vehicle crash test will be prepared in the framework of the project CPR/91/383.

Some limited works on ABS have been conducted in Automobile Research Institute at Tsinghua University for 5 years. Electronic control units for ABS has been developed, installed on some cars and tested. Diagnostic box has been also developed. Much attention has been paid to the problem of matching ABS and brake system. Main constraints in the conducted works are shortage of sophisticated facilities and expertise. The establishment of own capacity for developing ABS for domestically manufactured vehicles are regarded by China's authorities concerned as an extremely important and urgent task.

The establishment of test facilities for full-scale collision and ABS will make it possible to put into force relevant standards/regulations, and to introduce compliance checks of motor vehicle under production.

2. Expected end-of-project situation

By the end of the project, the following situation is expected.

a) A full-scale vehicle crash laboratory will be established. Equipment will be procured and installed, and the laboratory staff trained in testing technologies. The established laboratory will have the following tasks:

- to comprehensively assess crash safety performances of both domestically manufactured and imported vehicles;
- to carry out safety approval tests of vehicles;
- to carry out sophisticated R&D works in the area of automotive safety;
- to develop/participate in the development process of high quality automotive products.

b) Recommendations for the improvement of collision safety performances of selected vehicle types will be prepared. For this purpose, research programmes will be initiated, selected Chinese vehicles will be tested with regard to their crash safety performances and their weak points identified. The worked out recommendations will be a basis for further development works, conducted beyond the end of the project, to meet international requirements in the area of vehicle safety performances.

c) Full capacity required for research and testing in the area of ABS will be established. A test track will be constructed, adequate testing equipment installed, and the number of scientists and technical personnel required for research trained.

d) Functional models of anti-lock systems for selected vehicles (see section B4) will be developed in the framework of the project. They will be tested and recommendations for their improvement will be prepared. Moreover, services to the industry in the area of anti-lock systems will be identified which will make it possible to initiate development works on the basis of contracts (outside the scope of the project).

3. Target beneficiaries

The group of immediate beneficiaries will include Ministry of Machinery Industry (MMI), R&D institutions under or cooperating with MMI, e.g. CATARC and Tsinghua University, and vehicle manufacturers, in particular Dongfeng Motor Co., Heavy Duty Automotive Group Co., and light duty vehicle manufacturers, as well as companies that already produce or will produce such components and accessories as safety belts, seats, head restraints, steering systems, air bags as well as brake parts and brake systems. Their R&D base will be considerably developed/strengthened and they will be provided with the relevant expertise, training and know-how required to improve their products. Furthermore, recommendations for the improvement of passive safety performances of cars made in China will be prepared and the functional models of ABS for selected trucks developed.

The ultimate beneficiaries will be the population of China, pedestrians and vehicle occupants.

4. Project strategy and institutional arrangements.

The project will be managed by Ministry of Machinery Industry (MMI).

China Automotive Technology and Research Centre (CATARC) will host the establishment and operation of the full-scale collision test laboratory. A building for the laboratory will be constructed by CATARC. A preliminary design for the building has been prepared.

The building site for this purpose is possessed by CATARC. The design will be finalized with assistance of Chief Technical Adviser. The completion of sufficient engineering work on the construction of the building will be a prerequisite for the release of UNIDO funds for equipment (see chapter G). CATARC will conduct investigation and detailed preparatory work on the design and research programme for the full scale collision test laboratory. They will also prepare a proposal on the equipment to be purchased and its specifications. The established laboratory should be capable, in the first place, to run tests on the protection of the

vehicle occupants in the event of a frontal collision and tests on the protection of the vehicle occupants in the event of a lateral (side) collision.

As regards the frontal collision test, two main test procedures are currently used over the world. The first one has been developed in the USA and is specified in Federal Motor Vehicle Safety Standard (FMVSS) 208. It has been also adopted, among others, in Japan and Australia. In this procedure, the vehicle is propelled against a perpendicular rigid barrier at a speed of 30 mph. The other method has been developed in Europe and is specified in ECE Draft Regulation "Uniform provisions concerning the approval of vehicles with regard to the protection of the occupants in the event of a frontal collision" (document TRANS/SC.1/WP29/R.638). In this method, a 30° angle barrier with antislid devices is used: The test speed is 50 km/h. The barrier consists of a block of reinforced concrete not less than 3 m wide in front and not less than 1.5 m high. The orientation of the angle of 30° should be such that the first contact of the vehicle with the barrier is on the steering column side. A dummy corresponding to the specifications for fiftieth percentile Hybrid III is used.

As regards the lateral collision, two test procedures are also used in the world: the US procedure specified in FMVSS 214 and the European one specified in ECE Draft Regulation "Uniform provisions concerning the approval of vehicles with regard to the protection of the occupants in the event of a lateral collision" (document TRANS/SC.1/WP29/R.640). In the US test procedure, an angled moving barrier, travelling in a crab-like manner, is propelled into a precisely defined point of impact on the driver's side of a stationery vehicle at an angle of 27° and at a speed of 33.5 mph. The mass (1368 kg) and dimensions of the deformable moving barrier correlate with vehicle data for typical US vehicles. The test body on the front of the barrier consists of an aluminium honeycomb structure with a defined front structural stiffness including the bumper profile of a comparison vehicle. The test vehicle is equipped with two special test dummies (Side Impact Dummy -SID): on the driver's seat and on the near side rear seat. The European procedure differs for the US one, in particular with respect to test configuration and dummy instrumentation. A deformable barrier is propelled against the driver's side of the stationery vehicle at a speed of 50 km/h. The total barrier mass is 950 kg. The deformable test device mounted on the front of the barrier consists of six deformable elements of differing stiffness. The test vehicle is equipped with only one EUROSID dummy on the driver's seat. This dummy has a significantly different design compared to the US one which results, among others, from different evaluation injury criteria for occupant protection.

The first stage of the full scale vehicle collision laboratory design will be the selection of procedures most suitable for

Chinese conditions. For this purpose, such technical factors as vehicle data for typical Chinese vehicles, dummy representativeness, traffic environment etc. will be considered based on the available data. Furthermore, the vehicle control system (type approval/certification, conformity of production verification etc.) considered for adoption in China as well as procedures in force in countries to/from which China intends to develop vehicle export/import may also be factors. The above will be discussed with Chief Technical Adviser and international consultants, and the laboratory design will be finalized based on their comments and recommendations. Altogether 8 Chinese engineers will be trained in renowned test/development centres abroad, e.g. in the Netherlands, Japan, USA and France on collision test technologies and collision computer simulation. Two international consultants will be fielded under the project: the first in split missions at its beginning to assist in finalizing the design and in the middle to assist in solving problems that may be encountered, and the second in the final phase of construction, after the installation of the equipment and putting it into operation, to evaluate the laboratory, assist in on-the-job training, including various test runs, and in demonstration tests as well as in finalizing procedures for testing.

The second element of this project output will be to assist Traffic Management Bureau (TMB) of the Ministry of Public Security to upgrade the traffic accident investigation and analysis system. For this purpose, two international consultants will be fielded at TMB. They will preferably come from countries applying different systems, for instance from the USA and Japan, to enable the Chinese counterpart to analyze and compare advantages and defects of these systems. Four Chinese scientists/engineers will be trained abroad, for instance in Canada, Germany or USA (two fellows to each host countries) in the area of traffic accident investigation and analysis. Furthermore, the Chinese counterpart will conduct development works on a system most suitable for Chinese conditions and situation. Once the upgraded system has been established, TMB will collect statistics on the number of deaths, injuries and damage in traffic accidents, their breakdown by modes e.g. vehicle occupants, pedestrians; different vehicle categories: motorcycles, cars, trucks etc; accidents involving young and the elderly; accidents during nighttime etc. This information/statistics will be used in the process of formulating and revising safety standards as well as formulating research programmes, including those for full-scale collision tests. Furthermore, the ultimate impact of the improvement in vehicle and components safety performances will be measured by whether the rate of accidents, injuries and fatalities caused by some factors, e.g. poor quality of safety belts, construction of vehicle body, braking system etc. declines over time as reflected by statistics.

CATARC will also be the focal point for the preparation of recommendations for the improvement of passive safety performances

of selected light duty vehicles manufactured in China. 5 vehicle types will be selected and tested in the framework of the project. Manufacturers of these vehicles will be actively cooperated with CATARC (provision of test vehicles, participation in tests, identification of weak points, preparation of recommendations for improvement of vehicles). Comprehensive research programmes for each vehicle type will be prepared by CATARC in close cooperation with respective vehicle manufacturers and with assistance of the Chief Technical Adviser and an international consultant. Further works will be autonomously conducted by the Chinese counterpart team. They will include the testing of selected vehicles in the established laboratory in accordance with the finalized test procedures and the preparation of the above mentioned recommendations. Beyond the end of the project, works on the improvement of safety performances will be conducted by the vehicle manufacturers with assistance of CATARC based on the prepared recommendations with the ultimate goal of satisfying the requirements specified in the relevant international standards. It is also expected that CATARC will conduct safety performance tests of non-selected vehicle types on the basis of contracts with respective vehicle manufacturers.

Automobile Research Institute of Tsinghua University will be the focal point for activities for two outputs (see Section D) related to ABS. CATARC will cooperate in the area of testing vehicles fitted with anti-lock systems pursuant to international standards.

For output 3, five international consultants from, for instance, Germany, Japan, the USA and Austria will be fielded to advise the Chinese counterpart on such aspects as design, manufacturing techniques, application, testing technologies and equipment, software development, standards and regulations and diagnosing of ABS for both hydraulic brake systems and air brake systems. 12 Chinese scientists/engineers will receive training abroad in such countries as Germany, Japan and USA to complement with practical training the theoretical know-how to be acquired from the international consultants. 7 fellows will come from Tsinghua University (2 persons for 6 months each and 5 persons for 2 months each) and 5 (for 2 months each) from CATARC and the automotive industry: Dongfeng Motor Co. and Heavy Duty Automotive Group Co. Research facilities for ABS in Tsinghua University will be strengthened. Specifications for the required equipment will be prepared based on the preliminary specifications provided by the Project Authorities (Annex 5). The specialized equipment items will be purchased, installed and put into operation with assistance of international consultants. A test track (ground) to test vehicles equipped with anti-lock systems will be designed. It will meet conditions specified in international standards/regulations. References for the design of such a track may be the requirements specified, for instance, in ECE Regulation 13 and in Japanese "Technical standard for anti-lock brake system (Circular of Chigi No. 182 of 1990) and TRIAS 45 - 1990 "Anti-lock brake system test

procedure". This track will include, among others, sections with low adhesion (friction) surface and high adhesion surface to make it possible to conduct such special tests of vehicles fitted with ABS as tests of energy consumption, braking efficiency assurance, lock avoidance performance, performance in the event of a drop in road surface adhesion coefficient, performance in the event of a rise in road surface adhesion coefficient and performance on road surface having non-uniform adhesion coefficient. The design of the track will be finalized with assistance of Chief Technical Adviser and international consultants. This track will be constructed at CATARC or Tsinghua University. The final decision will be taken by the Project Authorities in the course of the project. A group study tour will be arranged to make it possible for the Chinese officials to acquaint themselves with the development trend in the area of ABS and to establish contacts and cooperation with foreign manufacturers of ABS, and to identify potential suppliers of know-how and components.

As regards the output 4, comprehensive research programmes according to priorities, including those associated with the market situation in China, will be prepared. Functional models of ABS for two selected motor vehicle types will be developed with assistance of foreign consultants and tested. These models will be further developed/improved in the framework of autonomous works beyond the end of the project with a view to introducing on selected vehicles anti-lock systems meeting international requirements (e.g. ECE Regulation 13 or FMVSS 135). It is assumed that foreign partners, most of them leading vehicle manufacturers, may provide required technologies for vehicles manufactured under joint ventures/licence agreements. That is why emphasis in the research programmes will be placed on the development of ABS for original Chinese vehicles. Ministry of Machinery Industry has tentatively proposed that the above mentioned functional models should be developed for medium duty trucks manufactured by Dongfeng Motor Co. and heavy duty trucks manufactured by Heavy Duty Automotive Group Co. For other vehicles works will be conducted outside the context of the project. Dongfeng Motor Co. and Heavy Duty Automotive Group Co. in their capacity as vehicle manufacturers, will closely cooperate with Tsinghua University in the development. They will provide vehicles, participate in the design and execution of components as well as final tests. Furthermore, services to other vehicle and component manufacturers will be identified. It is expected that development works on ABS for those vehicles will be undertaken outside the scope of the project on the basis of contracts with respective manufacturers.

The following order of priority for outputs to be delivered under the project (see Chapter D below) has been fixed by the implementing agency (MMI):

- i) output 1 - establishment of full-scale vehicle collision test laboratory;
- ii) output 2 - preparation of recommendations for improvement of

- vehicle passive safety performances;
- iii) output 3 - establishment of full capacity, both in terms of personnel and equipment, to carry out research on the application of ABS for hydraulic brake systems and air brake systems;
 - iv) output 4 - development of functional models of ABS for two selected vehicle types.

As basis for outlining the details herein elaborated served the project outline 4.4 of China's Agenda 21 Document. Further valuable information was collected and accordingly elaborated during discussion with representatives of the authorities concerned.

Institutional arrangements for the project are shown in Annex 6.

5. Reasons for assistance from UNIDO

The motor road traffic safety is a rapidly emerging field of concern in which the government of China is anxious to make substantive progress. It has been identified as one of priority areas for China's Agenda 21. In terms of UNIDO priorities, the reduction of fatalities, injuries and economic losses caused by road traffic accidents is clearly intimately related to human development in both specific and overall terms, and is identified as a key activity area. In this area, the testing technologies as well as product development technologies are very complex, therefore the required know-how is difficult to procure purely through commercial channels.

UNIDO comparative advantages in respect of this project are their capability to mobilize technical and organizational expertise at a global level, to provide access for Chinese experts to institutes/companies which possess the required know-how and can provide customized training programme in the area of both automotive passive and active safety. The requested assistance has a very complex, interrelated character and as such may be difficult to be provided by any other organizations. Furthermore, UNIDO is a cooperating agency in the project CPR/91/383 and as such is familiar with automotive sector problems, in particular with automotive safety problems in China.

6. Special considerations

The project directly addresses the rapid increase in injuries, fatalities and economic losses through traffic accidents as a result of inadequate quality of vehicles as a whole and selected components both passive and active ones in terms of safety. Consequently, it will help manufacturers to improve the quality of their products up to required standards.

7. Coordination arrangements

The overall coordination will rest with the Administrative Centre for China's Agenda 21. Division of Science and Technology of Ministry of Machinery Industry will be managing the project (see section B.4 above).

The National Project Director (NPD) will be appointed to work full-time on the project. His main tasks will be:

- coordination of the Chinese inputs and their interaction with UNIDO inputs;
- monitoring the progress of individual project activities;
- preparation of progress reports, in cooperation with Chief Technical Adviser;
- assembly of the Chinese counterpart team;
- making arrangements for study tours, fellowships and fielding of international consultants.

To ensure better coordination of internationally provided input delivery and its interaction with Chinese inputs, a Chief Technical Adviser (CTA) is envisaged to act as project manager of the international inputs with split missions to the country (4 m/m within 4 years). Further, he will provide advice on global issues/aspects of the implementation, for adherence to workplan and smooth conduct of project activities. Together with the National Project Director, the Chief Technical Adviser will prepare regular progress reports, as required. He will also provide Project Authorities with advice on such detailed aspects of the project as laboratory design, training priorities, preparation of equipment specifications and selection of equipment, research programmes etc.

Coordination arrangements are shown in the diagramme in Annex 6.

8. Counterpart support capacity

Ministry of Machinery Industry is a ministry level body under the supervision of the State Council. It is fully committed to support all institutes/ centres/companies involved in the project. The description of the main focal points for individual outputs of the project: CATARC and Tsinghua University is given in Annex 1. They are considered to have the sufficient technical and administrative personnel, both in terms of numbers and qualifications, as well as sufficient experience acquired in the framework of past and current R&D projects and tasks to fulfil the objectives of this project.

C. DEVELOPMENT OBJECTIVE

The development objective of this project is to improve the safety of vehicle occupants and pedestrians. It directly addresses the rapid increase in injuries, fatalities and economic losses caused by the road traffic accidents as a result of inadequate quality of

vehicles and vehicle components, affecting both passive and active safety.

D. IMMEDIATE OBJECTIVES, OUTPUTS AND ACTIVITIES

The detailed work plan specifying the timeframe and team responsibilities is given in Annex 2.

Activities marked * will be financed entirely or in predominant part from UNIDO funds and unmarked activities from other sources (Government funds, funds provided by local institutions/centre/companies participating in the project, soft loans etc.).

Immediate objective

Upgrading of testing technologies both for the vehicle as a whole and for selected vehicle components, affecting both passive and active safety to improve (to lay foundations for improving) safety performances of vehicles in general and of selected components in particular; initiation of R&D works for improvement.

General activities to establish the project; reporting

- 0.1. Appointment of the National Project Director (NPD).
- 0.2. * Fielding of the Chief Technical Adviser (CTA).
- 0.3. Establishment of administrative services for the project.
- 0.4. Assembly of the Chinese counterpart team.
- 0.5. * Progress reports.

Output 1

An established (built and installed) full-scale vehicle collision test laboratory.

Activities for output 1

- 1.1. Construction of an accommodation for the laboratory (finalization of the design of the building, engineering works etc.).
- 1.2. * Fielding of an international consultant in the design of full-scale vehicle collision test laboratory (11-51).
- 1.3. * Training of 6 engineers in collision test technology (in 3 different countries, two fellows to each country) (31-01, 31-02, 31-03, 31-04, 31-05, 31-06).
- 1.4. * Fielding of 2 international consultants in traffic accident investigation and analysis system (11-52, 11-53).
- 1.5. * Training of 4 scientists/engineers in traffic accident investigation and analysis (31-07, 31-08, 31-09, 31-10).

- 1.6. Detailed preparatory works on the design of the laboratory.
- 1.7. * Finalization of the design with assistance of international consultants, including CTA.
- 1.8. * Preparation of equipment specifications, final selection and procurement of the equipment.
- 1.9. Construction of the barrier, platform etc.
- 1.10. Installation of the new equipment and adjustment/calibration of the existing equipment and instruments
- 1.11. * Fielding of an international consultant in collision test procedures (11-54).
- 1.12. * Training of 2 engineers in collision computer simulation (31-11,31-12).
- 1.13. Demonstration tests. Finalization of test procedures.

Output 2.

Recommendations for the improvement of collision safety performances of selected light duty vehicle types worked out on the basis of full-scale collision tests.

Activities for output 2.

- 2.1. Selection of vehicles for testing.
- 2.2. * Elaboration of research programmes.
- 2.3. Tests of selected light duty vehicles in accordance with the finalized test procedures.
- 2.4. Preparation of detailed recommendations for required modifications in order to improve safety performances of tested vehicles and their components, and to meet relevant requirements.

Output 3.

A full capacity established, both in terms of personnel and equipment, to carry out R&D on the application of ABS to vehicles with both hydraulic and air brake systems;

Activities for output 3.

- 3.1. * Fielding of an international consultant in ABS design and development (11-55).
- 3.2. * Fielding of an international consultant in ABS for hydraulic brake systems (11-56).
- 3.3. * Training of 4 engineers in ABS design and development for air brake systems (31-13, 31-14, 31-15, 31-16).
- 3.4. * Training of 3 engineers in ABS design and development for hydraulic brake systems (31-17, 31-18, 31-19).
- 3.5. * Fielding of an international consultant in braking standards/regulations (11-57).
- 3.6. * Training of 3 engineers in testing vehicles equipped with ABS (31-20, 31-21, 31-22).

- 3.7. * Fielding of an international consultant in testing facilities for ABS (11-58).
- 3.8. * Group study tour.
- 3.9. * Preparation of equipment specifications, selection and procurement of equipment.
- 3.10. Design and construction of the test track.
- 3.11. Installation of new equipment; adjustment/calibration of existing equipment and instruments.
- 3.12. * Fielding of an international consultant in computer simulation for ABS (11-59).
- 3.13. * Training of 2 engineers in ABS computer simulation (31-23, 31-24).

Output 4.

Functional models of ABS for two vehicle types developed.

- 4.1. * Elaboration of comprehensive research programmes.
- 4.2. Developing the functional model of ABS for medium duty trucks.
- 4.3. Developing the functional model of ABS for heavy duty trucks.
- 4.4. Tests of medium duty trucks and recommendations for further development of ABS.
- 4.5. Tests of heavy duty trucks and recommendations for further development of ABS.

E. INPUTS

1. Government inputs

(To be prepared by Project Authorities)

2. UNIDO inputs

International staff

Post	Title	Total m/m	Required date
11-01	Chief Technical Adviser	4	1st month
11-51	Consultant in the design of full-scale vehicle collision test laboratory	2	3rd quarter
11-52	Consultant in traffic accident investigation and analysis system (No.1)	1	4th quarter
11-53	Consultant in traffic accident investigation and		

	analysis system (No. 2)	1	5th quarter
11-54	Consultant in collision test procedures	1	7th quarter
11-55	Consultant in ABS design and development	4	2nd quarter
11-56	Consultant in ABS for hydraulic brake systems	1	2nd quarter
11-57	Consultant in braking standards/regulations	1	4th quarter
11-58	Consultant in testing facilities for ABS	1	4th quarter
11-59	Consultant in computer simulation for ABS	1	7th quarter

Job Descriptions are given in Annex 3.

Training

- 31-01 Individual fellowships for total 68 m/m.
 (The full list of fellowships, indicating for each the
 31-24 subject and duration, is given in Annex 4)
- 32-01 Study tour for total 6 m/m.
 (The description, indicating the subject, duration,
 participants and countries, is given in Annex 4).

Equipment

42-00 Non expandable equipment for total 1,500,000 US\$.

The preliminary list of equipment provided by the Project Authorities is given in Annex 5. The list and cost of this equipment will be investigated further with assistance of Chief Technical Adviser and international consultants. For the determination of the exact requirements, it is necessary to have an inventory of existing equipment. Such an inventory will have to be prepared by the Project Authorities. The above equipment is listed in order of established priority (see section B.4). The items up to a total amount of 1.5 million US\$ will be purchased from funds provided by UNIDO, the remaining items, including all expendable equipment, from other funds (e.g. soft loans).

F. RISKS

Risk factor

Risk level

1. A concerted and coordinated effort involving several different institutions/centres/companies will be required to achieve the objectives of the project as a whole and its individual outputs. There is a risk that the coordination effort will

little

not be achieved. This is partially addressed by the appointment of NPD and placing the project under the overall management Ministry of Machinery Industry - a ministry level body.

2. Strategy will be changed or priorities will be shifted, and the production of vehicles (medium duty trucks or heavy duty trucks) for which ABS is planned to be developed will be discontinued and, as a result, the output 2 will become partially useless after the end of the project. medium

3. The design, development and production base, and experience of R&D centres and manufacturers will not be sufficient to develop/modernize relevant products in spite of intensive training and expertise provided by the project. medium

G. PRIOR OBLIGATIONS AND PREREQUISITES

i) Prior obligations

1. It should be guaranteed that all the non-UNIDO funds required for the project activities as specified in chapter D and Annex 2 will be timely available.

The project document will be signed by UNIDO only if the prior obligation stipulated above has been met to UNIDO's satisfaction.

ii) Prerequisites

1. A National Project Director of suitable seniority, experience and qualifications should be appointed by the Government; required administrative and technical staff should be shifted, if required, from other activities to activities covered by the project.

2. It should be ensured that sufficient staff with appropriate qualifications are available for working with international consultants or to be sent on fellowships abroad, in particular they should have knowledge of foreign language and technical background to maximize advantages of training to be received.

3. The detailed budget covering the Chinese contribution (funds provided by the Government and institutions/centres/companies participating in the project) should be prepared; allotment of funds to all participants specified; sources for soft loans and loans identified and agreements signed.

4. Sufficient work should be completed on establishing (construction/ adaptation) suitable accommodation for laboratories/ facilities to be set up.

5. A detailed inventory of existing equipment in individual Chinese institutes/centres should be prepared.

6. It should be ensured that the equipment not procured from UNIDO funds, but necessarily required for the functioning of the full-scale collision test laboratory, in particular items 5, 6, 8 and 9

of non-expendables listed in Annex 6 as well as expendables will be purchased from other funds.

The project document will be signed by UNIDO, and UNIDO assistance to the project will be provided, subject to UNIDO receiving satisfaction that the prerequisites listed above have been fulfilled or are likely to be fulfilled. When anticipated fulfillment of one or more prerequisites fails to materialise, UNIDO may at its discretion either suspend or terminate its assistance.

H. PROJECT REVIEW, REPORTING AND EVALUATION

The project will be subject to evaluation in accordance with policies and procedures established for this purpose by UNIDO. NPD and CTD will prepare and submit on a regular basis Project Performance Evaluation Reports (PPER).

I. LEGAL CONTEXT

J. BUDGET

See attached Project Budget/Revision sheets.

UNIDO

PROJECT BUDGET/REVISION

PAGE 4

3 COUNTRY China	4 PROJECT NUMBER AND AMENDMENT	5 SPECIFIC ACTIVITY
10 PROJECT TITLE Improvement of Safety for Automotive Products		

15 INTERNATIONAL EXPERTS (functional titles required except for line 11-50)	16 TOTAL		17		18		19		20	
	M/M	\$	M/M	\$	M/M	\$	M/M	\$	M/M	\$
11 01 Chief Technical Adviser	4	60 000	1	15 000	1	15 000	1	15 000	1	15 000
02										
03										
04										
05										
06										
07										
08										
09										
10										
11										
12										
13										
14										
15										
16										
11 50 Short term consultants	13	105 000	7	105 000	6	90 000				
11 99 Sub total international experts		255 000		120 000		105 000		15 000		15 000

25
21 REMARKS

4 PROJECT NUMBER	16. TOTAL		17.		18.		19.		20.	
	M/M	\$	M/M	\$	M/M	\$	M/M	\$	M/M	\$
OPAS EXPERTS (functional titles required)										
12-01										
12-02										
12-03										
12-99 Sub-total OPAS experts **										
ADMINISTRATIVE SUPPORT PERSONNEL										
13-00 Clerks, secretaries, drivers		8 000		2 000		2 000		2 000		2 000
13-50 Freelance interpreters (non-UNDP projects)										
13-99 Sub-total administrative support personnel		8 000		2 000		2 000		2 000		2 000
UN VOLUNTEERS (functional titles required)										
14-01										
14-02										
14-03										
14-99 Sub-total UN VOLUNTEERS **										
15-00 Project travel		7 000		3 000						4 000
16-00 Other personnel costs (including UNIDO staff mission costs)		20 000		5 000		5 000		5 000		5 000
NATIONAL EXPERTS (functional titles required)										
17-01										
17-02										
17-03										
17-04										
17-05										
17-50 Short term Consultants										
17-99 Sub-total National experts **										
18-00 Surrender prior years' obligations										
19-99 TOTAL PERSONNEL COMPONENT		290 000		130 000		112 000		22 000		26 000

* If additional individual budget lines are required, check here and attach continuation sheet 1A. These sub totals must include budget lines listed on page 1A.

4 PROJECT NUMBER	16. TOTAL		17.		18.		19.		20.	
	M/M	\$	M/M	\$	M/M	\$	M/M	\$	M/M	\$
SUBCONTRACTS										
21-00										
21-40										
21-50										
28-00										
29-00										
TRAINING										
31-00	68	680 000	34	340 000	32	320 000	2	20 000		
32-00	6	70 000			6	70 000				
33-00										
34-00										
35-00										
38-00										
39-99		750 000		340 000		390 000		20 000		
EQUIPMENT										
41-00										
42-00		1500 000				1500 000				
43-00										
45-00										
46-00										
47-00										
48-00										
49-99		10 000		2 000		2 000		2 000		4 000
MISCELLANEOUS										
51-00										
55-00										
56-00										
58-00										
59-99		10 000		2 000		2 000		2 000		4 000
99-99		2550 000		172 000		2004 000		44 000		30 000

SHORT DESCRIPTION OF THE FOCAL POINTS FOR INDIVIDUAL OUTPUTS

1. China Automotive Technology and Research Centre (CATARC)

CATARC is a multipurpose technology and research non-profit organization directly governed by the Ministry of Machinery Industry (MMI). Its function is to provide comprehensive, technical services to the whole Chinese automotive industry in the areas of research, development and testing, and to assist the related governmental departments in the areas of automotive product type approval, quality supervising and testing, the formulation of standards, regulations and laws, and technical information. It is independent of enterprises and enterprise groups and, therefore, has a strong impartial position.

CATARC was established in 1985 and currently employs over 500 employees, of whom over 80% are technical personnel. It has a site area of over 70,000 m² and the total building area of nearly 30,000 m². Since its founding, CATARC has done a great deal of work for the development of the Chinese automotive industry in product improvement, project engineering, product quality supervision and testing, standardization and technical information.

CATARC consists of the following main institutes:

- a) Automotive Product Inspecting and Testing Institute;
- b) Automotive Standardization Institute;
- c) Automotive Technical Information Research Institute;
- d) Planning, Design and Research Institute of Automotive Industry, MMI.

The counterpart for the project will be Automotive Product Inspecting and Testing Institute. Its main activities are as follows:

- testing and inspecting of automotive products according to the standards and regulations in force;
- examination of the quality assurance system for automotive plants;
- routine supervision of product quality;
- research and development, among others in the areas of automotive safety, both passive and active.

The Automotive Product Inspecting and Testing Institute employs 100 qualified engineers, of whom more than 30 are involved in

automotive safety activities. The following test facilities for passive safety are available at CATARC:

- a) Simulation crash test equipment to conduct tests in accordance ECE Regulations 16 and 17, FMVSS 207 and JIS 4608:
 - sled simulation crash device (catapult),
 - dummies: TNO-10 (TNO, Holland) and Hybrid II-50% (FTSS, USA),
 - high-speed camera (16mm, 500 frame/sec) (Photo-Sonics, USA),
 - film analysis system (NAC, Japan),
 - acceleration transducers, load cells;
- b) Equipment for safety belt testing in accordance with Chinese Standard GB 14166-93, ECE Regulation 16 and FMVSS 209:
 - material test machines,
 - safety belt retractor emergency locking test device,
 - safety belt retractor retracting force tester,
 - safety belt retractor tilt locking test device,
 - retractor durability test device,
 - retractor dust-resistance test device,
 - buckle durability test device,
 - webbing abrasion tester,
 - burning resistance test device,
 - salt-corrosion test device,
 - environment test chamber (high temperature, low temperature; humidity);
- c) Equipment for safety belt anchorage testing in accordance with Chinese Standard GB 14167-93, ECE Regulation 14 and FMVSS 210:
 - anchorage strength test device,
 - 3-dimensional H-point machine,
 - 3-dimensional measuring equipment;
- d) Equipment for seat testing in accordance with Chinese Standard GB 15083-94, ECE Regulations 17 and 25, and FMVSS 207:
 - static seat strength test device,
 - seat head-rest moment strength test device,
 - seat head-rest impact test device;
- e) Equipment for door locks and hinges testing in accordance with Chinese Standard 15086-94, Directive EEC/70/387 and FMVSS 206:
 - material test machines,
 - door locks longitudinal strength test device,
 - door locks lateral strength test machine,
 - door hinges strength test device.

Tests of many passive safety components/accessories pursuant to the above standards have been already made at CATARC and recommendations for the improvement in the safety performances to enable them to satisfy the requirements worked out. The list of tested items includes:

- 70 safety belt types, e.g. manufactured by Tianjin Yizong Safety Belt Factory, Beijing TaiDu Automotive Safety Components Company, No. 602 Research Institute;
- safety belt anchorages of 10 vehicles, e.g. manufactured by Tianjin Mini-car Factory, Tianjin Huali Automobile Factory, Quinchuan Mechanical Works;

- 20 seats, e.g. manufactured by ChengDu Blue Sky Seat Factory, FAW-VW Seat Factory, Xingtai Seat Factory, Changzhou Seat Factory;
- door locks, more than 15 products among others produced by Zhejiang WanMall Automotive Door Locks Factory.

2. Tsinghua University

Department of Automotive Engineering, Automobile Research Institute and State Key Laboratory of Automobile Safety and Energy Conservation are 3 interrelated units of Tsinghua University involved in the project. They employ 83 employees, of whom 31 with senior professional degrees (professor, associate professor, senior engineer). Automobile Research Institute was established in the late 1980s with financial (6 million RMB) and organizational assistance of the former China National Automotive Industry Corporation (CNAIC). The establishment of State Key Laboratory was approved and supported by State Planning Committee. A loan of 1,13 million US\$ from the World Bank was used to purchase the test equipment. The construction was completed in 1993.

The main tasks of the above units is related to development and promotion of new automotive technologies. Their activity areas include, among others:

- handling, stability and braking performances of high speed vehicles, especially passenger cars (methods of evaluation, methods of predicting, computer simulation, design optimization,
- vehicle dynamic parameters,
- anti-block braking system,
- crash tests, including computer simulation,
- vehicle safety design,
- vehicle vibration analysis,
- vehicle body design, including CAD.

The available test facilities include:

- vehicle handling and stability related parameters measuring stand,
- vehicle simulation crash stand,
- vibration test stand,
- vehicle dynamic parameters measuring stand.

Some limited works on ABS have been conducted for 5 years. Electronic control units for ABS has been developed, installed on some cars and tested. Diagnostic box has been also developed. Much attention has been paid to the problem of matching ABS and brake system.

WORK PLAN

Output/ Activity	Responsibility	1st year				2nd year				3rd year				4th year			
		1 st	2	3	4	5	6	7	8	9	10	11	12	12	14	15	16
Establishment of the project; reporting																	
0.1	PA	*															
0.2	EA	*															
0.3	ND	*															
0.4	ND	*															
0.5	ND, CT				*				*			*					*
Output 1. Collision test laboratory																	
1.1	CR	*	*	*	*	*	*										
1.2	EA, CR			*			*	*									
1.3	EA, CR				*	*											
1.4	EA, TM				*	*											
1.5	EA, TM, MI						*	*									
1.6	CR	*	*	*													
1.7	CT, IC, CR			*													

1.8	EA, CR			*	*	*	*										
1.9	CR					*	*	*									
1.10	CR						*	*	*								
1.11	EA, CR							*									
1.12	CR, CT, IC						*	*									
1.13	CR, IC								*	*							
Output 2. Recommendations for the improvement of safety performances																	
2.1	MI, CR, VM								*								
2.2	CR, IC								*	*							
2.3	CR, VM									*	*	*	*	*	*		
2.4	CR, VM															*	*
Output 3. Capacity to carry out research on ABS																	
3.1	EA, TU		*	*					*								
3.2	EA, TU		*														
3.3	EA, TU		*	*	*												
3.4	EA, TU		*	*	*												
3.5	EA, TU				*												
3.6	EA, TU				*	*											
3.7	EA, TU				*												

3.8	EA, ND					*											
3.9	TU, IC, CT			*	*	*											
3.10	TU or CR			*	*	*											
3.11	TU					*	*										
3.12	EA, TU							*									
3.13	EA, TU								*	*							
Output 4. Functional models of ABS																	
4.1	TU, CT		*		*	*											
4.2	TU, IC, VM					*	*	*	*	*	*	*					
4.3	TU, IC, VM					*	*	*	*	*	*	*					
4.4	TU, VM												*	*	*	*	
4.5	TU, VM												*	*	*	*	

* - 1, 2....16 means a quarter calculated from the start of the project implementation.

Abbreviations:

CR - China Automotive Technology and Research Centre (CATARC);
 CT - Chief Technical Adviser (CTA);
 EA - Executing Agency;
 IC - International Consultant;
 MI - Ministry of Machinery Industry;
 ND - National Project Director;
 PA - Project Authority;

TM - Traffic Management Bureau (Ministry of Public Security);
TU - Tsinghua University;
VM - Vehicle Manufacturer.

JOB DESCRIPTIONS
FOR INTERNATIONAL CONSULTANTS

Chief Technical Adviser - Post 11-01

Short Term Consultants - Post 11-51 through 11-59

UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION
UNIDO

PEOPLE'S REPUBLIC OF CHINA

Improvement of Safety for Automotive Products

Job Description

...../11-01/.....

Post Title: Chief Technical Adviser (CTA) for the project
Duration: 4 months (in split missions within 4 years)
Date required: 1st month (of the project)
Duty station: Beijing, with travels within the country

Purpose of Project: The objective of this project is to assist in improving the safety of vehicle occupants and pedestrians in China. It will lay foundations for the development and assimilation of the latest technology required to address the rapid increase in injuries, fatalities and economic losses caused by the road traffic accidents as a result of inadequate quality of vehicles and vehicle components, affecting both passive and active safety. For this purpose, a full-scale vehicle collision test laboratory and a full capacity, both in terms of personnel and equipment, to carry out research on the development and application of ABS will be established. Recommendations for the improvement of safety performances of selected vehicles/components will be prepared.

Duties: CTA will be expected:
1. to efficiently coordinate the delivery of internationally provided inputs and their interaction with Chinese inputs;
2. to ensure adherence to the workplan and smooth conduct of project activities;
3. to provide Project Authority with advice on detailed issues/aspects of the project implementation, eg. laboratory design, training priorities, selection of equipment, research programmes etc.
4. to prepare, in close cooperation with National

Project Director, regular progress reports.
The split mission will be effected as 2 - 3 weeks travels to the country, in principle once a year during the life of the project (altogether 4 travels) with subsequent home base work.

Qualifications: Senior engineer with extensive knowledge of problems covered by the project, in particular with experience in R&D in the area of automotive safety, collision test technology, ABS application for motor vehicles, safety regulations and standards. Knowledge of Chinese motor industry, road traffic safety problems, regulations etc. will be a bonus.

Language: English

Background information:

As a direct follow-up to its commitment at the Rio Conference, June 1992, the Government of China has drawn up a programme covering the country's overall development into the 21st century. The programme, Agenda 21 White Paper, concentrates on solving the pressing problems in the areas of population, natural resources, environment and development in order to ensure a good quality of life for the 1.3 billion population expected by then. The improvement of road traffic safety is amongst China's priority areas. China has experienced a very rapid vehicle population growth over the latest years. It has already brought with it several serious problems, among others, a rapid increase in the number of injuries and fatalities through accidents with consequent economic and social losses. The number of fatalities per 10,000 vehicles in China ranks among the highest in the world. It is expected that the vehicle population and use will continue to increase rapidly in years to come. The total number of motor vehicles in operation (excluding motorcycles) will grow from 9 million in 1994 to about 18 million in the year 2000 and will reach about 40 million in 2010. It is quite clear that this growth will dramatically deteriorate the situation if preventive measures are not taken. China has already done a lot of work in connection with the human and road factors affecting accidents. Now, emphasis is being placed on vehicle safety performances. The application of the latest safety technology is considered to be necessary to make up for the rapid growth in vehicle population and use in China in a longer term.

UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION
UNIDO

PEOPLE'S REPUBLIC OF CHINA

Improvement of Safety for Automotive Products

Job Description

...../11-51/.....

Post Title: Consultant in the design of full-scale vehicle collision test laboratory

Duration: 2 months (in split missions within 15 months)

Date required: 3rd quarter (of the project)

Duty station: Beijing, with travels within the country

Purpose of Project: The objective of this project is to assist in improving the safety of vehicle occupants and pedestrians in China. It will lay foundations for the development and assimilation of the latest technology required to address the rapid increase in injuries, fatalities and economic losses caused by the road traffic accidents as a result of inadequate quality of vehicles and vehicle components, affecting both passive and active safety. For this purpose, a full-scale vehicle collision test laboratory and a full capacity, both in terms of personnel and equipment, to carry out research on the development and application of ABS will be established. Recommendations for the improvement of safety performances of selected vehicles/components will be prepared.

Duties: The consultant will be assigned to China Automotive Technology and Research Centre (CATARC). His main task will be to advice on and assist in setting up full-scale vehicle collision facilities. For this purpose, he will travel to China to assess the foredesign of the full-scale vehicle collision laboratory and, in close cooperation with the counterpart personnel, to finalize the design, and to assist in the preparation of equipment specifications and selection of the equipment for

the laboratory. In the final phase of the establishment of the laboratory, he will travel again to assist the counterpart personnel in solving problems encountered in the construction of test facilities, installation of equipment etc. as well as elaboration of research programmes.

He is also expected:

- to provide the counterpart personnel with detailed information on matters related to collision tests;
- train the counterpart personnel in the collision test technology by means of lectures, group discussions etc., and advice Project Authority on training possibilities/ priorities.

The consultant will also be expected to prepare a report, setting out the findings of his mission and recommendations to Project Authorities on further actions which might be taken in the above areas.

The split mission will be effected as follows: 2 travels to China for about 2-3 weeks each (the first in the 4th quarter and the other in the 8th quarter) and home base work (preparatory work, report writing etc.).

Qualifications: Senior engineer with extensive knowledge of automotive safety problems, in particular collision test technology, equipment, development trends.

Language: English

Background information: As a direct follow-up to its commitment at the Rio Conference, June 1992, the Government of China has drawn up a programme covering the country's overall development into the 21st century. The programme, Agenda 21 White Paper, concentrates on solving the pressing problems in the areas of population, natural resources, environment and development in order to ensure a good quality of life for the 1.3 million population expected by then. The improvement of road traffic safety is amongst China's priority areas. China has experienced a very rapid vehicle population growth over the latest years. It has already brought with it several serious problems, among others, a rapid increase in the number of injuries and fatalities through accidents with consequent economic and social losses. The number of fatalities per 10,000 vehicles in China ranks among the highest in the world. It is expected that the vehicle population and use will continue to increase rapidly in years

to come. The total number of motor vehicles in operation (excluding motorcycles) will grow from 9 million in 1994 to about 18 million in the year 2000 and will reach about 40 million in 2010. It is quite clear that this growth will dramatically deteriorate the situation if preventive measures are not taken. China has already done a lot of work in connection with the human and road factors affecting accidents. Now, emphasis is being placed on vehicle safety performances. The application of the latest safety technology is considered to be necessary to make up for the rapid growth in vehicle population and use in China in a longer term.

UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION
UNIDO

PEOPLE'S REPUBLIC OF CHINA

Improvement of Safety for Automotive Products

Job Description

...../11-52/.....

Post Title: Consultant in traffic accident investigation and analysis system (No.1)

Duration: 1 month

Date required: 4th quarter (of the project)

Duty station: Beijing, with travels within the country

Purpose of Project:

The objective of this project is to assist in improving the safety of vehicle occupants and pedestrians in China. It will lay foundations for the development and assimilation of the latest technology required to address the rapid increase in injuries, fatalities and economic losses caused by the road traffic accidents as a result of inadequate quality of vehicles and vehicle components, affecting both passive and active safety. For this purpose, a full-scale vehicle collision test laboratory and a full capacity, both in terms of personnel and equipment, to carry out research on the development and application of ABS will be established. Recommendations for the improvement of safety performances of selected vehicles/components will be prepared.

Duties:

The consultant will be assigned to Traffic Management Bureau of the Ministry of Public Security. He will be expected:

- to provide the counterpart personnel with detailed information about the Japanese road traffic accident investigation and analysis system through lectures, group discussions,
- to advice the counterpart personnel on modifications required to improve the efficiency of the system applied in China,
- to advice Project Authority on training

possibilities/ priorities in the above areas. The consultant will also be expected to prepare a report, setting out the findings of his mission and recommendations to Project Authorities on further actions which might be taken in the above areas. The mission will include 2-3 weeks stay in China and home base work (preparatory work, report writing etc.)

Qualifications: Senior engineer with extensive experience of automotive safety problems, in particular of road traffic accidents investigation and analysis. The detailed knowledge of the Japanese system is required.

Language: English

Background information: As a direct follow-up to its commitment at the Rio Conference, June 1992, the Government of China has drawn up a programme covering the country's overall development into the 21st century. The programme, Agenda 21 White Paper, concentrates on solving the pressing problems in the areas of population, natural resources, environment and development in order to ensure a good quality of life for the 1.3 billion population expected by then. The improvement of road traffic safety is amongst China's priority areas. China has experienced a very rapid vehicle population growth over the latest years. It has already brought with it several serious problems, among others, a rapid increase in the number of injuries and fatalities through accidents with consequent economic and social losses. The number of fatalities per 10,000 vehicles in China ranks among the highest in the world. It is expected that the vehicle population and use will continue to increase rapidly in years to come. The total number of motor vehicles in operation (excluding motorcycles) will grow from 9 million in 1994 to about 18 million in the year 2000 and will reach about 40 million in 2010. It is quite clear that this growth will dramatically deteriorate the situation if preventive measures are not taken. China has already done a lot of work in connection with the human and road factors affecting accidents. Now, emphasis is being placed on vehicle safety performances. The application of the latest safety technology is considered to be necessary to make up for the rapid growth in vehicle population and use in China in a longer term.

UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION
UNIDO

PEOPLE'S REPUBLIC OF CHINA

Improvement of Safety for Automotive Products

Job Description

...../11-53/.....

Post Title: Consultant in traffic accident investigation
and analysis system (No. 2)

Duration: 1 month

Date required: 5th quarter (of the project)

Duty station: Beijing, with travels within the country

Purpose of
Project: The objective of this project is to assist in
improving the safety of vehicle occupants and
pedestrians in China. It will lay foundations for
the development and assimilation of the latest
technology required to address the rapid increase
in injuries, fatalities and economic losses caused
by the road traffic accidents as a result of
inadequate quality of vehicles and vehicle
components, affecting both passive and active
safety. For this purpose, a full-scale vehicle
collision test laboratory and a full capacity,
both in terms of personnel and equipment, to carry
out research on the development and application of
ABS will be established. Recommendations for the
improvement of safety performances of selected
vehicles/components will be prepared.

Duties: The consultant will be assigned to Traffic
Management Bureau of the Ministry of Public
Security. He will be expected:
- to provide the counterpart personnel with
detailed information about the American road
traffic accident investigation and analysis system
through lectures, group discussions,
- to advice the counterpart personnel on
modifications required to improve the efficiency of
the system applied in China,
- to advice Project Authority on training

possibilities/ priorities in the above areas. The consultant will also be expected to prepare a report, setting out the findings of his mission and recommendations to Project Authorities on further actions which might be taken in the above areas. The mission will include 2-3 weeks stay in China and home base work (preparatory work, report writing etc.)

Qualifications: Senior engineer with extensive experience of automotive safety problems, in particular of road traffic accidents investigation and analysis. The detailed knowledge of the American system is required.

Language: English

Background information: As a direct follow-up to its commitment at the Rio Conference, June 1992, the Government of China has drawn up a programme covering the country's overall development into the 21st century. The programme, Agenda 21 White Paper, concentrates on solving the pressing problems in the areas of population, natural resources, environment and development in order to ensure a good quality of life for the 1.3 billion population expected by then. The improvement of road traffic safety is amongst China's priority areas. China has experienced a very rapid vehicle population growth over the latest years. It has already brought with it several serious problems, among others, a rapid increase in the number of injuries and fatalities through accidents with consequent economic and social losses. The number of fatalities per 10,000 vehicles in China ranks among the highest in the world. It is expected that the vehicle population and use will continue to increase rapidly in years to come. The total number of motor vehicles in operation (excluding motorcycles) will grow from 9 million in 1994 to about 18 million in the year 2000 and will reach about 40 million in 2010. It is quite clear that this growth will dramatically deteriorate the situation if preventive measures are not taken. China has already done a lot of work in connection with the human and road factors affecting accidents. Now, emphasis is being placed on vehicle safety performances. The application of the latest safety technology is considered to be necessary to make up for the rapid growth in vehicle population and use in China in a longer term.

UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION
UNIDO

PEOPLE'S REPUBLIC OF CHINA

Improvement of Safety for Automotive Products

Job Description

...../11-54/.....

Post Title: Consultant in collision test procedures

Duration: 1 month

Date required: 7th quarter (of the project)

Duty station: Beijing

Purpose of
Project:

The objective of this project is to assist in improving the safety of vehicle occupants and pedestrians in China. It will lay foundations for the development and assimilation of the latest technology required to address the rapid increase in injuries, fatalities and economic losses caused by the road traffic accidents as a result of inadequate quality of vehicles and vehicle components, affecting both passive and active safety. For this purpose, a full-scale vehicle collision test laboratory and a full capacity, both in terms of personnel and equipment, to carry out research on the development and application of ABS will be established. Recommendations for the improvement of safety performances of selected vehicles/components will be prepared.

Duties:

The consultant will be assigned to China Automotive Technology and Research Centre (CATARC). He will be expected:

- to assess collision, both frontal and lateral, test procedures applied at CATARC and, if required, to provide the counterpart personnel with recommendations for their improvements and to assist in the finalization of test procedures;
- to assist in the elaboration of research programmes;
- train the counterpart personnel in the collision

test technology by means of lectures, group discussions etc.

The consultant will also be expected to prepare a report, setting out the findings of his mission and recommendations to Project Authorities on further actions which might be taken in the above areas.

The mission will include 2-3 weeks stay in China and home base work (preparatory work, report writing etc.)

Qualifications: Senior engineer with experience in automotive safety problems, in particular with extensive knowledge of full-scale collision test procedures.

Language: English

Background information:

As a direct follow-up to its commitment at the Rio Conference, June 1992, the Government of China has drawn up a programme covering the country's overall development into the 21st century. The programme, Agenda 21 White Paper, concentrates on solving the pressing problems in the areas of population, natural resources, environment and development in order to ensure a good quality of life for the 1.3 billion population expected by then. The improvement of road traffic safety is amongst China's priority areas. China has experienced a very rapid vehicle population growth over the latest years. It has already brought with it several serious problems, among others, a rapid increase in the number of injuries and fatalities through accidents with consequent economic and social losses. The number of fatalities per 10,000 vehicles in China ranks among the highest in the world. It is expected that the vehicle population and use will continue to increase rapidly in years to come. The total number of motor vehicles in operation (excluding motorcycles) will grow from 9 million in 1994 to about 18 million in the year 2000 and will reach about 40 million in 2010. It is quite clear that this growth will dramatically deteriorate the situation if preventive measures are not taken. China has already done a lot of work in connection with the human and road factors affecting accidents. Now, emphasis is being placed on vehicle safety performances. The application of the latest safety technology is considered to be necessary to make up for the rapid growth in vehicle population and use in China in a longer term.

UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION
UNIDO

PEOPLE'S REPUBLIC OF CHINA

Automotive Emission Control and Regulatory Measures

Job Description

...../11-55/.....

Post Title: Consultant in ABS design and development

Duration: 4 months (in split missions within 18 months)

Date required: 2nd quarter (of the project)

Duty station: Beijing, with travels within the country

Purpose of
Project: The objective of the project is to assist in addressing the growing motor vehicle pollution problems in China. Its aims to upgrade the country's motor vehicle emission control system, in particular to formulate/revise standards for emissions and fuel consumption, and integrated with them specifications for fuel properties, and to devise the enhanced supervision and management system required for the efficient implementation and enforcement of the control. Furthermore, it also aims to create/develop basis for comprehensive R&D works leading to considerable improvement in vehicle pollutant emissions and energy efficiency, to strengthen ongoing R&D activities in the area, to improve the technical level of selected products.

Duties: The consultant will be assigned to Automobile Research Institute of Tsinghua University. His main task will be related to the development of functional models of ABS for medium duty trucks manufactured by Dongfeng Motor Co. and heavy duty trucks manufactured by Heavy Duty Automotive Group Co. The consultant will, in close cooperation with the counterpart personnel, including vehicle manufacturers, analyse the design of these vehicles and prepare the concept of ABS, and the programme

of development works. In the course of the works, he will assist in solving encountered development problems. The consultant will also:

- advise on and assist in the development of testing capabilities and setting up relevant facilities required for R&D in the area of gas vehicles;

- train the counterpart personnel in the above aspects by means of lectures, group discussions etc., and advice Project Authority on training possibilities/ priorities.

The consultant will also be expected to prepare a report, setting out the findings of his mission and recommendations to Project Authorities on further actions which might be taken in the above areas.

The split mission will be effected: 2 stays of a duration of about 1.5 months in China, home base work (about 1.0 months).

Qualifications: Senior engineer with knowledge of automotive safety problems, in particular with extensive experience in ABS design and development.

Language: English

Background information: As a direct follow-up to its commitment at the Rio Conference, June 1992, the Government of China has drawn up a programme covering the country's overall development into the 21st century. The programme, Agenda 21 White Paper, concentrates on solving the pressing problems in the areas of population, natural resources, environment and development and specifically calls for China to control pollution by the year 2000, to ensure a better environment for the 1.3 billion population expected by then. The reduction of motor vehicle emission and energy consumption is amongst China's priority areas. China has experienced a very rapid vehicle population growth over the latest years. It is expected that this growth will continue in years to come or even may be sped up. The total number of motor vehicles in operation (excluding motorcycles) will grow from 9 million in 1994 to 18 million in the year 2000 and will reach about 40 million in 2010. It is quite clear that this dramatic growth will bring with it several serious problems, among them increased pollution, with consequent economic and social losses and an adverse effect on the quality of life, if not addressed in the early stage of development.

UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION
UNIDO

PEOPLE'S REPUBLIC OF CHINA

Improvement of Safety for Automotive Products

Job Description

...../11-56/.....

Post Title: Consultant in ABS for hydraulic brake systems

Duration: 1 month

Date required: 2nd quarter (of the project)

Duty station: Beijing

Purpose of
Project:

The objective of this project is to assist in improving the safety of vehicle occupants and pedestrians in China. It will lay foundations for the development and assimilation of the latest technology required to address the rapid increase in injuries, fatalities and economic losses caused by the road traffic accidents as a result of inadequate quality of vehicles and vehicle components, affecting both passive and active safety. For this purpose, a full-scale vehicle collision test laboratory and a full capacity, both in terms of personnel and equipment, to carry out research on the development and application of ABS will be established. Recommendations for the improvement of safety performances of selected vehicles/components will be prepared.

Duties: The consultant will be assigned to Automobile Research Institute of Tsinghua University. He will be expected:
- to provide detailed information and advice the counterpart personnel on ABS for vehicles equipped with hydraulic brake systems, in particular on such aspects as current situation and development trends, system design and design of individual assemblies, matching problems, manufacturing techniques, improvement of frequency response characteristic, decrease of manufacturing cost,

trouble shooting;

- to advise on the development of testing capabilities and setting up facilities required for R&D in the area of ABS;

- train the counterpart personnel in the above aspects by means of seminars, lectures, group discussions etc. and advice Project Authority on training possibilities/priorities.

The consultant will also be expected to prepare a report, setting out the findings of his mission and recommendations to Project Authorities on further actions which might be taken in the above areas.

The mission will include 2-3 weeks stay in China and home base work (preparatory work, report writing etc.)

Qualifications: Senior engineer with knowledge of automotive safety problems, in particular with extensive experience in ABS design and development.

Language: English

Background information: As a direct follow-up to its commitment at the Rio Conference, June 1992, the Government of China has drawn up a programme covering the country's overall development into the 21st century. The programme, Agenda 21 White Paper, concentrates on solving the pressing problems in the areas of population, natural resources, environment and development in order to ensure a good quality of life for the 1.3 billion population expected by then. The improvement of road traffic safety is amongst China's priority areas. China has experienced a very rapid vehicle population growth over the latest years. It has already brought with it several serious problems, among others, a rapid increase in the number of injuries and fatalities through accidents with consequent economic and social losses. The number of fatalities per 10,000 vehicles in China ranks among the highest in the world. It is expected that the vehicle population and use will continue to increase rapidly in years to come. The total number of motor vehicles in operation (excluding motorcycles) will grow from 9 million in 1994 to about 18 million in the year 2000 and will reach about 40 million in 2010. It is quite clear that this growth will dramatically deteriorate the situation if preventive measures are not taken. China has already done a lot of work in connection with the human and road factors affecting accidents. Now, emphasis is being placed

on vehicle safety performances. The application of the latest safety technology is considered to be necessary to make up for the rapid growth in vehicle population and use in China in a longer term.

UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION
UNIDO

PEOPLE'S REPUBLIC OF CHINA

Improvement of Safety for Automotive Products

Job Description

...../11-57/.....

Post Title: Consultant in braking standards/regulations

Duration: 1 month

Date required: 4th quarter (of the project)

Duty station: Beijing

Purpose of
Project:

The objective of this project is to assist in improving the safety of vehicle occupants and pedestrians in China. It will lay foundations for the development and assimilation of the latest technology required to address the rapid increase in injuries, fatalities and economic losses caused by the road traffic accidents as a result of inadequate quality of vehicles and vehicle components, affecting both passive and active safety. For this purpose, a full-scale vehicle collision test laboratory and a full capacity, both in terms of personnel and equipment, to carry out research on the development and application of ABS will be established. Recommendations for the improvement of safety performances of selected vehicles/components will be prepared.

Duties:

The consultant will be assigned to Automobile Research Institute of Tsinghua University. He will be expected:

- to provide detailed information and advice the counterpart personnel on braking standards/regulations, e.g. ECE Regulation 13 and FMVSS 135, for vehicles fitted with anti-lock systems, in particular on such aspects as current situation and development trends, ABS performance requirements and test procedures for vehicles and trailers, test track requirements, and on effect of ABS on traffic accidents;

- to train the counterpart personnel in the above aspects by means of seminars, lectures, group

discussions etc. and advice Project Authority on training possibilities/priorities. The consultant will also be expected to prepare a report, setting out the findings of his mission and recommendations to Project Authorities on further actions which might be taken in the above areas. The mission will include 2-3 weeks stay in China and home base work (preparatory work, report writing etc.)

Qualifications: Senior engineer with knowledge of automotive safety problems, in particular with extensive experience in motor vehicle safety control, inspecting and testing, including vehicles equipped with ABS.

Language: English

Background information: As a direct follow-up to its commitment at the Rio Conference, June 1992, the Government of China has drawn up a programme covering the country's overall development into the 21st century. The programme, Agenda 21 White Paper, concentrates on solving the pressing problems in the areas of population, natural resources, environment and development in order to ensure a good quality of life for the 1.3 billion population expected by then. The improvement of road traffic safety is amongst China's priority areas. China has experienced a very rapid vehicle population growth over the latest years. It has already brought with it several serious problems, among others, a rapid increase in the number of injuries and fatalities through accidents with consequent economic and social losses. The number of fatalities per 10,000 vehicles in China ranks among the highest in the world. It is expected that the vehicle population and use will continue to increase rapidly in years to come. The total number of motor vehicles in operation (excluding motorcycles) will grow from 9 million in 1994 to about 18 million in the year 2000 and will reach about 40 million in 2010. It is quite clear that this growth will dramatically deteriorate the situation if preventive measures are not taken. China has already done a lot of work in connection with the human and road factors affecting accidents. Now, emphasis is being placed on vehicle safety performances. The application of the latest safety technology is considered to be necessary to make up for the rapid growth in vehicle population and use in China in a longer term.

UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION
UNIDO

PEOPLE'S REPUBLIC OF CHINA

Improvement of Safety for Automotive Products

Job Description

...../11-58/.....

Post Title: Consultant in testing facilities for ABS

Duration: 1 month

Date required: 4th quarter (of the project)

Duty station: Beijing

Purpose of
Project:

The objective of this project is to assist in improving the safety of vehicle occupants and pedestrians in China. It will lay foundations for the development and assimilation of the latest technology required to address the rapid increase in injuries, fatalities and economic losses caused by the road traffic accidents as a result of inadequate quality of vehicles and vehicle components, affecting both passive and active safety. For this purpose, a full-scale vehicle collision test laboratory and a full capacity, both in terms of personnel and equipment, to carry out research on the development and application of ABS will be established. Recommendations for the improvement of safety performances of selected vehicles/components will be prepared.

Duties:

The consultant will be assigned to Automobile Research Institute of Tsinghua University. He will be expected:

- to advice on the development and strengthening of the counterpart's facilities to carry out research on ABS;
- to assist in the preparation of equipment specifications as well as selection of the equipment and instruments for this purpose;
- to train the counterpart personnel in the testing technology by means of seminars, lectures, group discussions etc.;
- advice Project Authority on training possibi-

lities/priorities and cooperation possibilities with advanced foreign institutes/centres and manufacturers in the area of ABS.

The consultant will also be expected to prepare a report, setting out the findings of his mission and recommendations to Project Authorities on further actions which might be taken in the above areas.

The mission will include 2-3 weeks stay in China and home base work (preparatory work, report writing etc.)

Qualifications: Senior engineer with knowledge of automotive safety problems, in particular with extensive experience in ABS design and testing, and testing equipment.

Language: English

Background information: As a direct follow-up to its commitment at the Rio Conference, June 1992, the Government of China has drawn up a programme covering the country's overall development into the 21st century. The programme, Agenda 21 White Paper, concentrates on solving the pressing problems in the areas of population, natural resources, environment and development in order to ensure a good quality of life for the 1.3 billion population expected by then. The improvement of road traffic safety is amongst China's priority areas. China has experienced a very rapid vehicle population growth over the latest years. It has already brought with it several serious problems, among others, a rapid increase in the number of injuries and fatalities through accidents with consequent economic and social losses. The number of fatalities per 10,000 vehicles in China ranks among the highest in the world. It is expected that the vehicle population and use will continue to increase rapidly in years to come. The total number of motor vehicles in operation (excluding motorcycles) will grow from 9 million in 1994 to about 18 million in the year 2000 and will reach about 40 million in 2010. It is quite clear that this growth will dramatically deteriorate the situation if preventive measures are not taken. China has already done a lot of work in connection with the human and road factors affecting accidents. Now, emphasis is being placed on vehicle safety performances. The application of the latest safety technology is considered to be necessary to make up for the rapid growth in vehicle population and use in China in a longer term.

UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION
UNIDO

PEOPLE'S REPUBLIC OF CHINA

Improvement of Safety for Automotive Products

Job Description

...../11-59/.....

Post Title: Consultant in computer simulation for ABS

Duration: 1 month

Date required: 7th quarter (of the project)

Duty station: Beijing

Purpose of
Project:

The objective of this project is to assist in improving the safety of vehicle occupants and pedestrians in China. It will lay foundations for the development and assimilation of the latest technology required to address the rapid increase in injuries, fatalities and economic losses caused by the road traffic accidents as a result of inadequate quality of vehicles and vehicle components, affecting both passive and active safety. For this purpose, a full-scale vehicle collision test laboratory and a full capacity, both in terms of personnel and equipment, to carry out research on the development and application of ABS will be established. Recommendations for the improvement of safety performances of selected vehicles/components will be prepared.

Duties:

The consultant will be assigned to Automobile Research Institute of Tsinghua University. He will be expected:
- to provide the counterpart personnel with detailed information and advise on ABS simulated computation and modelling, in particular such aspects as models of vehicle, tyre, special roads, models of hydraulic and pneumatic brake systems and ABS components e.g. modulator, control logic, stability analysis, simulation of anti-lock braking process on special roads (e.g. ice, snow), selection of control parameters etc.;

- to train the counterpart personnel in the above aspects by means of seminars, lectures, group discussions etc.;

- advice Project Authority on training possibilities/ priorities and cooperation possibilities with advanced foreign institutes/centres and manufacturers in the area of ABS.

The consultant will also be expected to prepare a report, setting out the findings of his mission and recommendations to Project Authorities on further actions which might be taken in the above areas. The mission will include 2-3 weeks stay in China and home base work (preparatory work, report writing etc.)

Qualifications: Senior engineer with knowledge of automotive safety problems, in particular with extensive experience in ABS design and modelling.

Language: English

Background information: As a direct follow-up to its commitment at the Rio Conference, June 1992, the Government of China has drawn up a programme covering the country's overall development into the 21st century. The programme, Agenda 21 White Paper, concentrates on solving the pressing problems in the areas of population, natural resources, environment and development in order to ensure a good quality of life for the 1.3 billion population expected by then. The improvement of road traffic safety is amongst China's priority areas. China has experienced a very rapid vehicle population growth over the latest years. It has already brought with it several serious problems, among others, a rapid increase in the number of injuries and fatalities through accidents with consequent economic and social losses. The number of fatalities per 10,000 vehicles in China ranks among the highest in the world. It is expected that the vehicle population and use will continue to increase rapidly in years to come. The total number of motor vehicles in operation (excluding motorcycles) will grow from 9 million in 1994 to about 18 million in the year 2000 and will reach about 40 million in 2010. It is quite clear that this growth will dramatically deteriorate the situation if preventive measures are not taken. China has already done a lot of work in connection with the human and road factors affecting accidents. Now, emphasis is being placed on vehicle safety performances. The application of

the latest safety technology is considered to be necessary to make up for the rapid growth in vehicle population and use in China in a longer term.

TRAINING PROGRAMME

A. INDIVIDUAL FELLOWSHIPS (BL 31)

31-01, 31-02, 31-03, 31-04, 31-05, 31-06.

Fellowships title: Collision test technology

Training areas: General plan of laboratory; testing equipment; maintenance, service and calibration of the equipment, in particular dummies; test procedures; standards/regulations in force, including the latest ECE Regulations; development trends.

Number of fellows: 6.

Duration: 3 months.

Required date: 4th quarter.

Suggested countries: Japan, Germany, USA, France (3 selected countries; 2 fellows to each country).

31-07, 31-08, 31-09, 31-10.

Fellowship title: Traffic accident investigation and analysis .

Training areas: Comprehensive road traffic accident investigation and analysis applied all over the world; latest trends; data collection and processing; analysis of factors for traffic accidents, their breakdown and classification in "Humans", "Vehicle", "Environment"; relationship between vehicle safety performances and accidents injuries and fatalities; accident reconstruction; investigation documentation; statistical analysis.

Number of fellows: 4 (2 from Traffic Management Bureau in Ministry of Public Security, 2 from Ministry of Machinery Industry and Chinese Automotive Technology and Research Centre).

Duration: 3 months.

Required date: 6th quarter.

Suggested countries: Germany, USA, Canada.

31-11, 31-12.

Fellowship title: Collision computer simulation.

Training areas: Examination of phenomena occurring during collision; modelling of different collision types: vehicle-vehicle, vehicle-pedestrian etc.; lateral collision, frontal collision etc.; software.

Number of fellows: 2.

Duration: 3 months.

Required date: 6th quarter

Suggested countries: Holland, USA.

31-13, 31-14, 31-15, 31-16.

Fellowship title: ABS design and development for air brake systems.

Training areas: ABS design for vehicles equipped with air brake

systems, in particular medium/heave duty trucks and busses; structure design of individual components and assemblies; development trends; matching of ABS and braking system; control methods: individual, modified etc.; material selection and production techniques; failure mode analysis; decrease of manufacturing cost; integration with other vehicle systems; logic systems; use, repair and trouble shooting.

Number of fellows: 4

Duration: 1*6 months, 3*2 months.

Required date: 2nd quarter.

Suggested countries: USA, Japan, Germany, Austria.

31-17, 31-18, 31-19.

Fellowship title: ABS design and development for hydraulic brake systems.

Training areas: ABS design for vehicles equipped with hydraulic brake systems, in particular light duty vehicles; structure design of individual components and assemblies; development trends; matching of ABS and braking system; control methods; material selection and production techniques; decrease of manufacturing cost; use, repair and trouble shooting.

Number of fellows: 3

Duration: 1*6 months, 2*2 months.

Required date: 2nd quarter.

Suggested countries: USA, Japan, Germany, Sweden.

31-20, 31-21, 31-22.

Fellowship title: Testing vehicles equipped with ABS.

Training areas: Braking standards/regulations in force (e.g.ECE Regulation 13, FMVSS 135) and their comparative analysis; development trends; test procedures; testing equipment; maintenance, service and calibration of equipment.

Number of fellows: 3.

Duration: 2 months.

Required date: 4th quarter.

Suggested countries: USA, Germany, France, Holland.

31-23, 31-24.

Fellowship title: ABS computer simulation.

Training areas: Mathematical models of vehicles, tyres, roads; models of hydraulic and air brake systems; model algorithms; selection of control logic and control parameters; signals of wheel speed; calculation of wheel acceleration; software.

Number of fellows: 2.

Duration: 2 months.

Required date: 8th months.

Suggested countries: USA, Germany, Japan.

* Required date calculated from the start of the project implementation

B. STUDY TOURS (BL 32)

32-01. A group study tour to make it possible for the Chinese officials to acquaint themselves with the development trend in the area of ABS and to establish contacts and cooperation with foreign manufacturers of ABS, and to identify potential suppliers of know-how and components.

Number of participants: 6

Suggested participants: MMI, CATARC, Tsinghua University.

Duration: 1 month.

Required date: 1st quarter.

Suggested countries: Japan, USA, Germany, Sweden, Holland, United Kingdom.

EQUIPMENT REQUIREMENTS

A. NON-EXPANDABLE EQUIPMENT

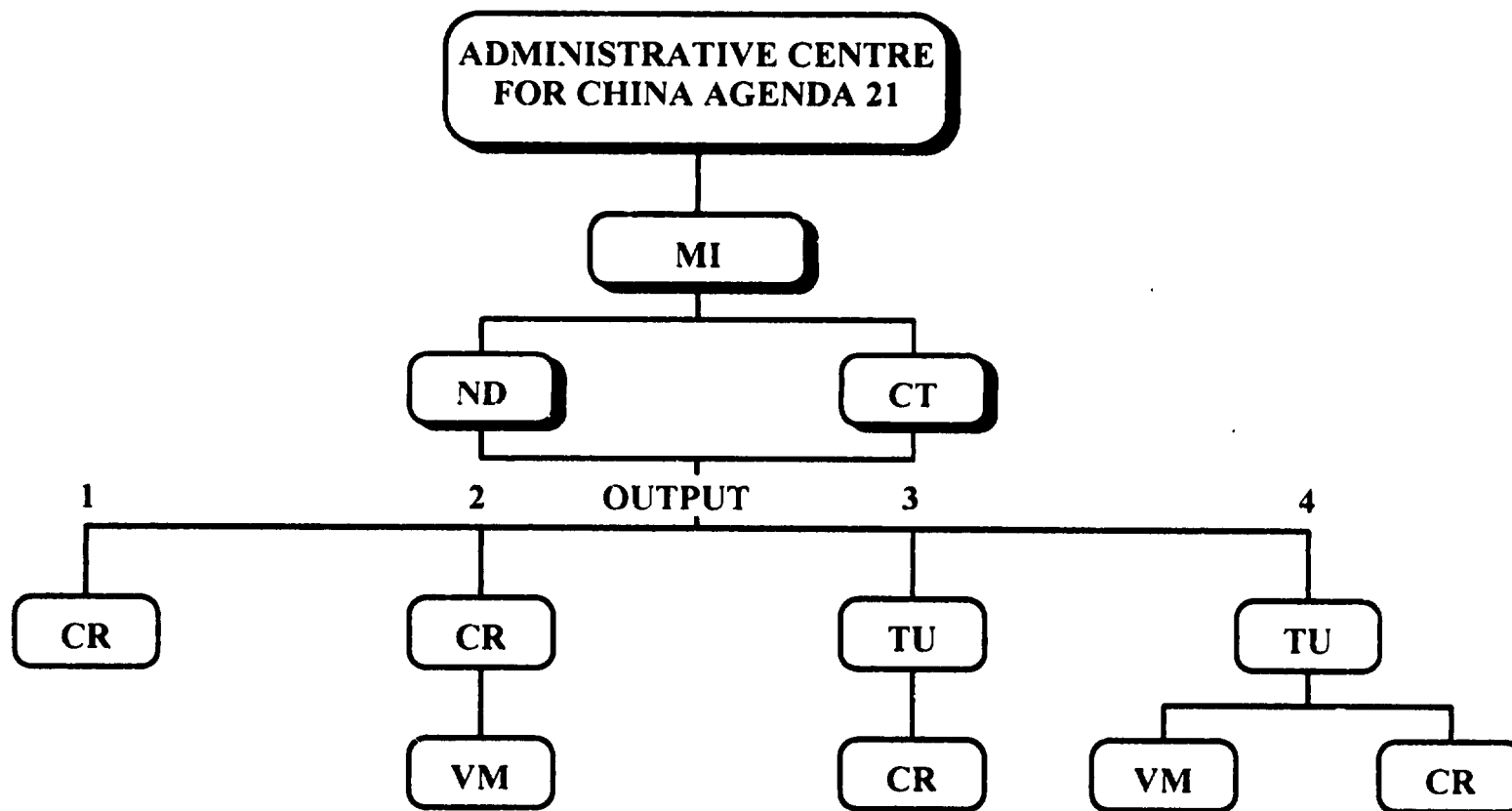
No.	Specification	Quantity	Unit price estimate (US\$)	Total amount (US\$)
Output 1				
1.	Hybrid-III, 50% Dummy	2	75,000	150,000
2.	High-speed camera (over 500 fr./sec)	5	60,000	300,000
3.	Data recorder (over 48 channels)	1	350,000	350,000
4.	Driving unit for full-scale collision tests (high-power DC motors, wires, separating mechanism)	1	700,000	700,000
5.	Dummy calibration system (including dummy calibration device, calibration data acquisition and processing system)	1	300,000	300,000
6.	High-speed video (over 1000 fr./sec)	1	150,000	150,000
7.	Lighting system for high-speed camera	1	50,000	50,000
8.	SID Dummy	2	75,000	150,000

9.	Eurosid-1 Dummy	2	100,000	200,000
Output 3				
10.	Bench for brake and ABS performance testing	1	400,000	400,000
11.	Equipment for ABS modulating system testing	1	10,000	10,000
12.	Computer work station	1	50,000	50,000
13.	Software for ABS simulation	1	50,000	50,000
14.	Measurement device for vehicle handling and stability characteristic (QCW - made in China)	1	10,000	10,000
15.	Portable multi-function computer (MSP III - made in China)	1	6,000	6,000
16.	Display for fifth wheel	1	4,000	4,000
17.	Intellec microcomputer development system - model 95	1	50,000	50,000

B. EXPANDABLE EQUIPMENT

1. Samples of ABS for vehicles equipped with hydraulic brake systems
 - Bendix VI ABS 5 sets
 - Bendix 6 ABS ECU 6 sets
 - Bosch ABS 2U 2 sets
 - Delco Moraine ABS VI 2 sets
 - ITT Teves ABS MKVII 2 sets
 - Kelsay Hayes RABS 2 sets.
2. Samples of ABS for vehicles equipped with air brake system
 - Knorr KB90 ABS 4S/4K 2 sets

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- Knorr KB90 ABS/ASR 4S/4K 2 sets.
 - 3. Light duty vehicles for collision tests.
 - 4. Medium duty truck for ABS development.
 - 5. Heavy duty truck for ABS development.
 - 6. Spare parts; operating materials.



INSTITUTIONAL AND COORDINATION ARRANGEMENTS
(For abbreviations - see Annex 2)