17 Group 17 - Miscellaneous Bridgeworks Items
第 17 章：其他桥梁工程项目

17.1 Proprietary Products
专有产品

Where proprietary products are specified by name on the Drawings it implies a standard and is in no way intended to preclude the use of an alternative approved by the Engineer. The product shall be used in accordance with the manufacturer's instructions. Where such instructions are in conflict with the Drawings or Specification the Contractor shall draw the Engineer's attention to the inconsistency and await the Engineer's direction.
如果在图纸上使用名称指定了专有产品，则其意味着充当标准，并且绝不意图排除使用监理工程师批准的替代品。应按照制造商的说明使用产品。如果此等说明与图纸或规范相冲突，承包商应提请监理工程师注意不一致之处并等待监理工程师的指示。

17.2 Bearings
支座

17.2.1 General
概述

The Contractor shall supply and fit all bearings in the positions and to the details shown on the Drawings. Bearings shall be set when the ambient temperature is approximately equal to the mean temperature shown on the Drawings or advised by the Engineer.
承包商应提供并安装所有位置的支座，以及应提供图纸上显示内容的细节。当环境温度约等于图纸上显示的平均温度或监理工程师建议的温度时，应安装支座。

17.2.2 Elastomeric Bearing Pads
板式橡胶支座

The elastomer shall comprise natural rubber and other materials compounded and cured to give the properties specified in AS 5100.4 with IRHD 60 ± 5.
弹性体应由天然橡胶和其他复合和固化的材料组成，以达到 AS 5100.4 规定的 IRHD 60 ± 5 的性能。

Pads and strips shall be vulcanised in a mould under pressure and shall not be extruded or cut from sheet.
应在压力下将垫片和滑条在模具中进行硫化，且不得从片材挤出或切割。

Tolerances on the width and length of the bearings shall be 0 to + 3 mm and on the thickness 0 to + 2 mm, provided the bearing surfaces shall be plane and parallel to one another within a tolerance of 0.75 mm.
如果支座表面为平面且与另一支座相互平行，且公差为 0.75 mm，则支座的宽度和长度公差应为 0 至+3 mm，厚度公差为 0 至+2 mm。

Unless otherwise shown on the Drawings all bearings shall be bonded with approved

epoxy resin adhesive to the upper surfaces.
除非图纸上另有说明，否则所有支座应使用经批准的环氧树脂粘合剂粘合到上表面。

The Contractor shall submit test certificates to the Engineer giving physical properties and mechanical properties for each bearing. All bearings shall be indelibly marked with appropriate bearing type number and a unique number for correlation to test certificates.
承包商应向监理工程师提交测试证书，提供每个支座的物理性能和机械性能。所有支座应具有永久性标记，标注出适当支座类型编号和唯一编号，以便与测试证书相关联。

The following procedure shall be used for the installation of the elastomeric bearings at abutments and piers unless otherwise detailed in the Drawings or an alternative procedure is approved by the Engineer.
除非图纸中另有说明或监理工程师批准替代程序，否则应将以下程序用于在桥台和桥墩处弹性支座的安装之中。

17.2.3 Pot Bearings
盆式支座

17.2.3.1 Pot Bearing Information
盆式支座信息

The Contractor shall submit to the Engineer for approval, the following information for each bearing type he proposes for use in the Works, at least six weeks prior to its incorporation in the Works:
针对其拟在工程中使用的每种支座类型，承包商应至少在其纳入工程前六周向监理工程师提交以下信息，以获得监理工程师批准：

a. Name of the bearing supplier;
支座供应商名称；

b. Evidence from the supplier of load testing of at least one bearing of each type for vertical and lateral loading capacity; for sliding friction; for movement and rotation capacity, to confirm that the bearings conform to the performance requirements stated in the Drawings
供应商对每种类型支座至少一个支座进行载荷测试的证明，测试垂直和侧向载荷能力、测试滑动摩擦以及测试变形和转动能力，以确认支座符合图纸中规定的性能要求；

c. Drawings of the assembled bearing and attachment plates to scale with overall dimensions;
组装好的支座和附件板的图纸，且图纸按与外形尺寸成比例进行绘制；

d. Calculations detailing elastomer pressure, elastomer thickness, PTFE mean and peak pressures, maximum bearing stress on substructure and superstructure giving method of calculation, and forces on bolts and dowels with required sizes and grades;
相关计算，此等计算详细说明了弹性体压力、弹性体厚度、PTFE 平均值和峰值压力、子结构和上部结构的最大轴承应力（给出计算方法）、以及所需

尺寸和等级的螺栓和销钉上的力；

e. Basis of deriving the rotational stiffness used in the calculations;
导出计算中使用的转动刚度的依据；

f. Calculations and methods for sealing the gap between piston and cylinder, accounting for all rotations;
用于密封活塞和气缸之间间隙的计算和方法（且考虑了所有旋转）；

g. Evidence of internal sealing ring performance;
内部密封圈性能证明；

h. PTFE thickness, dimpling pattern, grease type, and method of bonding to steel;
PTFE 厚度、造窝图案、油脂类型以及与钢粘合的方法；

i. Specification for machine polishing and method of attachment of stainless steel sliding surfaces;
机器抛光规范以及不锈钢滑动面的连接方法；

j. Treatment of skew and taper if applicable;
倾斜和锥度处理（如适用）；

k. Surface protection including colour, thickness and grit blasting details;
表面防护，包括颜色、厚度和喷砂细节；

l. Test loads, loading arrangement and evidence of accreditation of testing facilities;
测试载荷、装载安排以及测试设施认证的证明；

m. Lifting and transportation arrangements; and
起吊以及运输安排；以及

n. Deviations from the Drawings or Specification.
与图纸或规范的偏差。

The Contractor shall send to the Engineer a certificate (including design calculations from a professional engineer experienced in the design of structural bearings) that details the information required in this Clause and which verifies that all bearings and attachments comply with the requirements of the Drawings and this Specification.
承包商应向监理工程师发送证明（包括从在结构支座设计方面有丰富经验的专业监理工程师处所获得设计计算内容），详细说明本条款所要求的信息，并验证所有支座和附件是否符合图纸和本规范的要求。

17.2.3.2 Pot Bearing Materials
盆式支座材料

a. The bearing pot, piston, sliding plate, guide bars and all attachment plates shall be fabricated from structural steel conforming to AS/NZS 3678 and/or AS/NZS 3679.1.
支座盆、活塞、滑板、导向杆和所有连接板应使用符合 AS/NZS 3678 和/或 AS/NZS 3679.1 规定的结构钢进行制造。

b. The sliding surfaces on the sliding plates and the guide bars shall be

manufactured from austenitic stainless steel conforming to ASTM A240M Grade 316 L with 2B-mill surface finish.
滑动板和导向杆上的滑动面应使用符合 ASTM A240M 中 316 L 级别的奥氏体不锈钢制造，表面光洁度为 2B 轧制。

c. Bolts, nuts and washers shall conform to sub-clause 15.2.2.3.
螺栓、螺母和垫圈应符合第 15.2.2.3 款的规定。

d. Sliding pads and strips shall be 100% virgin polytetrafluoroethylene (PTFE) conforming to ISO 13000-1 Grade 1, and etched on the side bonded to the steel.
滑动垫片和滑条应由 100%纯净的聚四氟乙烯（PTFE）制成，符合 ISO 13000-1 的 1 级标准，并在与钢粘合的一侧进行蚀刻。

e. The sliding pad shall be unfilled PTFE dimensionally stabilised moulded sheet that is dimpled and lubricated in accordance with Clause 14.2 of AS 5100.4 on the face in contact with the sliding surface.
滑动垫片应未填充 PTFE，且为具有稳定尺寸的模塑片，并按照 AS 5100.4 的第 14.2 条规定在与滑动面接触的表面上造窝以及进行润滑。

f. The sliding strips on the guide faces shall be a durable filled PTFE with fillers being either milled glass fibre (25% maximum) or carbon fibre (25% maximum). Alternatively, sliding strips may be a multilayered composite material e.g. for a three layer composite; a bronze backing strip, a sintered interlocking porous impregnated matrix, and an overlay of PTFE/lead, graphite/lead or similar mixture.
导向面上的滑条应耐用且已填充的PTFE，填充物为铣削玻璃纤维（最大25%）或碳纤维（最大 25%）。或者，滑条可以由多层复合材料制成，例如，三层复合材料，即青铜背垫条、烧结而成联锁多孔浸渍基体、以及 PTFE/铅、石墨/铅或类似混合物的覆盖层。

g. The elastomer used in the elastomeric disc must comprise 100% virgin natural rubber (polyisoprene). The elastomer must be plain, not laminated or fibre reinforced. The elastomer and its testing must conform to Type 53H of Appendix B of AS 5100.4.
弹性盘中使用的弹性体必须由 100%新鲜天然橡胶（聚异戊二烯）组成。弹性体不得含有与其他杂质，不得为层压制成或纤维增强的。弹性体及其测试必须符合 AS 5100.4 附录 B 中的 53H 型规定。

h. Internal seals shall be made from rectangular brass sections conforming to AS/NZS 1567 (half-hard). Where the zinc content in the brass is greater than 15%, the brass must be inhibited against dezincification. Alternatively, internal seals may be made from stainless steel strips conforming to ASTM A240M Grade 316 L.
内部密封件应由符合 AS/NZS 1567（半硬）规定的矩形黄铜部分制成。当黄铜中的锌含量大于 15%时，必须抑制黄铜的脱锌处理。或者，内部密封件也可以由符合 ASTM A240M 中 316 L 级别要求的不锈钢带制成。

i. The lubricant used for filling the lubrication reservoirs in the dimpled face of the PTFE sliding pad, and for lubrication of the top and bottom surfaces of the elastomeric disc, must be made from silicone compounds. It must retain its consistency at room temperature over a temperature range of －40°C to +200°

C. The lubricant must be compatible with all the components in contact with it.
用于填充 PTFE 滑动垫的凹坑面中的润滑剂储存槽的润滑剂以及用于润滑弹性盘的顶表面和底表面的润滑剂必须由硅氧烷化合物制成。在-40°C 到+200°C 的温度范围内，润滑剂必须保持其在室温下的硬度。润滑剂必须与所有与之接触的部件相兼容。

17.2.3.3 Protective Treatment of Pot Bearings
盆式支座防护性处理

Unless otherwise specified all work required for the protective treatment shall comply with the requirements of AS/NZS 2312. The protective treatment shall be applied under factory conditions prior to assembly of the bearings. Repairs to damaged coatings shall be carried out in accordance with the paint manufacturer's recommendations. Stainless steel sliding surfaces and bearing internal surfaces must not receive protective treatment and care must be taken to protect these surfaces from being damaged or coated during the application of the protective treatment to adjacent areas.
除非另有规定，防护性处理所需的所有工作应符合 AS/NZS 2312 的要求。应在组装支座之前在工厂条件下进行防护性处理。应按照涂料制造商的建议进行受损涂层修复。不锈钢滑面和支座内表面不得进行防护性处理，在对相邻区域进行防护性处理时，必须注意保护这些表面免受损坏或受到涂装。

17.2.3.4 Pot Bearing Replacement
盆式支座更换

The bearings shall be designed to allow removal for replacement using a maximum jacking lift of 5 mm.
支座在设计上应允许使用最大 5mm 起重吊车来进行拆除和更换。

17.2.4 Installation of Bearings
支座的安装

17.2.4.1 General
概述

All bearing installation shall be witnessed by the Engineer. At all times during the installation operation, every bridge member shall be kept stable and safe, and the installation operation shall be carried out without any damage to the bridge member, the bearings, or any other element of the structure.
所有支座进行测试时，监理工程师应在场。在安装过程中的任何时候，各桥梁构件应保持稳定和安全，并且应在不损坏桥梁构件、支座或结构任何其他元件的情况下进行安装操作。

During positioning of the bearings, the Contractor shall allow for any change in dimensions of the structure under dead and erection loads and for an ambient temperature during installation different to that assumed on the Drawings.
在支座定位期间，承包商应允许在静荷载和装配负载规定下变更任何结构尺寸，以及允许在安装期间的环境温度可与图纸中假定的温度不同。

For elastomeric bearings, the top and bottom faces of the bearings shall be in full contact respectively with the superstructure element being supported, and with the

underlying support surface, prior to opening the bridge to traffic.
对于弹性体支座，支座的顶面和底面应分别与受支撑的上部结构元件以及下面的支撑表面完全接触，然后桥梁可以通车。

17.2.4.2 Installation Tolerances
安装公差

Unless otherwise nominated on the Drawings, tolerances for installation of bridge bearings shall be as follows:
除非在图纸中另有说明，否则桥梁支座的安装公差应如下所示：

a. Elastomeric Bearings
弹性支座

For plain elastomeric strips and pads or laminated elastomeric bearings, the tolerances in Table 17-1 below apply:
对于普通弹性体条和垫片或层压弹性体支座，适用下表 17-1 中的公差：

Table 17-1 Bearing Installation Tolerances
表 17-1 支座安装公差

Bearing Type 支座类型	Item 项目	Tolerance 公差
Elastomeric Strip 弹性体条	Level 水平高度	±2.5 mm
	Flatness of top surface 顶表面平整度	0.5 mm over a 1.2 m straight edge 使用 1.2 米直尺测量超过 0.5 毫米
	Transverse slope 横坡	0.0005 radians 0.0005 弧度
	Longitudinal slope 纵坡	0.005 radians 0.005 弧度
	Transverse position 横向位置	±5 mm
	Longitudinal position 纵向位置	±15 mm
Plain pad and laminated elastomeric bearing 普通垫片和层压弹性支座	Level 水平高度	±2.5 mm
	Flatness of top surface 顶表面平整度	1.0 mm over a 1.2 m straight edge 使用 1.2 米直尺测量超过 1.0 毫米
	Transverse slope 横坡	±0.002 radians ±0.002 弧度
	Longitudinal slope 纵坡	±0.002 radians ±0.002 弧度
	Transverse position 横向位置	±3 mm
	Longitudinal position 纵向位置	±3 mm
	Difference in level between adjacent bearings 相邻支座之间的水平高度差异	±2.5 mm

b. Pot Bearings
盆式支座

Pot bearings shall be located such that the bearing centreline in each direction is within 3 mm of the location shown on the Drawings.
盆式支座的位置应满足每个方向的支座中心线在图纸所示位置的 3 mm 范围内的要求。

For bridges comprising simply supported girders, bearings shall be set to the levels shown on the Drawings within a tolerance of ± 5 mm.
对于仅仅由支梁构成的桥梁，支座应设置在图纸所示的水平高度，公差为±5mm。

For bearings supporting continuous superstructures, bearings shall be set to the level shown on the Drawings with a tolerance of ± 0.0001 times the sum of the length of the adjacent spans, but not exceeding ± 5 mm.
对于支撑连续上部结构的支座，支座应设置在图纸所示的水平高度，公差为相邻跨间长度的±0.0001 倍，但不得超过±5 mm。

The bearing inclination including any attachment plates which form part of the bearing shall be within 1 in 200 of that shown on the Drawings.
支座斜率（包括构成支座一部分的任何连接板）应在图纸所示 5‰的斜率之内。

17.2.4.3 Mortar Pads
砂浆垫层

Mortar to be used in mortar pads shall be approved by the Engineer. Cement mortar shall be used for mortar pads under elastomeric bearings. The mortar shall contain sufficient coarse sand to provide a rough texture on the contact face to ensure frictional restraint to the bearing. The contact face shall be flat with a surface roughness no smoother than Grade 40 sandpaper.
在砂浆垫层中使用的砂浆应经监理工程师批准。水泥砂浆应用于弹性体支座下的砂浆垫层。砂浆中应含有足够的粗砂，以在接触面上产生粗糙的纹理，从而确保对支座的摩擦约束力。接触面应平整，且表面粗糙度不得比 40 级砂纸平滑。

For construction of mortar pads for bearings that have steel attachment plates between the bearing and the concrete substrate, or girder, and where the steel plates are fixed by mechanical means (i.e. studs, anchor bolts), suitable proprietary pre-mixed bedding grouts or mortars may be used.
对于在支座和混凝土基板或梁之间具有钢连接板的支座，以及钢板是通过机械方式（即螺柱、地脚螺栓）固定的，则砂浆垫层的施工可使用适当的专有预拌底层薄灰浆或砂浆。

Recesses for anchor bolts and similar shall be filled with grout prior to construction of the mortar pads.
在砂浆垫层施工之前，应使用薄灰浆填充地脚螺栓和类似物的凹陷处。

If a mortar pad is used to support the bearing, it shall be extended at least over the whole plan area of the bearing plus a minimum of 25 mm outside the edge of the bearing. In the case of an elastomeric bearing held in position by friction alone, the mortar pad shall be extended beyond the edge of the bearing a minimum of 50 mm outside the edge of the bearing. In the area outside these minimum extents, the mortar pad top surface must slope away from the bearing.

如果使用砂浆垫层来支撑支座，则砂浆垫层应至少延伸到支座的整个规划区域以及到延伸到支座边缘外至少 25mm。如果弹性支座仅通过摩擦来使其保持在位置上，则砂浆垫层应延伸并超出支座边缘，且至少超出支座边缘外 50mm。在这些最小范围之外的区域中，砂浆垫层顶部表面必须远离支座倾斜。

The mortar pad shall be cast on a surface adequately prepared and compatible with the mortar used. The edges of the mortar pad shall be inclined at an angle of less than 45° to the supporting surface. The compressive strength of the mortar shall be as stated on the Drawings and capable of transmitting the design loads to the structure without damage.
砂浆垫层应浇铸在充分处理过的表面上并与所用砂浆相容。砂浆垫层的边缘应与支撑表面成小于 45°的角度倾斜。砂浆的抗压强度应如图纸所示，并能够将设计荷载传递给结构而不会造成损坏。

Temporary supports under the bearing baseplates shall not be removed until after the mortar pad has developed its specified design strength. Any voids left upon removal of the temporary supports shall be filled with the same mortar.
在砂浆垫达到其规定的设计强度之前，不得移除支座基板下的临时支撑。应使用相同的砂浆填充移除临时支撑物后留下的任何空隙。

17.2.4.4 Fixing Elastomeric Bearings
固定弹性支座

Elastomeric bearing strips may be installed directly onto a concrete surface provided the surface is finished with a wooden float and it meets the tolerances in Clause 5.2 and any other requirements detailed on the Drawings.
如果用木抹子抹平表面，并且表面符合第 5.2 条中的公差要求以及满足图纸中详述的任何其他要求，则可以直接将弹性支座条安装在混凝土表面上。

Elastomeric bearing pads may be installed directly onto a concrete surface provided that the surface meets the tolerances specified in Sub-clause 17.2.4.2.
如果表面满足第 17.2.4.2 款规定的公差要求，则可以直接将弹性支座垫层安装在混凝土表面上。

Epoxies shall not be used to fix elastomeric bearings.
不得将环氧树脂用于固定弹性体支座。

Unless otherwise specified, the diameter of the recesses for anchor bolts or studs shall be at least 50 mm larger than the diameter of the bolts. The recesses shall be cleaned and the bolts set and fixed. The recesses shall then be filled with an approved grout capable of withstanding the design loads.
除非另有规定，地脚螺栓或螺柱的凹槽直径应至少比螺栓直径大 50mm。应清洁凹槽，以及设置和固定螺栓。然后应在凹陷中填充能够承受设计载荷的受认可薄浆。

17.2.4.5 Fixing Pot Bearings
固定盆式支座

For pot bearings, temporary clamping devices shall be removed before bearings are required to accommodate any movement. Holes exposed on the removal of temporary clamps shall be filled with a material approved by the Engineer.

对于盆式支座，在需要支座承受任何运动之前，应拆除临时夹紧装置。应将监理工程师批准的材料填充到拆除临时夹具时暴露的孔中。

Where bearings are installed prior to forming a cast-in-place concrete deck, the formwork around the bearing shall be sealed to prevent leakage of the concrete. Bearings shall not be tilted, displaced or distorted during concreting operations. Any mortar that could contaminate the bearings shall be completely and immediately removed.
如果在现浇混凝土桥面形成之前安装支座，则应密封支座周围的模板工程以防止混凝土泄漏。在混凝土浇筑过程中，不得倾斜、移位或扭曲支座。应彻底且立即清除任何可能污染支座的砂浆。

17.3 Deck Joints, Sealants and Void Formers
面板接缝、密封剂以及制孔机

17.3.1 Impact Angles
冲击角

Where shown on the Drawings, the concrete edges at deck level shall be protected by steel angle sections, bent, if necessary, to conform to the profile of the wearing surface, and rigidly fixed to the superstructure as shown.
如图纸所示，应使用角钢保护位于面板高度的混凝土边缘（必要时可弯曲），以符合磨损表面的轮廓，并如图所示刚性固定在上部结构上。

Care shall be taken in placing concrete adjacent to the protection angles to ensure that it is sound, without air pockets and is properly worked into corners and/or below the outstanding legs of the angles.
在浇筑保护角附近的混凝土时应小心，以确保其完好且没有气穴，并且正确放置到角落和/或保护角突出脚的下方。

If indicated on the Drawings, impact angles shall be hot dipped galvanised in accordance with Clause 16.2. Galvanizing shall satisfy any test ordered in accordance with AS/NZS 4680.
如果图纸上有标明，应按照第 16.2 条对冲击角进行热浸镀锌处理。镀锌处理应满足根据 AS/NZS 4680 指定的任何测试。

17.3.2 Preformed Neoprene Jointing
预制氯丁橡胶接缝

Preformed neoprene compression joint seals shall be installed to the width and details given in the Drawings. The brand of the jointing shall be approved by the Engineer. The jointing shall be installed according to the manufacturer’s recommendations. Alternative jointing to that detailed on the Drawings may be used if approved by the Engineer.
预制氯丁橡胶承压接缝密封应按照图纸中给出的宽度和细节进行安装。应由监理工程师批准所用接缝品牌。应根据制造商的建议安装接缝。如果监理工程师予以批准，可以使用图纸中详细说明的替代接缝。

Compression seals shall be installed in one continuous length. The lubricant-adhesive shall be compatible with the bridge joint and shall be resistant to oxidisation and fuel oils.