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GUARDING OF AGRICULTURAL TRACTORS AND MACHINERY

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STANDARDS ASSOCIATION OF AUSTRALIA
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THE FOLLOWING SCIENTIFIC, INDUSTRIAL AND GOVERNMENTAL organizations and departments were officially represented on the committee entrusted with the preparation of this standard:

Agricultural Equipment Committee

Australian Farmers Federation

Australian Woolgrowers and Graziers Council

Australian Workers Union

CSIRO, Division of Mechanical Engineering

Department of Labour Relations and Consumer Affairs

Department of Primary Industry

Department of Productivity

Departments of Agriculture

Departments of Labour and Industry

National Safety Council of Australia

Queensland Agricultural College

Queensland Cane Growers Council

Safety Institute of Australia

Tractor and Machinery Association of Australia

This standard, prepared by Committee AG/4, Agricultural Tractors and Machinery, was approved on behalf of the Council of the Standards Association on 7 February 1978, and was published on 1 April 1978.

To keep abreast of progress in industry, Australian standards are regularly reviewed. Suggestions for improvements to published standards, addressed to the head office of the Association, are welcomed.

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AUSTRALIAN STANDARD

RULES FOR THE GUARDING OF AGRICULTURAL TRACTORS AND MACHINERY

AS 2153—1978

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PREFACE

This standard was prepared by the Association's Committee on Agricultural Tractors and Machinery as one of a series of standards aimed at providing protection for the operators of agricultural machinery.

It had originally been intended to base it on AS 1755, SAA Conveyor Safety Code, but differing needs forced the preparation of an entirely separate standard, oriented more towards the concepts outlined in the Foreword. Drafting was well advanced when ISO/TC 23* commenced work on a similar subject, so that Australia was able both to contribute to and to receive assistance from that project. In the process differences between the ISO and the Australian viewpoints have been gradually minimized. The only remaining significant differences are that this standard gives greater emphasis to the special agricultural problem of routine cleaning and maintenance, and ISO/TC 23 (in ISO/DP 4254) has tended to include details of problems specific to particular types of machinery where this standard remains general. The intention has been to leave designers as much freedom as possible to exercise design options.

This standard has been written to provide a statement of general principles, in a Foreword, followed by a set of rules of basic design for the guidance of machine designers. It must be recognized that it is not exhaustive as to the fine detail of individual items of machinery; it has not yet been possible to consider this larger task. The standard is limited to design factors that affect safety, and it should be recognized that other matters outside the scope of this standard will need to be considered by a designer, e.g. tendency to accumulate debris.

This standard may require reference to the following Australian standard:

AS 1121 Guards for Agricultural Tractor Power Take-off, Power Take-off Shaft and Implement Connections.

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*Internal Organization for Standardization Technical Committee 23, Tractors and Machinery for Agriculture and Forestry.

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STANDARDS ASSOCIATION OF AUSTRALIA

Australian Standard Rules for the GUARDING OF AGRICULTURAL TRACTORS AND MACHINERY

FOREWORD

The general safety and guarding of agricultural tractors and machinery presents problems that differ significantly from those associated with industrial machinery. The fact that most such machines are mobile has a mixed effect in that it mitigates some classes of risk but increases others. There is less risk to casual bystanders, but a greater problem caused by functional stoppages, blockages, etc. Maintenance and servicing have proved to be prime causes of hazards; therefore more attention has been paid to the function of guards in relation to service operations than is normal with industrial machinery. Much of the necessary machine maintenance is carried out by people whose mechanical training is comparatively minimal. Children are more likely to be about farm machinery than about a factory. The fact that a farmer often works alone renders the consequences of an injury more serious. Factors such as those require certain modifications to traditional industrial safety thinking.

This standard is based on the concept that—

(a) dangerous parts should be effectively guarded unless they are, by any reasonable definition, located out of reach;

(b) guards should be convenient in use so that operators and servicemen are less likely to remove them permanently and thereby re-instate hazards;

(c) guards should have strength commensurate with their usage, and durability commensurate with the machine;

(d) dangers to people caused by ejected material should be reduced by basic design, or by protection by barriers;

(e) hot parts may be dangerous, and means to protect people against burns may be necessary.

Certain machine components are difficult to classify precisely in terms of the degree of hazard. Ground wheels on some machines, by experience, need complete guarding, e.g. machines such as tomato harvesters which require the presence of several operators on the machine while it is in motion. Tractor wheels are usually only partially guarded, so that it is still possible to touch the wheels from inside, but this situation seems adequately safe. Wheels for drills and combines are totally exposed to contact from the platform, yet this

arrangement also seems safe. Thus, three apparently similar risks are in fact known to differ in degree, and a clear definition of the distinctions has proved elusive, in these as in other cases.

The reach dimensions which form the essential basis for this standard are graphic presentations of the values given in AS 1219, SAA Safety Code for Metalworking Power Presses, as adapted by the University of Queensland (from a 95th to a 99th percentile basis).

SECTION 1. SCOPE AND DEFINITIONS

1.1 SCOPE. These Rules (hereinafter referred to as 'the Code') specify means by which machine parts on agricultural tractors and machines may be guarded so as to increase the degree of personal safety of operators and others involved in the normal operation, servicing, and maintenance of such machines. The Code also provides for reduced risk arising from material ejected from any such machine.

1.2 DEFINITIONS. For the purpose of the Code, the following definitions apply.

1.2.1 Guard—any shield, cover, casing or physical barrier which by reason of its form or its location relative to any machine part that might otherwise constitute a hazard, is intended to prevent contact between that machine part and a person or part of that person's clothing.

1.2.2 Hazardous part—a machine component which moves under non-manual power, and which is likely to cause injury if contacted by a person or that person's clothing. The term includes the following:

(a) Any rotating shafting (including joints, coupling, shaft ends and crank shafts), gearing (including friction roller mechanism), cable, sprocket, chain, clutch, coupling, cam or fan blade.

NOTE: A plain shaft that is without projections, is adequately chamfered and projects not more than half of its diameter, as from a bearing housing, would not be considered to be a hazardous part.

(b) The run-on point of any belt, chain, or cable. Belts are not of themselves to be considered hazardous, provided that their joints are smooth and without hazardous projections or jointing.

(c) Keyways, keys, grease nipples, set-screws, bolts or any other projections on rotating parts.

(d) Any pulley or flywheel that incorporates any openings, spokes, protrusions, etc that render it anything other than totally smooth.

(e) Any crushing or shearing points, e.g. augers and slide blocks, roller feeds, conveyor feeds.

(f) Ground wheels, and track gear that incorporates protrusions, spokes, etc which are adjacent to an operator's position (standing platform, seat, footrest) or passenger's seat.

(g) Rotating knives, blades, tines or similar parts of power-driven machines which operate in or near the ground or engage crops, except at the point of crop or ground engagement.

(h) Any machine component which cuts, grinds, pulps, crushes, breaks or pulverizes farm produce.

1.2.3 Hot parts—any machine components whose surface temperature exceeds 120°C in normal operation.

1.2.4 Normal operation—operation of the machine within its recognizable limitations, by persons familiar with its operations and controls.