2. EXECUTIVE SUMMARY

The recommendations made in this section are based on the consultants report and recommendations made by the workshop which was organised by DSIR, Ministry of Science & Technology in cordination with AIEI (Northern region) at Chandigarh on 22nd November, 1985. The recommendations have been made separately for cottage, small scale sector and organised sector.

Sl. No.	*Technology Area*	*Present Status*	*Action Plan Recommended*
01.	*Collaborations*	1. Hand tool technology obtained was initially viable but is now to be updated. This is based on hot forging using drop hammers, upsetters and presses, elaborate machining/finishing, heat treatment etc. Technological routine problems, only based on the imported technology sorted out with collaborators, but upgrated new technology not introduced.	1. A regular review of the technology status incorporating the promotion of upgradation activities should be instituted to ensure that technological upgradation does actually take place. Use of modern technologies and latest equipment for manufacturing high quality hand tools by the latest forging techniques should be encouraged so as to make available readily good quality hand tools for domestic and export requirement also covering OEMs for automobiles, electronics, power, mining, petroleum and other industries which require high quality tools.
02.	*Raw Materials*	1. Raw materials although available indigenously are not of comparable quality standards in comparison to imported matrials.	1. To meet rquirement of specialised steels for making hand tools mini steel plants located in particular regions having hand tool industry

			concentrations should be encouraged to make the special quality steels for hand tools.
		2. Since procurement is done on individual basis by hand tool manufacturers, the order quantities become small and consequently have to choose uneconomical sizes, and qualities resulting in higher wastage.	2. Appropriate action needs to be taken to arrive at rational basis, of the requirement of steels, its sizes and quantities on a regional basis having concentration of hand tool industry, and make available the same to the industry at reasanable prices with time schedules.
		3. Alloy steels needed for hand tools having cold and warm forging/forming characteristics are not available indigenously.	3. Developmental efforts should be initiated for making steels needed for hand tools having cold and warm forging characteristics with adjustment in composition.
		4. The incentive in terms of price difference between international and prevailing prices is Rs. 1,705/t whereas the actual price difference is Rs.5,000/— to Rs.6,000/— per ton. Similar disparity is there in cellulose acetate price difference and export incentives.	4. The incentives should be rationalised and other appropriate measures taken so that our product prices in the export market compare favourably with competitor's and the foreign trade is further increased in hand tools.
03.	*Forging Practice and Toolings*	1. Due to hot drop forging technology adopted, the flash and rejection losses are as high as 45-50% of the raw material inputs for almost all types of hand tools under study.	1. Major breakthrough has been made with development of new materials in hand tool forging technology. Special pupose machines using cold and warm forging techniques are available with supporting tooling for making different types of hand

	tools. The principle used is of chipless forming, resulting into negligible losses in forging. These raw materials need to be made available easily including through indigenous development.
2. Hot forging process results in poor surface finish, close tolerance cannot be maintained, tooling, handling and subsequent machining, need to be done.	2. Above mentioned technological development has improoved the surface finish of forged components to very close tolerances, thus eliminating machining operations to a great extent. Due to cold/warm forming the physical properties also get improved, consequently in certain cases heat treatment process is also eliminated. For certain applications cheaper materials can be substituted for costlier high alloy steels but still achieve the required functional characteristics due to cold/warm working.
3. The furnace oil required for manufacture of hand tools per ton of raw material varies from 350 to 400 ltrs. This is mainly due to poor efficiency (7—9%) of oil fired furnaces and no efforts to utilise the waste heat even in large scale sector are being made.	3. The first step would be to take measure for waste heat utilisation. Thereafter the existing furnaces should be replaced with high efficiency oil fired furnaces. With better availability of power supply, induction resistance heating should be adapted depending on the type of equipment in use.

		4. Tooling know-how for hot forging of hand tools is reasonably developed, but since superior technology of using cold and warm forging not adapted and hence the tooling technology needed, has to be developed accordingly.	4. Since there are two entirely different types of hand tool applications i.e. (a) General application (b) Specialised use in prestigious sectors of industry as part of original equipment (O.E.) supply and alongwith the vehicles, The technology/equipment induction should be specially done for specific market segments. The development of special purpose tooling for use with new generation of forging machines can be simultaneously taken up with the use of modern equipments similar to those presently used in other countries.
04.	*Machining Techniques*	1. The machining technique adapted for hand tool manufacture has been gererally standardised and improvements made in productivity per machine per man in the organised sector.	1. The machining requirements using new technology would be considerably reduced. Keeping in view the end application requirements, use of existing processes should be continued. The changes should be made only where essential, especially for making transfer dies/ toolings for use with special pose forging machines.
05.	*Heat Treatment*	1. The heat treatment is done by low pressure oxy-acetyline heating and oil quenching by cottage scale units and oil fired heat treatment furnaces, salt bath furnaces are used by small, medium and large scale	1. Proper heat treatment facilities should be developed in places like Nagaur (Rajasthan) and Purulia (W. Bengal). oil fired furnaces and salt bath heat treatment is considered satisfactory for components to be

		units. Some large scale units have started induction hardening.	fully heat treated. Components required to be partially hardened must be heat treated by induction heating where temperature control is excellent and the energy utilisation efficiency high. Existing low efficiency oil fired furnaces should be replaced.
06.	*Finishing and Packing*	1. Due to hot forging process the surface finish and overall get up is not as good as that of the products from competitors especially in the export market.	1. This problem would sort out when switch over to chipless forging is made as suggested in the recommendations.
		2. Monocartons and kits supplied by Indian manufacturers are of poor quality. It is estimated that we spend only 2-4% of sales price on packing whereas our competitors spend 8-10% of sales price on packing to improve their product image.	2. The product packing is of immense value for customer acceptance. The production costs have to be reduced and packings improved to levels better than competitors for boosting exports. Special purpose packing machines need to be imported initially and developed to cater to long range requirements.
07.	*Product range and Quality*	Hand tools manufactured in India mainly cater to the requirements to the requirements of General engineering application, special types needed for electronic and automobile sector etc abroad having huge requirements are not being made. Some manufacturers have started developing tools for electronic industry applications.	Specialised units should be set up with sophisticated technology for manufacture of hand tools for electronics and O.E. requirements of automobiles etc. This would help in import substitution and open new export market segments.

08.	*Research and Development*	1. Main R&D efforts in industry are limited and are towards immediate profits but lacks the long range planning for implementation of technological improvements and self reliance.	1. Industry should be encouraged to allocate a pre-determined percentage of sales turnover towards R&D efforts. 2 Government should encourage and support major R&D Project relevants to industry, avoiding duplications of efforts. 3. The developments achieved should be consolidated and made available to units on suitable terms. 4. Forging equipment manufacturers should be encouraged to import modern prototypes or technology of the latest forging equipments for hand tools to be used for further R & D and indigenisation.