TRANSACTIONS OF
K.C. WONG EDUCATION FOUNDATION
SUPPORTED LECTURES

王宽诚教育基金会

学术讲座汇编

主编　钱伟长

·31·

2010

上海大学出版社

王宽诚教育基金会

学 术 讲 座 汇 编

（第31集）

主编　钱伟长

上海大学出版社

图书在版编目(CIP)数据

王宽诚教育基金会学术讲座汇编. 第31集/钱伟长主编. 一上海：上海大学出版社，2010.8
ISBN 978-7-81118-668-0

Ⅰ.①王… Ⅱ.①钱… Ⅲ.①社会科学一文集②自然科学-文集 Ⅳ.①Z427

中国版本图书馆CIP数据核字(2010)第176010号

王宽诚教育基金会
学术讲座汇编(第31集)
钱伟长 主编
上海大学出版社出版发行
(上海市上大路99号 邮政编码200444)
(http://www.shangdapress.com 发行热线66135110)
出版人：姚铁军
*
南京展望文化发展有限公司排版
上海华业装潢印刷厂印刷
开本787×1092 1/16 彩插1 印张13.5 字数320千字
2010年8月第1版 2010年8月第1次印刷
印数：1~850册
ISBN 978-7-81118-668-0/Z·024

王宽诚教育基金会简介

王宽诚先生(1907—1986)为香港著名爱国人士,热心祖国教育事业,生前为故乡宁波的教育事业做出积极贡献。1985年独立捐巨资创建王宽诚教育基金会,其宗旨在于为国家培养高级技术人才,为祖国四个现代化效力。

王宽诚先生在世时聘请海内外著名学者担任基金会考选委员会和学务委员会委员,共商大计,确定采用"送出去"和"请进来"的方针,为国家培养各科专门人才,提高内地和港澳高等院校的教学水平,资助学术界人士互访以促进中外文化交流。在此方针指导下,1985、1986两年,基金会在国家教委支持下,选派学生85名前往英、美、加拿大、德国、瑞士和澳大利亚各国攻读博士学位,并计划资助内地学者赴港澳讲学,资助港澳学者到内地讲学,资助美国学者来国内讲学。正当基金会事业初具规模、蓬勃发展之时,王宽诚先生一病不起,于1986年年底逝世。这是基金会的重大损失,共事同仁,无不深切怀念,不胜惋惜。

1987年起,王宽诚教育基金会继承王宽诚先生为国家培养高级技术人才的遗愿,继续对中国内地、台湾及港澳学者出国攻读博士学位、博士后研究及学术交流提供资助。委请国家教育部、中国科学院和上海大学校长钱伟长教授等逐年安排资助学术交流的项目。相继与(英国)皇家学会、法国科研中心、德国学术交流中心、法国高等科学研究院等著名欧洲学术机构合作,设立"王宽诚(英国)皇家学会奖学金"、"王宽诚法国科研中心奖学金"、"王宽诚德国学术交流中心奖学金"、"王宽诚法国高等科学研究院奖学金",资助具有副教授或同等职称以上的中国内地学者前往英国、法国、德国等地的高等学府及科研机构进行为期2至12个月之博士后研究。

王宽诚教育基金会过去和现在的工作态度一贯以王宽诚先生倡导的"公正"二字为守则,谅今后基金会亦将秉此行事,奉行不辍,借此王宽诚教育基金会《学术讲座汇编》出版之际,特简明介绍如上。王宽诚教育基金会日常工作繁忙,基金会各位董事均不辞劳累,做出积极贡献。

钱 伟 长

二〇一〇年六月

前　言

王宽诚教育基金会是由已故全国政协常委、香港著名工商企业家王宽诚先生(1907—1986)出于爱国热忱，出资一亿美元于1985年在香港注册登记创立的。

1987年,基金会开设“学术讲座”项目,此项目由当时的全国政协委员、历任第六、七、八、九届全国政协副主席、著名科学家、中国科学院院士、上海大学校长、王宽诚教育基金会贷款留学生考选委员会主任委员兼学务委员会主任委员钱伟长教授主持。由钱伟长教授亲自起草设立“学术讲座”的规定,资助内地学者前往香港、澳门讲学,资助美国学者来中国讲学,资助港澳学者前来内地讲学,用以促进中外学术交流,提高内地及港澳高等院校的教学质量。

本汇编收集的文章,均系各地学者在“学术讲座”活动中的讲稿,文章内容有科学技术,有历史文化,有经济专论,有文学,有宗教和中国古籍研究等。本汇编涉及的学术领域颇为广泛,而每篇文章都有一定的深度和广度,分期分册以《王宽诚教育基金会学术讲座汇编》的名义出版,并无偿分送国内外部分高等院校、科研机构和图书馆,以广流传。

王宽诚教育基金会除资助“学术讲座”学者进行学术交流之外,在钱伟长教授主持的项目下,还资助由国内有关高等院校推荐的学者前往欧、美、亚、澳等参加国际学术会议,出访的学者均向所出席的会议提交论文,这些论文亦颇有水平,本汇编亦将其收入,以供参考。

王宽诚教育基金会学务委员会

凡　例

（一）编排次序

本书所收集的王宽诚教育基金会学术讲座的讲稿及由王宽诚教育基金会资助学者赴欧、美、亚、澳等参加国际学术会议的论文均按照文稿日期先后或文稿内容编排刊列，不分类别。

（二）分期分册出版并作简明介绍

因文稿较多，为求便于携带，有利阅读与检索，故分期分册出版，每册约150页至220页不等。为便于读者查考，每篇学术讲座的讲稿均注明作者姓名、学位、职务、讲学日期、地点、访问院校名称。内地及港、澳学者到欧、美、澳及亚洲的国家和地区参加国际学术会议的论文均注明学者姓名、参加会议的名称、时间、地点和推荐的单位。上述两类文章均注明由王宽诚教育基金会资助字样。

（三）文字种类

本书为学术性文章汇编，均以学术讲座学者之讲稿原稿或参加国际学术会议者向会议提交的论文原稿文字为准，原讲稿或论文是中文的，即以中文刊出，原讲稿或论文是外文的，仍以外文刊出。

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Christianity and Contemporary China

— A Religious Vitality Perspective

GUO Chang-gang *

(College of Liberal Arts, Shanghai University, Shanghai 200444, P. R. China)

1 Introduction

It is a fact of singular note that in nineteenth century the vast majority of the educated classes in China either passively or actively rejected Christianity. Passively, they did so by remaining coldly indifferent to Christianity's message. The percentage of officials and literati who embraced the foreign religion was infinitesimally small. Actively, they expressed their hostility by writing and disseminating inflammatory anti-Christian literature, creating countless stumbling blocks for the Christian missionary, issuing threats of retaliation against any who dared enter the religion or have dealings with its foreign transmitters, and by the direct instigation of, and participation in, anti-Christian riots.

The extent of this anti-Christian activity is suggested by the situation in the 1860's. At one time or another during this decade, vast sections of China appear to have been literally swamped with anti-Christian propaganda. Moreover, although the exact number of cases of open or veiled opposition to the missionary and convert will never be known, one Chinese bibliography lists over fifty of these important enough to require top-level diplomatic activity, and the record indicates that the number of less important cases, which were settled locally during the 1860's, may well have run into the thousands. Naturally, we have no way of proving that the great majority of these cases were directly or indirectly inspired by the educated classes. However the evidence available and the virtually unanimous opinion of contemporary foreigners both tend to

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* 郭长刚,教授,上海大学研究生部副主任。由王宽诚教育基金会资助,于 2007 年 7 月赴德国莱比锡参加"第 29 届国际宗教社会学大会",此为其向大会递交的论文纲要。

support such an assumption.

In part, of course, this intense hostility to Christianity arose in response to peculiarly nineteenth century circumstances to Christianity's identification with the Taiping rebellion, its association with the use of foreign force and gunboat diplomacy, the interference of some missionaries in Chinese administrative affairs, *etc*. It is seldom recognized, however, that above and beyond these immediate factors there was a tradition of anti-Christian thought in China. This tradition went back at least as far as the early seventeenth century. Its literature was abundant. In addition it proved a major influence on, as well as source for, the anti-Christian attitudes of the nineteenth-century Chinese intellectual[1].

However Christianity has experienced a rapid growth in recent decades in rural China. Though there are various personal causes that trigger the Christianity conversion, it is embedded in the macro social changes. The increasing economic freedom and the reallocating economic powers have undermined the interpersonal connections and communal patronage. This leads to create a vacuum for the Christian expansion. There are social needs for the sense of belonging under the market transition and the Christian conversion could be seen as one of the adopted strategies.

2 Data Collection

The analysis is composed of case studies collected in 2006 in Linyi, locating in the eastern part of Shandong Province. The village experienced rapid economic growth and diversification since the market reform was initiated in 1978. Linyi is selected as the field site because it is a perfect representative of the social change experienced by the rural villages, which is characterized by the interaction between traditional and modern life styles. Linyi has a population of 700. Like other villages of the eastern coastal China, the high ratio of population to farming land makes it impossible for the villagers to make their living on agrarian income. Thus the adults have to go to the big cities to do part-time job, and those who are left at home are all old men, household women and children.

3 Method

Interview; observation.

Table 1 Data (50) 2006

Item	State	*N*	%	Note
Sex	Male	3	6	Poor1, low2
	Female	47	94	

continue

Item	State	N	%	Note
Age	Over 60	32	64	
	40 - 60	13	26	
	25 - 40	4	8	
	Under 25	1	2	Poor health
Health	Good	34	68	
	Poor	16	32	
Economy	Rich	4	8	
	ok	7	14	
	Poor	39	78	
Position	High	4	8	
	Low	6	12	
Education	J. Middle school	6	12	
	Elementary	10	20	
	Illiterate	34	68	

4 Sense of Belonging Under Moral Economy

The growth of Christianity is not only related with the individual factors. The conversion are embedded in the social changes at the meso and macro levels, such as changes in rural property institutions, economic activities, and administrative organizations. In other words, the rising religiosity has its root in the change of rural economic and social life.

Before the reform and opening up policy, rural collective production teams had worked as the agency under the control of the state machine to organize laboring activities in agriculture and agriculture-linked industry. Since 1980s, Linyi, as other villages in China, experienced the transition from the centralized command economy to the decentralized peasant economy.

In traditional terms, social connections and communal cohesion create mutual understandings to promote the survival in the face of scarcity and external turmoil. In the late imperial China, peasants traditionally turned to the local gentry and extended family relations for the stabilization of life chances. As James Scott found in Southeast Asia, the subsistence ethic played a crucial role in the peasant economy, and the peasant choice and values. Such rules helped peasants to cope with the unequally distributed risks and repressions and construct a relatively steady living environment[2].

With regard to the socialist legacy, the absolute equality and social coordination had been seen as the foundation of the political correctness of the regime. In a situation that the "classes" were eliminated and the communist government took over pubic authority, the most important principle was of the collective patronage: instead of turning to the local gentry or the relatives, peasants can rely on the superstructure that provides protection and exerts control.

In sum, under both the traditional and the socialist circumstances, the relative value of goods and services are not independently negotiated in an impersonal, anonymous market. Instead, the traditional and socialist elements of rural economy are nested in a resilient system of moral economy.

The market economy reform has a complicated effect on these elements. On one hand, the reform reinstates the individual and households producers. On the other hand, the market transition decentralized the vertical organization of rural economy that was set up by the communist regime, as well as the state's responsibility to "take care of" peasants. In one word, the reform operates to achieve economic efficiency based on the traditional understandings of the peasant economy. However when the socialist communal cohesion is broken down, the traditional reciprocity does not work smoothly. The informal social network, together with the collective patronage, is undermined by the prevalent economic transactions between strangers and market rules[3].

5 Seeking for the New Sense of Belonging

The seeking for the sense of belonging is not only caused by the change of mode of production, but also by the collapse of traditional moral system. The traditional Confucian morality is based on family piety, or the abeyance of the children to the parents. Nowadays, the situation has changed.

Acknowledgement

The author gratefully acknowledges the support of K. C. Wong Education Foundation, Hong Kong.

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王宽诚教育基金会
《学术讲座汇编》第 31 集,5 ~ 23(2010)

Computer Simulation of the Two-Body Abrasion Process Modelling the Particle as a Paraboloid of Revolution

FANG Liang[1,2*], LI Bo[1], ZHAO Jia[1], SUN Kun[1]

(1. School of Materials Science and Engineering, China University of Mining and Technology, Xuzhou 221116, Jiangsu, P. R. China;
2. The State Key Laboratory of Mechanical Behavior of Materials, Xi'an Jiaotong University, Xi'an 710049, P. R. China)

Abstract: Two-body abrasive wear is a process with strong stochastic characteristic. Abrasive particle geometry, distribution and worn surface morphology can only be statistically determined. Analytical solution always causes large inaccuracy. In this research, revolution parabolic particle geometry was applied to improve the old model of pyramid with semi-sphere tip. In the pyramid model normal load cannot be large enough to penetrate through the semi-sphere height. Generally, the diameter of semi-sphere is quite small in the real world. It is easily penetrated through. Therefore, it is necessary to construct a new particle model to expand normal load range. New contact equations were proposed to match the revolution parabolic particle geometry in the present model. Monte Carlo shooting method and finite elements method (FEM) were combined together to calculate wear rate of material during simulation. It has been shown that the linear wear rate was decreased continuously in running-in process and reached to a constant value after the running-in process. Roughness and worn surface morphology for simulated results also matched experimented data. Finally, a comparison between simulated and experimented wear data was made. Both data also matched very well.

Key words: two-body abrasion, finite elements method (FEM), Monte Carlo method, revolution parabolic particles

* 方亮,教授,中国矿业大学材料科学与工程学院。由王宽诚教育基金会资助,于 2008 年 9 月赴英国参加"第一届磨损过程国际会议",此为其向大会递交的论文。

1 Introduction

Wear, the progressive damage and material loss which occurs on the surface of a component as a result of its motion relative to the adjacent working parts, has far reaching economic consequences which involve not only the costs of replacement but also the expenses involved in machine downtime and lost production. As a result, considerable efforts have been expended on the development of theories and deterministic models. For example, Meng and Ludema[1] have identified nearly 200 "wear equations" involving an enormous spectrum of material properties and operating conditions. However, despite the best efforts of their authors, there is still no way of predicting, with confidence or certainty, the tribological performance of a loaded pair of surfaces, whether dry or lubricated, even if all of their physical and chemical properties have been independently established.

The response of a material to mechanical loading can be broadly classified as being either ductile or brittle. However, under the peculiar conditions generated under intensely loaded point or line contacts, a material may display very different forms of behaviour from those observed under less arduous testing conditions. In particular, because of the intense local compressive stress fields materials which are usually classified as brittle (such as ceramics) can show significant plastic deformation while those that are ductile can show greatly enhanced strains prior to failure. The practical difficulty of simulating the physical environment (principally this high containing stress which can be of the order of several GPa) within the zone immediately under a point or line contact under more carefully controlled test conditions has meant that there is a dearth of good material data which can be used with confidence in some of the mechanical models referred to above.

No simple and universal model is applicable to all situations. In the dry, unlubricated or perhaps marginally lubricated sliding of two, usually dissimilar, loaded surfaces, so-called two-body conditions, the rate of surface degradation or damage of each depends on many factors.

When a third body is present at the interface wear may be inhibited, though not entirely eliminated (for example if the third body is a lubricant or low shear strength film with a thickness dimension at least comparable with the mean surface roughness, or enhanced as in the case of contamination by entrained dirt) or even just the retained debris from previous wear events. Contamination by debris both harder and softer than the opposing solid surfaces are likely to be detrimental to the life of the contact though may involve different detailed mechanisms: the distribution of sizes, shapes and mechanical properties of the third bodies are all influential variables.

Two-body abrasion is a process during which hard particles or asperities cause matched surface damages during relative sliding. Although the two-body abrasion process is not more complex than the three-body abrasion process, it must be considered as a stochastic process because of abrasive particle shapes and their statistical distributions relative to the matched surface. Furthermore, the worn surfaces also exhibit strong statistical characteristics because of the statistical character of the abrasion process. The classical mathematical models can not easily predict the wear rate of worn materials.

Some models predicted a wear rate of materials at least one order of magnitude larger than the experimentally observed values. Therefore, in order to properly describe the two-body abrasion process, the stochastic process should be introduced. Some researchers have made successful attempts using stochastic models. Zhang and Xie[2-5] proposed surface roughness stochastic model of two-body pure microcutting wear. The construction of predicting two-body abrasion proposed by Liu and Xie[6] was based on Zhang's model. Unfortunately, it has not yet provided the experimental verification at present. Nicholls and Stephenson[7] established a Monte Carlo model of erosion processes. That work prompted us to do work on two-body abrasion by using a similar method.

Jacobson, *et al.*[8] used a random generator of computer to establish a statistical model of two-body abrasion. Their model has proved to be successful in qualitatively predicting the influence of wear parameters on wear rate, such as grit size, load and work piece hardness. Careful comparison of their simulation results with experimental values shows that the wear rates between them differ by one order of magnitude. The reasons for that are the following:

(i) Parameters of groove ridges pushed aside by abrasive particle have not been directly estimated in the model. They are only evaluated by an anti-inference method after completing the computing. That means pure microcutting wear mechanism is included in his model.

(ii) A constant cone angle and a constant tip radius of abrasive particles are assumed instead of random parameters. Jiang, *et al.*[9] also used the assumption of conical particles with round tips similar to Jacobson's particle model to propose a new two-body abrasion model. In that model, the ploughing mode is considered. The experimental data of Hokirigawa and Kato[10] were used to estimate the removal fraction of material from the groove. A wear rate of the same order of magnitude as the experimental values was predicted by his model. However, random parameters of particle geometry have not yet been applied although the tip radius and apex angle of particles are set down as real variables in Jiang's model.

In our previous research, a stochastic process because of abrasive particle shapes and their statistical distributions relative to the matched surface was simulated from a personal computer. Furthermore, the wear rates exhibit strong statistical characteristics because of the statistical character of the abrasion process during the simulation progress. A comparison between simulated and experimented wear data was made. Both data also matched very well. However, in the simulation progress with the pyramid model, the normal load can not be large enough to penetrate through the semi-sphere. Generally, the load afforded is too small that the computer simulation of two-body progress can merely be used in a narrow range. For more normal and significant use with the computer simulation, it is necessary to construct a new particle model to expand normal load range.

From the above literature survey, it becomes obvious that the introduction of a stochastic process into a two-body abrasion model contributes to quite satisfactory understanding of the two-body abrasive wear processes. In the present paper, a Monte Carlo method is applied to establish the model of two-body abrasion processes. The geometry parameters, height and position distribution of abrasive particle are all treated as random variables. The decreases of wear volume due to groove ridges pushed aside by abrasive particle are also taken into account in the present model. Finally, the proposed model is compared with experimental values of wear obtained from tests by the same author and references.

In this research, revolution parabolic particle geometry was applied to improve the old model of pyramid with semi-sphere tip. In the pyramid model normal load cannot be large enough to penetrate through the semi-sphere height. Generally, the diameter of semi-sphere is quite small in the real world. It is easily penetrated through. Therefore, it is necessary to construct a new particle model to expand normal load range. New contact equations were proposed to match the revolution parabolic particle geometry in the present model. Monte Carlo shooting method and finite elements method (FEM) were combined together to calculate wear rate of material during simulation. It has been shown that the linear wear rate was decreased continuously in running-in process and reached to a constant value after the running-in process. Roughness and worn surface morphology for simulated results also matched experimented data. Finally, a comparison between simulated and experimented wear data was made. Both data also matched very well.

2 Parabolic Particle Model

The fundament of the statistical approach derives from the observation that common engineering surfaces produced by standard machining process (*e. g.* ground surfaces) are characterized by a random topography. Starting from the pioneering work of Greenwood and Williamson[11], the surface asperities are often simulated with hemispheres assuming for the asperity heights opportune distribution functions (*e. g.*, Gaussian one). In this way, it is possible to obtain simple equations that allow fast contact analysis. However, the exactitude is strongly dependent on the assumption on asperity shape and heights distribution sometimes not so immediate.

Although GW model has been widely used to describe the asperity contacts, the necessary input date, that is summit asperity height deviation, mean radius and asperity density can not be easily calculated through the commercial roughness measuring equipment. A numerical procedure to calculate the input data of GW model is proposed in [12]. An extension of Nayak's theory to elliptic model of rough surface contacts is given in [13]. Several works show the effect that sliding contact can have on the stresses within a spherical contact[14]. Many have also focused on the adhesion between a sphere and a flat rather than the sliding interaction between two spheres[15].

Generally, the diameter of semi-sphere is quite small in the real world. It is easily penetrated through. In the pyramid model normal load can not be too large to penetrate through the semi-sphere height. Therefore, it is necessary to construct a new particle model to expand normal load range. In this research, revolution parabolic particle geometry was applied to improve the old model of pyramid with semi-sphere tip.

In the work of Aramaki, *et al.* [16], they proposed a model for roughness description representing measured rough profile with quadratic functions. This model, based on the parabolic indenter problem in elasticity, calculate the average pressure and the real contact area in a contact between two longitudinally rough surfaces. Every asperity is represented as a parabola with width L defined as the distance between two points at which the real asperity crosses a reference plane (see Fig. 1).

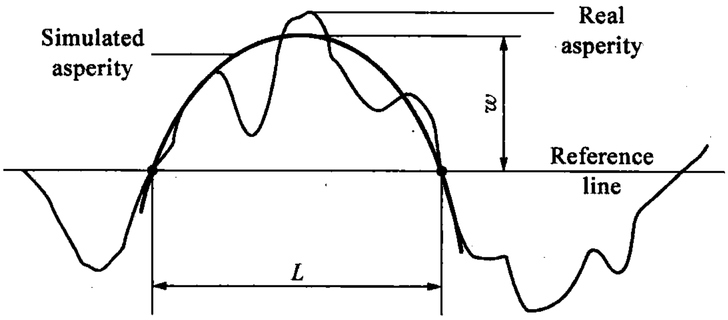

Fig. 1 Scheme of the approximation of an asperity

The analytical simulation of the surface morphology with a mathematical function makes it easy that the determination of important parameters such as the peaks curvature that can be used for solving contact mechanics problems. Five different models are presented and applied to five profiles obtained by profilometric analysis of some very different specimens used in dry and lubricated tests that had undergone some running-in or even wear. Simulation parabolic surface morphology gives better approximation of the profiles.

The proposed models describe the rough profiles by parabola functions obtained using simple parameters of roughness. Parabolas have been used for describing the peaks and the valleys. A different parabola is considered between each consecutive couple of points where the measured profile crosses the reference line and the corresponding heights are equal to zero. The analytical simulation of the profile with a mathematical function would have other transformations when matching special profiles obtained by specimens used in dry and lubricated tests and real cases. The mathematical functions are similar as follows:

$$y = a_1x^2 + a_2x^4 + a_3x^6 + \cdots.$$

3 Mechanical Expressions

Since a new particle model to expand normal load range is constructed. New contact equations are proposed to match the revolution parabolic particle geometry in the present model. The pioneering contribution to this field was made by Greenwood and Williamson[11], who developed a basic elastic contact model (GW model). In their model, a rough surface was represented by a population of hemispherically-tipped asperities of identical radius of curvature with their height following a Gaussian distribution. The basic asperity GW model has been extended to cover the case of other contact geometries based on contact-mechanics theories in conjunction with the continuity and smoothness of variables across different modes of deformation. Three deformation stages were studied individually by former works. The load is calculated as a function of the interference of each profile with a rigid smooth flat surface for single parabolic asperities.

Comparison between semi-sphere tip and parabolic tip.

Consider the contact between one asperity and a smooth flat. Let a and R stand for the radii of the sphere knocked in and the radii of the semi-sphere, respectively. Then, w is the contact interference. Equation is established as follows:

$$a^2 = R^2 - (R - w)^2 = 2Rw - w^2. \tag{1}$$

The interference w is an important variable that measures the extent of the asperity deformation. The contact pressure and contact area of the asperity are fully determined by this interference. According to the Hertz theory for the elastic contact of a flat, the asperity deforms elastically sufficiently small, as $R >> w$. Thus (1) is rewritten to give as

$$a^2 = 2Rw. \tag{2}$$

Then consider the contact between one asperity with parabolic tip and a smooth flat. The function of a parabolic profile is given as

$$w = \frac{h}{r^2} a^2, \tag{3}$$

where h is the height of a parabolic asperity, r the radii at the bottom. As w stands for the same contact interference in (2) and (3), the following expression is obtained for R, r and h,

$$R = \frac{r^2}{2h}. \tag{4}$$

Contact of a single parabolic asperity with a smooth surface.

The asperity will experience three distinct deformation stages as w increases: elastic, elastic-plastic and fully plastic. The distinct deformation stages can be divided by the elastic